DRAFT
FOCUSED REMEDIAL INVESTIGATION REPORT

OLIN CHEMICAL SUPERFUND SITE
51 EAMES STREET
WILMINGTON, MASSACHUSETTS

Submitted to:
United States Environmental Protection Agency
Region I – New England
One Congress Street
Boston, Massachusetts 02114

Submitted by: Olin Corporation 1186 Lower River Rd Charleston,TN 37310

Prepared by:

MACTEC Engineering and Consulting, Inc.
107 Audubon Road
Wakefield, Massachusetts 01880

Project No. 6300-06-0010

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Peter Thompson
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GLOSSARY OF ACRONYMS

3-D	three dimensional
ADA	azodicarbamide
Al	aluminum
AOC	Administrative Order On Consent
ARAR	applicable relevant and appropriate requirements
AS	air sparge
ASAS	applicable or suitably analogous standard
AST	above ground storage tank
ASTM	American Society for Testing and Materials
AUL	Activity and Use Limitation
AWQC	Ambient Water Quality Criteria
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BIPS	Borehole Image Processing System
BNA	base neutral acid
BRTP	Butters Row Treatment Plant
BTEX	benzene, toluene, ethylbenzene, xylenes
BWSC	Bureau of Waste Site Cleanup
Ca	calcium
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	cubic feet per second
Cl	chloride
CLP	Contract laboratory Program
CPT	cone penetrometer test
Cr	chromium
CRA	Conestoga-Rover and Associates
C-RAM	Construction-Related Release Abatement Measure
CSA	Comprehensive Site Assessment
CSL	Calcium Sulfate Landfill

GLOSSARY OF ACRONYMS - CONTINUED

cy	cubic yards
D	deep
DAPL	dense aqueous phase liquid
DCA	dichloroethane
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenylethylene
DDT	dichlorodiphenyltrichloroethane
DEP	Department of Environmental Protection
DPS	Downgradient Property Status
D-RAM	Drum Removal Release Abatement Measure
DRMA	Drum Area A
DRMB	Drum Area B
EJ	Environmental Justice
EMPA	Electron Micrograph Analysis
EOEA	Executive Office of Environmental Affairs
EPA	Environmental Protection Agency
EPC	Exposure Point Concentrations
EPH	extractable petroleum hydrocarbons
ERC	Ecological Risk Characterization
ES	Executive Summary
F	Fahrenheit
Fe	iron
FETEX	Frog Embryo Teratogenesis assay Xenopus
FFS	Focused Feasibility Study
floc	flocculant
FRA	Focused Risk Assessment
FS	Feasibility Study

GLOSSARY OF ACRONYMS - CONTINUED

FSC	Focused Site Characterization
ft	feet
GC/HRMS	Gas Chromatography and High Resolution Mass Spectrometry
GC/MS	gas chromatography/mass spectrometry
GEI	Geotechnical Engineers Inc.
gpd	gallons per day
gpm	gallons per minute
GPR	ground penetrating radar
GPS	global positioning satellite
GW	groundwater
HBHA	Hall's Brook Holding Area
HHRA	Human Health Risk Assessment
HI	hazard index
HLA	Harding Lawson Associates
HPLC	high pressure liquid chromatography
HQ	hazard quotient
HR/MS	high resolution/mass spectrometry
I	inside
ICE	Ion Composition Elucidation
IH	Imminent Hazard
IHA	Imminent Hazard Assessment
IHE	Imminent Hazard Evaluation
IRA	Immediate Response Action
IRSWP	Interim Response Steps Work Plan
Kempore	azodicarbonamide
kg	kilogram
Koc	partitioning coefficient to organic carbon matter

GLOSSARY OF ACRONYMS - CONTINUED

l	liter
LAW	Law Environmental
LCS	lab control sample
LGI	Layne Geosciences,Inc.
LNAPL	light non-aqueous phase liquid
LSP	Licensed Site Professional
M	intermediate
MACTEC	MACTEC Engineering and Consulting, Inc.
MADEP	Massachusetts Department of Environmental Protection
MADEQE	Massachusetts Department of Environmental Quality Engineering
MADPH	Massachusetts Department of Public Health
MBTA	Massachusetts Bay Transit Authority
MCL	Maximum Contaminant Level
MCP	Massachusetts Contingency Plan
MDG	million gallons per day
MDL	method detection limit
MEK	methyl ethyl keytone
mg	milligram
MLP	multilevel piezometer
MMB	Maple Meadow Brook
MMBA	Maple Meadow Brook Aquifer
MMH	monomethylhydrazine
Mn	manganese
MODFLOW	constant-density groundwater flow modeling
MP	multilevel piezometers
MPE	Multi-Phase Extraction
MS/MSD	matrix spike
MSL	mean sea level
MTBE	methyl-t-butyl ether
MWH	Montgomery Watson Laboratories
MWRA	Massachusetts Water Resources Authority

GLOSSARY OF ACRONYMS - CONTINUED

MWSW	municipal water supply well
Na	sodium
NBSD	New Boston Street Drainway
NCP	National Contingency Plan
ND	non-detect values
NDMA	n-nitrosodimethylamine
NDPA	n-nitrosodiphenylamine
NEPCO	New England Pollution Control Company, Inc.
NERL	National Exposure Research Laboratory
ng	nanogram
NH_3	ammonia
NIS	Nutrient Injection System
NJ	presumptive evidence
NOR	Notice of Responsibility
NPDES	National Pollution Discharge Elimination System
NPDWR	National Primary Drinking Water Regulation
NPI	National Polychemicals, Inc.
NPL	National Priority List
O	outside
Off-PWD	Off-Property West Ditch
OHM	Oil or Hazardous Material
OHMPC	Oil or Hazardous Material of Potential Concern
Olin	Olin Corporation
On-PWD	On-Property West Ditch
OPWD	Off Property West Ditch
Opex	dinitrosopentamethylenetetramine
ORNL	Oak Ridge National Laboratories
ORP	Oxidation-Reduction Potential
Ortho-photo	orthographically rectified photograph
OSRR	Office of Site Remediation & Restoration

GLOSSARY OF ACRONYMS - CONTINUED

OU	Operable Unit
OU1	Operable Unit 1
OU2	Operable Unit 2
OU3	Operable Unit 3
OVA	organic vapor analyzer
PAH	polycyclic aromatic hydrocarbon
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PCMP	Post Construction Monitoring Plan
PID	Photoionization Detector
PRG	Preliminary Remediation Goal
Property	Olin Property
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAA	Remedial Action Alternatives
RAM	Release Abatement Measure
RCRA	Resource Conservation Recovery Act
RfD	Reference Dose
RGP	Remediation General Permit
RI	Remedial Investigation
RTN	Release Tracking Number
S	shallow
SB	Sawmill Brook
SBC	
sec	second
SGT-HEM	silica gel treated n-hexane extractable
Shaw	Shaw Environmental

GLOSSARY OF ACRONYMS - CONTINUED

Site	The Olin Chemical Superfund Site
SLERA	Screening Level Environmental Risk Assessment
SMB	Sawmill Brook
SO_4	sulfate
SOP	Standard Operating Procedure
SOW	Statement of Work
SSPL	Site-Specific Parameter List
STL	Severn Trent Laboratory
SVE	soil vapor extraction
SVOC	semi-volatile organic compounds
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TMP	trimethylpentenes
TMP-1	2,4,4-trimethyl-1-pentene
TMP-2	2,4,4-trimethyl-2-pentene
TOC	total organic carbon
TP	test pit
TRV	Toxicity Reference Value
TSD	Treatment/Storage/Disposal
UCL	Upper Concentration Limit
UDMH	unsymmetrical dimethylhydrazine
Upper NBSD	upstream portion of the New Boston Street Drainway
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geologic Survey

GLOSSARY OF ACRONYMS - CONTINUED

UV	ultra-violet
VOC	volatile organic compounds
VPH	volatile petroleum hydrocarbons
WBV	western bedrock valley
WC	Wetland Complex
WSL	Woburn Sanitary Landfill

EXECUTIVE SUMMARY

ES-1.0 INTRODUCTION AND PURPOSE

This Executive Summary (ES) describes the Focused Remedial Investigation (RI) Report prepared for the Olin Chemical Superfund Site (the Site) in Wilmington, Massachusetts on behalf of Olin Corporation (Olin) by MACTEC Engineering and Consulting, Inc (MACTEC). The Site is comprised of the Olin Property (Property), an approximately 50-acre parcel, at 51 Eames Street in Wilmington, Massachusetts (Figure ES-1) and adjoining off-Property areas impacted by manufacturing and waste disposal activities at the Property. The northern part of this property was formerly the site of a chemical manufacturing facility.

The Site was listed on the National Priorities List (NPL) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 105, 42 U.S.C. ' 9605 on April 19, 2006 (71 FR 20,016). In September 2005, when the USEPA identified the Site as a Proposed Site for the NPL, the primary substance used by USEPA to score the Site was NDMA (USEPA, 2005). The primary exposure pathway evaluated by USEPA was groundwater. Other principal contaminants noted by EPA included chloride, sodium, sulfate and ammonia. Environmental contamination has migrated to surface water at on-Property locations by groundwater pathways. Prior to the NPL listing, the Site has been the subject of many years of investigations and response activities carried out by Olin Corporation and supervised by Massachusetts Department of Environmental Protection (MADEP) under Chapter 21E of the General Laws of Massachusetts and the Massachusetts Contingency Plan (MCP). The Site has been a Priority site under the MCP since 1993, and a Tier I site since 1994

Respondents, Olin Corporation, American Biltrite Inc., and Stepan Company have voluntarily entered into an Administrative Order On Consent (AOC) with the United States Environmental Protection Agency (USEPA) to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the Site. The effective date of the AOC is July 3, 2007. The Scope of the RI/FS is described in the Statement of Work (SOW), Remedial Investigation and Feasibility Study, Olin Chemical Superfund Site, prepared by the USEPA Region I – New England and dated June 28, 2007.

The USEPA recognizes that a significant amount of Site data and other information has already been collected during prior environmental sampling and response activities performed by Olin

under the MCP. The purpose in preparing this Focused RI Report is to avoid duplication of previously completed efforts and maximize the efficiency of future RI data collection activities. This purpose is accomplished by merging previously compiled environmental reports, results of testing, and other relevant information, into Operable Unit (OU) specific summaries and providing an evaluation of existing data relative to spatial coverage and EPA data quality and usability objectives. The Focused RI report identifies existing data uncertainties and gaps and provides recommendations for future work

Due to the technically complex nature of the cross-media impacts at the Site, EPA has subdivided the Site into three OUs described as follows.

- Operable Unit 1: OU1 is defined as the approximately 50-acre Olin Property including the former facility area, the established conservation area, the on-Property ditch system, the Calcium Sulfate Landfill, and the Slurry Wall Containment Area.

- Operable Unit 2: OU2 is defined as off-Property surface water and sediment areas, including at a minimum, the off-Property East Ditch, South Ditch, and West Ditch. This operable unit will also includes surface water and sediment in portions of Maple Meadow Brook and Sawmill Brook.

- Operable Unit 3: OU3 is defined as all on- and off-Property groundwater areas including Maple Meadow Brook Aquifer, groundwater beneath the Olin Property, and groundwater located south and east of the Olin Property.

ES-1.1 HISTORY OF OPERATIONS AND SITE BACKGROUND

The following paragraphs summarize the history of ownership and operations at the Property and provide site background information including a summary of Site surface water, geology and groundwater features that make up the Operable Units that define the Site.

Ownership and History Operations

The Olin Chemical Superfund Site includes the Property and adjacent off-Property areas that have been impacted from former chemical releases from the Property. The Property is located in a heavily industrialized area within the southern portion of the Town of Wilmington and is the location of a former manufacturing facility that produced specialty chemicals for the rubber and plastics industry from 1953 to 1986. From 1953 to 1980 the facility was owned by several

companies whose operations resulted in environmental contamination to on-Property soil, groundwater, sediment, and surface water.

The chemical manufacturing facility was constructed in 1953 and was operated by National Polychemicals, Inc. (NPI). From 1953 to 1968 the business conducted by NPI was owned by three different corporations: American Biltrite Rubber Co., Fisons Limited, and Fisons Corporation, now known as NOR-AM Agro LLC. In 1968 Stepan Chemical Company bought the business, and continued to operate the facility until 1980, when the facility was purchased by Olin Corporation. Olin submitted closure plans for the plant facilities to MADEP and USEPA in April 1986 and closed the facility in the same year. After Olin initiated closure of the site in 1986, the chemical manufacturing buildings were demolished and removed along with the closure of the lined lagoons. Olin remains the current owner.

Since 1987 Olin has conducted numerous environmental investigations, risk assessments and remedial actions to develop an understanding of the nature of environmental impacts and to protect human health and the environment. These investigations and remedial actions were carried out by Olin Corporation and supervised by MADEP under Chapter 21E of the General Laws of Massachusetts and the MCP. The investigations and assessments were based on data collected and analyzed in accordance with work plans approved by the MADEP. The data generated for the Site are of known data quality and usability as determined by data validation procedures that met the MCP requirements.

Between 1953 and approximately 1970, liquid wastes generated at the chemical factory were disposed of in unlined pits on the northern half of the property and percolated into the soil or overflowed into on-Property ditches. These pits included Lake Poly, East and West Pits and the Acid Pits (Figure ES-2). The former manufacturing processes generated liquid wastes which contained sulfuric acid, sodium chloride, sodium sulfate, ammonium chloride, ammonium sulfate, chromium sulfate and other constituents. Sodium dichromate was used in the Kempore ® process and acidic wastes containing chromium were discharged until 1967 Former manufacturing operations included Plants A, Plant B, Plant C-1, C-2, C-3, and Plant D. In the early 1970's a wastewater treatment plant was installed.

The liquid wastes had high concentrations of dissolved inorganic constituents and fluid densities greater than water allowing these dense liquids to penetrate the underlying overburden water table

and migrate vertically to the bedrock surface, where a dense aqueous phase liquid (DAPL) pooled in bedrock depressions. The DAPL material, which moved primarily in response to gravity, migrated to the west and northwest within a sloping bedrock valley (the Western Bedrock Valley) and remains as several isolated DAPL pools in bedrock depressions located both on- and off-Property. These DAPL pools include the Upper DAPL pool located partially on-Property, the Main Street DAPL Pool, and the Western Bedrock Valley DAPL Pool. The migration of this dense fluid was accompanied by extensive convective mixing with groundwater and an extensive area of dissolved DAPL constituents resulted in the deeper sections of the overburden aquifer. The primary constituents associated with these chemical releases include inorganic compounds, although specific volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were also associated with chemical processes used at the Property. The DAPL is characterized by low pH, high concentrations of total dissolved solids, and its principal inorganic constituents include sodium (Na), calcium (Ca), chloride (Cl), iron (Fe), manganese (Mn), sulfate (SO_4), ammonia (NH_3), aluminum (Al), and chromium (Cr). The DAPL and the groundwater that immediately overlies DAPL contain low level concentrations of VOCs and SVOCs. VOCs that are most commonly detected include acetone, bromoform, 2-butanone, 2-hexanone, toluene and trimethylpentenes. SVOCs most commonly include benzoic acid, bis-2-ethylhexlphathalate (BEHP), phenols, naphalene, n-nitrosodiphenylamine (NDPA), and n-nitrosodimethylamine (NDMA). Since the emplacement of the DAPL the primary mechanism for release of these solutes from the DAPL is chemical diffusion, which is a slow and inefficient mass transfer process. Several of the DAPL constituents and in particular chromium are rapidly attenuated by geochemical reactions which take place as solutes move over a several foot distance from the low pH environment of the DAPL to the buffered pH conditions of overlying groundwater.

Currently, the approximate 50 acre Property is largely undeveloped and contains a vacant office and laboratory building, two warehouses, a building which houses a groundwater recovery and treatment facility (Plant B), and a closed landfill (Calcium Sulfate Landfill). In 2006, Olin installed a 40-foot office trailer near Plant B for use by the Olin employees who operate Plant B and maintain the Property. These operations are conducted during most weekdays during daytime hours. Property access is controlled along the entire Property perimeter by an eight foot high fence and all access gates are locked when Olin employees are not on the Site.

Numerous remedial activities have been conducted at the Facility and the history of investigations is summarized in Section ES-1.2. These investigations and subsequent remedial actions have

resulted in the excavation and off-site disposal of contaminated soil from Lake Poly, two Drum Disposal Areas and a Buried Debris Area and impacted sediment from the on-Property West Ditch, the on-Property West Ditch Wetland, the South Ditch, and the Central Pond. All removal actions were conducted in accordance with work plans approved by the MADEP and soils and sediments were manifested, transported and disposed of at facilities licensed and approved for such materials. An area of trimethylpentenes in soil and shallow groundwater known as the EPH/VPH area (referring to Extractable petroleum Hydrocarbons and Volatile Petroleum Hydrocarbon analyses) and located near Plant B was identified and successfully remediated using an air sparge/ soil vapor extraction system (AS/SVE) that was closed subsequent to approval by the MADEP.

Since 1997 Olin and its predecessors have operated the Plant B groundwater recovery/treatment system as an Immediate Response Action (IRA) under the MCP. The system was installed in response to the seepage of a light non aqueous phase liquid (LNAPL) into the East Ditch that is located at the eastern perimeter of the former facility property. The LNAPL is a process oil that contains BEHP, NDPA, and trimethylpentenes. The system was designed to create a groundwater cone of depression to prevent migration of the LNAPL and allow for mechanical removal of the material. Groundwater extracted during operation of the system is treated to remove iron and ammonia as well as dissolved organic compounds. The treated groundwater is discharged to surface water on the former Facility property in compliance with a Remediation General Permit (RGP). The system is currently proposed for a monitored shut down test as the LNAPL recovery has reached a practical endpoint and the remaining LNAPL is increasingly immobile.

In 2000/2001 Olin constructed a Slurry Wall/Cap containment structure around the on-Property portion of the Upper DAPL Pool as a Release Abatement Measure (RAM) consistent with the MCP. The intent of this source control action was to eliminate, to the extent feasible, the on-Property DAPL source material as a source of dissolved constituents to groundwater. The containment structure is comprised of a perimeter slurry wall keyed into bedrock and a temporary cap to minimize infiltration of precipitation into the containment area. Construction of the slurry wall was preceded by a pre-design boring program to determine the depth to bedrock. The slurry wall fully contains the on-Property DAPL and overlying groundwater located within the containment structure.

Surface Water

Surface water bodies within the Site include Sawmill Brook and Maple Meadow Brook which are within the Ipswich River Watershed and not hydraulically connected to the Property. These surface waters are located several thousand feet northwest of the Property and are not impacted by chemicals released from the Property. Other surface water bodies within the Site include Central Pond, the on-Property and off-Property Ditch System that are located within the Aberjona River Watershed. The central portion of the Property is bounded on the west side by the off-Property West Ditch and on the east side by the East Ditch. The East Ditch is the drainage within the Massachusetts Bay Transit Authority (MBTA) Railroad line that borders almost the entire eastern side of the Olin Property. The central portion of the site is bisected by the Ephemeral Drainage and South Ditch. The South Ditch connects the off-Property West Ditch and the East Ditch. A stormwater detention basin was constructed by Olin prior to constructing the Slurry/Wall Cap containment area. This detention basin is between the containment area and South Ditch. Another portion of the ditch system is the on-Property West Ditch, which has been remediated, relocated and culverted. Flow from this ditch still flows into the South Ditch. A weir located in the Upper South Ditch raises water levels in the off-Property West Ditch, effectively mitigating the discharge of contaminated groundwater to that ditch. Some groundwater which contains DAPL-related constituents discharges to the on-Property South Ditch, which flows off-Property to the East Ditch and downstream to the New Boston Street Drainway and Halls Brook.

Geology

Shallow regional geology of the Site includes peat and unconsolidated glacial deposits overlying crystalline metamorphic and igneous bedrock formations. The unconsolidated units include organic silts, ice contact deposits, outwash deposits and glacial till. Bedrock below the overburden deposits includes late Proterozoic age mafic meta-volcanic rocks and gabbro-diorites. A large regional fault zone, named the Bloody Bluff Fault underlies the area and its presence and glacial erosion of the bedrock have combined to form a buried bedrock valley known as the Western Bedrock Valley which is located under the Site.

Groundwater

Groundwater occurs in two primary geologic units including the unconsolidated sand and gravel deposits and the underlying fractured crystalline bedrock. The unconsolidated overburden deposits are locally heterogeneous, however over the Site scale these sand and gravels are found to exhibit fairly uniform properties (Geomega, 2001a)typically with high porosity and permeability, and are

capable of transmitting large quantities of water. Approximately 2,000 feet northwest of the Property under the Maple Meadow Brook (MMB) wetland, the unconsolidated deposits attain appreciable thicknesses and form a highly transmissive, though shallow, overburden aquifer above the Western Bedrock Valley. Groundwater in bedrock occurs principally in secondary porosity features (e.g., fractures) as the bedrock has limited primary porosity. Where studied, the bedrock groundwater system has low permeability and low yield and transmits a small amount of groundwater compared to the overburden aquifer. With respect to the bulk movement of groundwater within the hydrogeologic system, the bedrock system likely contributes an insignificant amount of groundwater compared to the overburden aquifer. The water balances related to the groundwater system have been evaluated by a groundwater flow model and the details of groundwater modeling are described in the Sections 2 and 3, and in Appendix B of this Focused RI Report.

Due to the high permeability of the shallow overburden deposits, the shallow groundwater is influenced by surface water features; with less influence being transmitted to the deeper water bearing zones. A groundwater divide bisects the Site and the northern half of the Olin Property, from north east to south west. The location of the divide is sensitive to relatively small changes in groundwater elevation and moves laterally seasonally in response to changing precipitation patterns. Groundwater within the Site flows away from this divide both to the northwest towards the Ipswich River Watershed and to the southeast toward the Aberjona River Watershed. Below the former Facility, on the southeast side of this divide, groundwater flow is generally from northwest to southeast, with a small zone of radial flow, from a small groundwater mound, in the north end of the Property. On the northeast side of the Property, on the east side of this localized groundwater mound, groundwater is captured by the Plant B groundwater extraction system. For the remaining areas within the Property, groundwater flows to the south and southeast and discharges to surface water within the South Ditch and the East Ditch.

At the southwestern corner of the Property, a small groundwater divide is present underlying the Calcium Sulfate Landfill. Groundwater moves both to the southwest and to the east-northeast from this divide.

North and northwest of the seasonal groundwater divide, groundwater flows northwest and north toward the MMB Wetland. Groundwater recharge to the MMBA includes contributions from areas bordering Main Street and the landfill on the Spinazola Trust Land and surrounding upland areas.

Groundwater entering the MMBA from the south eventually turns to flow northeast following MMB after its confluence with Sawmill Brook.

Vertical gradients within the overburden groundwater system have been measured at numerous vertical well couplets in on-Property and off-Property areas. In general, vertical head potentials are weakly downward or neutral between shallow and deep overburden groundwater. Upward vertical head potentials are only present within or in the immediate adjacent vicinity of gaining surface water bodies such as the MMB, Sawmill Brook, and South Ditch, where groundwater discharges.

Since 1960, the town of Wilmington operated a municipal water supply well field within the northern edge of the MMB aquifer. Groundwater within the zone of contribution of the Wilmington water supply wells (Zone II) is classified as GW-1 groundwater under the MCP. These distinctions are discussed in detail in Section 3.0 and 4.0. The water supply study that determined the Zone II boundary was completed by a consulting firm for the Town of Wilmington in 1990 (IEP, 1990). The Zone II area includes the northeastern portion of the Property, including Plant B, extending northwest over most of the MMB wetland west and north of Main Street and Eames Street and falls within the Ipswich River Watershed. Groundwater outside the Zone II includes the remainder of the Site, including most of the Property and areas extending to the south and east.

Groundwater within the zone of contribution of the Wilmington water supply wells (Zone II) is classified as GW-1 groundwater under the MCP. These distinctions are discussed in detail in Section 3.0 and 4.0. The water supply study that determined the Zone II boundary was completed by a consulting firm for the Town of Wilmington in 1990 (IEP, 1990). The Zone II area includes the northeastern portion of the Property, including Plant B, extending northwest over most of the MMB wetland west and north of Main Street and Eames Street and falls within the Ipswich River Watershed. Groundwater outside the Non-Zone II includes the remainder of the Site, including most of the Property and areas extending to the south and east.

Massachusetts has promulgated drinking water quality regulations, including Massachusetts Drinking Water Standards (including Massachusetts Maximum Contaminant Levels (MCLs), that are in large part based on Federal National Primary Drinking Water Regulations (NPDWRs). These standards are applicable to public water supplies. Massachusetts also publishes Drinking Water Guidelines for substances without MCLs that are used by MADEP and municipal water providers

to evaluate public water supplies. These guidelines are not incorporated into regulation but are used often to evaluate contamination of water supplies or water supply sources.

In addition to the drinking water standards, MADEP has also published, per the MCP, standards that are applicable at monitoring wells and water supply wells within category GW-1 groundwater areas. Per the MCP, in a Method 1 Risk Assessment-based evaluation, GW-1 standards are applicable cleanup standards for GW-1 areas. Also, per the MCP, in a Method 3 Risk Assessment-based evaluation, the Massachusetts MCLs are considered applicable public health standards in category GW-1 groundwater areas. Therefore, the Massachusetts MCLs, Massachusetts Drinking Water Guidelines, and the MCP GW-1 groundwater standards are relevant numerical criteria for evaluating nature and extent of contamination within the Zone II groundwater area (also classified as category GW-1 per the MCP). These same numerical criteria are not relevant outside the Zone II area, since those areas are not current or potential drinking water sources.

The Town of Wilmington operates a public water system that includes the Butters Row Treatment Plant (BRTP) and five wells within the MMBA including the Chestnut Street No. 1 and No. 1A/2 wells, the Butters Row No. 1and No. 2 wells, and the Town Park Well. The BRTP also treats water from one other well designated as the Shawsheen Avenue Well

The wells were not in use immediately prior to sampling in February 2003. During 2002, the Town wells were in use intermittently, with certain wells being taken off-line by the town during different time periods in response to concerns of potentially exceeding nitrite standards in the distribution system. In October 2002, the town ceased use of all the wells (except Town Park) in the MMBA. In February 2003, the Town activated the two Butters Row wells and the two Chestnut Street wells and pumped them to waste for two days to allow collection of raw water samples (untreated) from these wells on February 26, 2003. A raw water sample was also collected from the Town Park Well that was in operation prior to and after the sampling. The results of the NDMA analysis of raw water samples from these wells ranged from not detected (ND) in the Town Park Well (reporting limit of 0.000002 mg/L) to 0.000166 mg/L. The MADEP office of Research and Standards derived a water guideline for NDMA for a thirty year exposure period at a concentration of 0.000010 mg/L (10 ng/L) and an immediate action level of 0.000200 mg/L (200 ng/L). Although detected concentrations of NDMA were below the immediate action level, based on these sampling results, the Wilmington Water Department suspended operation of all five wells in the MMBA in April 2003. The five MWSWs have remained off-line since February 2003.

On February 25, 2003, samples were collected from the Butters Row Treatment Plant (untreated incoming water & treated water leaving the plant) and analyzed for NDMA. Additionally, eleven samples from the distribution system and storage tanks were collected and analyzed for NDMA. NDMA was not detected in any of these samples at a reporting limit of 0.000002 mg/L (2 ng/L).
At the time of this sampling, water from the Shawsheen Avenue Well and the Town Park Well was being treated at the Butters Row Treatment Plant.

Even though the wells were below the immediate action level, based on these sampling results, Olin worked with the town of Wilmington to develop a supplemental water source through a water purchase agreement from adjacent communities. This supplemental water source remains in service. In order to provide a permanent supply, the town is currently constructing a new connection to the MWRA system that is funded by Olin and the other respondents. Tentative completion of this line is scheduled for the end of 2007.

ES-1.2 HISTORY OF INVESTIGATIONS

Investigations have been conducted at the Site by several parties since the mid 1970s. Olin became involved in the investigation and remedial activities at the Site after its purchase of the facility in 1980. Most of the pre-1980 investigations were related to wastewater, groundwater, and surface water as well as the development and operation of the Calcium Sulfate Landfill (CSL). Earlier investigations and associated reports included groundwater and surface water investigations described in the document titled Report on Groundwater and Surface Water Study, Stepan Chemical Company, Wilmington, Massachusetts (Geotechnical Engineers, Inc. (GEI), 1978)), soil and groundwater investigations along the eastern boundary of the facility concerning the LNAPL release in that area (New England Pollution Control Company (NEPCO), 1980), and the USEPA's Site Inspection Report for the Facility in December 1980 (Ecology & Environment, 1980) which focused on water pollution control and RCRA compliance. A Phase I Site Inspection Report for the Facility was prepared for the Massachusetts Department of Environmental Quality Engineering (MADEQE) in 1986 (Wehran Engineering Corp., 1986). Olin conducted response actions to mitigate and control migration of LNAPL at the Plant B area in response to the 1980 Site Inspection Report. The LNAPL containment system was installed in 1982.

The Site was officially identified as a site subject to the Massachusetts Contingency Plan (MCP) in a Notice of Responsibility letter from MADEP on May 28, 1992 (MADEP Release Tracking Number 3-0471). Subsequently, investigations and response actions at the Site have been conducted per the requirements of the MCP. The MCP requires a phased approach to site investigation and remediation that is modeled after the USEPA's National Contingency Plan (NCP). The 1993 Comprehensive Site Assessment Report, hereafter referred to as the 1993 CSA (Conestoga Rovers Associates (CRA), 1993), was focused on potential sources or release areas identified as Solid Waste Management Units (SWMUs). The investigations leading to the preparation of the 1993 CSA was the first investigation at the Site conducted under MCP requirements. This CSA was the report referred to in the MCP as the "Phase II Comprehensive Site Assessment". This MCP submittal was subsequently augmented by investigations intended to delineate nature and extent of release of oil and/or hazardous materials and to characterize the representative concentrations in environmental media to support risk characterizations and evaluation of remedial requirements. These supplemental investigations were conducted in a manner that is in substantive compliance with both the National Contingency Plan (NCP) and the Massachusetts Contingency Plan (MCP).

The 1997 Supplemental Phase II Report (Smith, 1997) was a comprehensive report of the supplemental investigations conducted for the MCP Site. Supplemental Phase II investigations have continued since the 1997 Supplemental Phase II Report. During that time, a number of response actions (including investigations, risk assessments, removals, and other remedial activities) have been conducted. They consisted of two types of MCP interim response actions: Immediate Response Actions (IRAs); and Release Abatement Measures (RAMs). These types of interim response actions address items that require immediate response and allow for implementation of prudent response actions prior to completion of all investigation and feasibility study activities. A number of monitoring programs have also been implemented in conjunction with these IRAs. The MCP investigations and response actions were directed by Licensed Site Professionals (LSPs) and the work was performed consistent with scopes of work that were approved by MADEP. Documentation of the Site investigations were submitted to MADEP during the course of these MCP activities for review and approval.

Previous investigations have included the following: surface features; contaminant source investigations and removal actions; meteorological investigations; surface water and sediment investigations; geological investigations; soil and vadose zone investigations; groundwater

investigations; indoor air investigations; biota; human population surveys; and ecological surveys. In addition, a substantial amount of work has been conducted in the modeling of the groundwater environment for the Site Table ES-1 presents a list of a number of the more comprehensive Site investigations conducted to date which have resulted in important advances in understanding the nature and distribution of contaminants within Site environmental media.

Section 2.0 of this Focused RI Report summarizes the investigations (including those associated with IRAs) conducted to date and Section 4.0 (Nature and Extent of Contamination) and Section 5.0 (Fate and Transport) present and summarize the findings and conclusions of many of the investigations that are discussed in Section 2.0. Many of the investigations and interim response actions have included human health and/or ecological risk assessments. The results and conclusions of these risk assessments are briefly summarized in Section 6.0. The risk assessments are more fully summarized in Appendix F.

The investigations conducted to date have been comprehensive and they have been conducted using techniques and procedures that are consistent with standard practice in the environmental investigation industry. To date, more than 500 soil samples, hundreds of surface water samples, and more than 100 sediment samples have been collected and analyzed. More than 120 monitoring wells have been installed, sampled, and analyzed over a thirty-year period. Several thousand groundwater samples have been analyzed during the investigations. Samples have been analyzed using USEPA and MADEP chemical analytical methods applied by certified laboratories and the analytical data have undergone chemist reviews and data validation. All of these investigations have been conducted to characterize nature and extent of contamination, to support assessment of human health and ecological risks, and to evaluate the need for interim response actions and remedial actions.

ES-1.3 NATURE AND EXTENT OF CONTAMINATION

The following subsection summarizes the nature and extent of contamination in soil, surface water, sediment and groundwater. These sections are preceded by a brief summary of the Site Conceptual Model.

ES-1.3.1 Conceptual Site Model Summary

A comprehensive series of investigations of the Site and response actions at the Property have been conducted. Previous work has led to the development of a substantially complete Conceptual Site Model that:

- relates the historic facility operations to impacts to soil, sediment, surface water and groundwater quality,
- explains the manner in which DAPL formed and migrated to its current locations,
- documents that DAPL Pool elevations are stable,
- demonstrates that the measured concentrations of solutes in the diffuse layer above the DAPL are consistent with the expected concentration based on the theoretical flux due to chemical diffusion processes,
- documents how geochemistry has and will continue to effect solute transport of chromium,
- documents and explains the vertical distribution of solutes in groundwater with respect to transport mechanis
- defines the completed groundwater migration pathways, the location and extent of the interaction of impacts to surface waters, including the mechanisms of floc formation and the stable nature of all precipitated chromium bearing minerals,
- documents that volatile compounds in groundwater do not present risks to atmospheres within building structures, and
- defines the lateral and vertical extent of groundwater impacts and documents that impacted groundwater is not in use for consumption by the public,

The disposal of process wastes within unlined basins at the facility resulted in the formation of a series of DAPL pools in bedrock depressions within the WBV underlying the Site. The subsurface migration of DAPL impacted waters also resulted in a broader area of deeper contamination in groundwater, which owing to the higher density of these constituents, has settled within and occupied the lower stratigraphic portions of the overburden groundwater system. The disposal activities also resulted in contaminated soil above the water table, much of which has been remediated by a series of removal actions. Process waters overflowing the surface impoundments flowed into the on-Property Ditch system and to the East Ditch and contaminated the sediments within those ditches. Subsequently, the on-Property West Ditch was remediated and relocated, and the on-Property South Ditch was remediated by excavation to a point down stream known as the delta. Sediments beyond that point were not removed based on results of risk assessments. The principal contaminants of concern in sediments were chromium and BEHP. The sediments that

were removed were disposed off-site at a facility licensed and approved to receive such materials. The MMB and Sawmill Brook areas are not connected by surface water pathways to the Property and were not affected by disposal activities on the Property.

DAPL is a material that has a specific gravity greater than 1.025 with an acidic pH and contains chromium and a high concentration of dissolved solids. The transfer mechanism of constituents from DAPL to overlying groundwater is chemical diffusion, a slow and inefficient mass transfer process. The DAPL pools are contained by bedrock saddles and the pool elevations have remained stable based on over a decade of monitoring data. Since the transfer rate of DAPL related constituents is limited by diffusion processes, the areas of impacted groundwater have maintained consistent chemical concentration profiles both laterally and vertically within the overburden aquifer system. Within the thicker MMB aquifer, vertical gradients between shallow and deep groundwater are typically neutral to slightly downward. Shallow groundwater and surface water within the MMB area are not impacted by site-related contaminants. Site related contaminants are detected in intermediate depth groundwater and deep groundwater. Site-related contaminants in groundwater within the MMB aquifer include NDMA, bis-2ethylhexyl phthalate (BEHP) chromium (Cr), calcium, sodium, ammonia, sulfate and chloride. Chromium in groundwater is rapidly attenuated by geochemical reactions that cause the formation of Al-Cr hydroxides, and sulfates that precipitate in the aquifer in proximity to the margins of the DAPL pools. The other constituents in groundwater have a consistent lateral and vertical distribution within the WBV in the MMB aquifer.

In vicinity of the Property, and in particular areas underlying the Upper South Ditch and Ephemeral Drainage, the overburden aquifer has a substantially thinner saturated thickness, and the “deeper” impacted groundwater is in closer proximity to ground surface and surface water bodies. Due to these physical relationships, the vertical hydraulic gradients directly under the Upper South Ditch penetrate the groundwater system sufficiently deep to capture groundwater with appreciably higher solute concentrations. Groundwater discharging in the vicinity of Upper South Ditch downstream of the weir contains ammonia, chloride, sulfate, aluminum, calcium, sodium, chromium and NDMA. As this groundwater discharges and mixes with surface water inflows from the off-Property West Ditch or the Plant B discharge, the pH of the mixed water increases favoring the precipitation of hydrated Fe-Al-Cr sulfate minerals (redingtonite), and Cr-bearing Al hydroxides (gibbsite), and hydrated iron hydroxides. These minerals form flocculants (floc) that aggregate on the bottom of South Ditch and are transported with surface water through scour erosion and

deposition. Some of this floc becomes incorporated into sediment and flood plain soils in downstream areas. The floc is chemically and thermodynamically stable under normal stream conditions. The discharging groundwater also results in elevated inorganics and metals in surface water, in particular ammonia, and semi-volatile organic compounds, principally NDMA. Chromium concentrations in surface water decline rapidly due to the geochemical precipitation reactions described previously.

Approximately 300 feet downstream from the weir, the Upper South Ditch bends around the storm water detention basin that was constructed between the containment area and the ditch. Bedrock outcrops adjacent to South Ditch approximately 350 feet down stream of the weir on the backside of the detention basin, which was partially blasted out of the bedrock. Within this 300 foot upper reach of the stream, groundwater typically discharges. Beyond this point, in vicinity of the shallow bedrock and Central Pond the stream varies between gaining and losing conditions. Across from the East End of Central Pond, vertical gradients are dominantly downward indicating losing conditions in the stream. The central portion of the stream will often go dry in summer months as the groundwater surface drops below the stream bottom. Near the eastern property boundary, the Lower South Ditch again predominantly becomes a gaining stream, at the southern end of the Central Wetland.

The Ephemeral Drainage is not as active as a discharge area, although it forms a wetland that is supported by groundwater discharge and surface water run-off. Thus surface water in the Ephemeral Drainage is generally not impacted by site-related contaminants from groundwater.

The East Ditch typically contains surface water over most of its length upstream of its confluence with South Ditch and is a flowing stream downstream of the confluence with South Ditch. Thus the East Ditch is expected to act as an overburden groundwater flow boundary on the east side of the Property. Groundwater migrating east and off the Property is expected to flow parallel to and discharge to the East Ditch. The discharge of groundwater to these drainages to the east and southeast of the Property controls the downgradient extent of impacted groundwater.

NDMA that discharges to surface water in the South Ditch migrates with surface water until it is attenuated by dilution of cleaner groundwater discharge and photo-degradation by sunlight. Although the photo-degradation rate constants are relatively rapid, the rate of attenuation is dependent on water depth, turbidity, and intensity of sunlight exposure. Chromium in surface

water is attenuated by precipitation and ammonia is attenuated by dilution, and nitrogen fixing aquatic plants and algae during growing seasons. Ammonia is also produced naturally in anaerobic wetland environments.

ES-1.3.2 OU1 Soil

The nature and extent of contamination in surface soil and subsurface soil at the former Facility is closely related to the historical manufacturing and waste disposal activities, particularly those Site features that have been identified as sources or potential sources of chemicals to the environment. A number of sources at the Site have previously been discussed in Sections 1.0 and 2.0. Those sources that have the greatest potential to impact soil at the facility include Drum Area A, Drum Area B, the Buried Debris Area, Lake Poly, the East and West Pits, the Acid Pits, the Plant B LNAPL area, and the Plant B EPH/VPH area (former Plant B location).

A number of remedial actions have been conducted to address several of these major sources as well as some other areas of localized contamination that had been identified during the Site investigations. These actions resulted in removal of impacted soils, waste materials, and volatiles from soils and they have had a positive impact with respect to nature and extent of soil contamination at the Facility. In particular, the following actions were conducted and as a result removed impacted soil from the Facility:

- Lake Poly Soil and Waste Material Removals during the Construction-Related RAM (C-RAM);
- Drum Areas A and B and Buried Debris Area Soil and Waste Material Removal during the Drum Remocal RAM (D-RAM);
- Backfilling and regarding of the area within the footprint of the slurry wall containment structure and cap;
- Removal of the soil hot spot at locations RSO-6 and A8-CW-1;
- Removal of oil-impacted soils from the banks of Central Pond during the C-RAM;
- Removal of soil from most of SWMU-27 during excavation activities in the West Ditch Wetland and Lake Poly (C-RAM);
- Removal of trimethylpentenes from subsurface soils by air sparging/soil vapor extraction at the EPH/VPH area at Plant B.

ES-1.3.2.1 Soil Background Conditions

Site-specific background conditions for soil were characterized prior to the 1997 Phase II Report. That investigation focused on specific indicator parameters that were not addressed by the Massachusetts soil background characterization published by MADEP (MADEP, 1995a). Background conditions for inorganics and metals in soils have been characterized by a combination of the site-specific background investigation and documents concerning soil background conditions published by MADEP in 1995 and 2002. The 2002 document (MADEP, 2002a) included background concentrations for PAH compounds in addition to the inorganics and metals. To date, background soil conditions for VOCs, pesticides PCBs, and SVOCs other than PAHs were considered to be "not detected". A separate background investigation and assessment was conducted for arsenic in soils. A comparison of Site soil arsenic concentrations to the MADEP background data set for arsenic and to the site-specific background data set concluded that on-Property surface and subsurface soil arsenic concentrations were not significantly different statistically from background conditions (HLA, 1999).

ES-1.3.2.2 Surface Soil – Current Conditions

The nature and extent of contamination at the Property has been characterized by numerous investigation events and programs. The investigations have been focused on the Property and not on the surrounding areas. The investigation of soils at off-Property areas was not conducted because the physical characteristics of the Property and surrounding area and the history of the Facility indicate that off-property impacts to soil are unlikely. The facility is (and has been historically) bounded to the north by Eames Street and other industrial properties; to the east by the East Ditch and the MTBA commuter rail line; to the south by the Woburn landfill and higher elevation land; and to the west by the off-PWD and the Boston and Maine rail line (higher elevation land than the Facility). Overland migration of soil contaminants and deposition on soils at adjacent properties is unlikely because there are physical barriers (higher land elevation and structures such as roads and rail lines) that would prevent such migration. Potential migration of impacted soil material via erosion and/or storm water drainage has been addressed by investigations of the ditch system which would be the primary conduit for such migration.

Figure ES-3 indicates the locations of soil samples that have been collected at the Site. Three hundred twenty four surface soil samples have been identified as representative of current, post-

remedial conditions at the Site. These samples are a mix of investigation samples as well as post-remedial confirmatory surface soil samples.

- Many of the inorganics and metals detected in surface soil samples have some concentrations that are higher than corresponding soil background concentrations. Many of these inorganics and metals have high frequencies of detection because they are natural constituents of soil. The following Site-related inorganics or metals have surface soil sample concentrations that were inconsistent with (higher than) background conditions: chromium (total), calcium, potassium, sodium, ammonia, and sulfate. Among detected inorganics and metals only chromium had at least one reported concentration greater than the corresponding published MADEP natural soil background concentration and the corresponding Region IX Industrial Soil total chromium PRG (for those parameters with published PRGs).

- Most of the total chromium concentrations in surface soil in the developed portion of the Property are below the Region IX Industrial total chromium PRG of 450 mg/kg (Figure 4.1-1). All total chromium concentrations in surface soil at the Site are below the Region IX Industrial trivalent chromium PRG of 100,000 mg/kg

- However, total chromium concentrations in surface soil in the floodplain immediately adjacent to the Lower South Ditch (downstream of the Property boundary and upstream of the East Ditch) are substantially higher than the concentrations in surface soil throughout the remainder of the property. The area of chromium-impacted soil is limited to the floodplain area. This suggests that deposition of floc or other chromium-containing material may be associated with the elevated soil concentrations.

- Speciation of chromium can be an important factor in risk assessments due to the differences in toxicity among species. Investigations were conducted to determine speciation of chromium in surface soils at the Site including the former Lake Poly area. Hexavalent chromium concentrations in all samples collected for that purpose indicate that trivalent chromium is the predominant species in soils at the Facility. Hexavalent chromium was not detected at concentrations approaching or above the MADEP's threshold level of 200 mg/kg level for allergic contact dermatitis and were below the Region IX Industrial Soil PRG for hexavalent chromium of 64 mg/kg and the MADEP 2002 published background of 30 mg/kg. Total chromium concentrations in surface soil in the developed portion of the Property are generally below the Region IX Industrial/Commercial Preliminary Remediation Goal of 450 mg/kg. It should be noted the Region IX PRG for total chromium assumes a 1:6 ratio of hexavalent chromium : trivalent chromium. The PRG for trivalent chromium is 100,000 mg/kg while the PRG for hexavalent chromium is 64 mg/kg. Therefore, the PRG for trivalent chromium is a more appropriate value to use for evaluating total chromium results for soil at the Site.

- VOCs detected in at least 10% of the surface soil samples were formaldehyde, hydrazine, and methylene chloride. None of the detected VOCs in surface soil samples were detected at concentration greater than the corresponding Region IX Industrial Soil PRG. The

trimethylpentene compounds are indicator compounds for the Facility, but were detected at low frequency in surface soil (approximately 5%).

- Trimethylpentenes were not detected in most surface soil samples (more than 90% of the samples). Di-isobutylene, a mixture of 2,4,4-trimethyl-1-pentene and 2,4,4-trimethyl-2-pentene, was a raw material in the production of Wytox ADP (also known as dioctyldiphenylamine) at the former Plant B. Trimethylpentenes were detected in surface soil in the area of Lake Poly, SWMU-27, and near the former Plant D area. With the exception of trimethylpentenes; VOCs are not a characteristic contaminant at the Site.

- SVOCs that were detected in at least 10% of surface soil samples include benzo(b)fluoranthene, pyrene, fluoranthene, chrysene, phenanthrene, benzoic acid, BEHP, di-n-butyl phthalate and NDPA. BEHP, NDPA, and di-n-butyl phthalate are associated with historical chemical processing at the Facility. BEHP was detected most frequently among SVOCs (72.5%) in surface soil samples. Among SVOCs, only BEHP and the PAH benzo(a)pyrene were detected above the corresponding Region IX Industrial Soil PRGs. Generally, low levels of residual BEHP (well below the Industrial Soil PRG of 120 mg/kg) are present in confirmatory surface soil samples from excavations of the on-Property West Ditch, South Ditch, Central Pond, Drum Areas A and B, and Lake Poly. BEHP is present at concentrations above the Region IX Industrial Soil PRG in only seven of the more than one hundred ten surface soil samples analyzed for that compound. These seven samples were all collected from soils beneath the South Ditch after excavation of sediments. NDPA was reported in surficial soil samples at a frequency much lower than that of BEHP and at concentrations substantially lower than those of BEHP (no concentrations above the Region IX Industrial Soil PRG). The low level residual NDPA in surface soil was detected in confirmatory soil samples associated with former source areas and the excavated ditches. Although NDMA was the subject of investigations in all environmental media, NDMA was not detected in any of the nine surface soil samples from the Facility that were tested specifically for NDMA. In fact, NDMA was not detected in any soil or sediment samples from the Site.

- PAHs were detected sporadically throughout the Facility, with a somewhat higher frequency of detection in the Central Pond drainage area and the floodplain soils of the Lower South Ditch. PAHs are not related to releases from the site.

- The distribution of total pesticides, their low concentrations and frequency of detection indicate they are residuals from their intended use rather than a release of pesticides from a manufacturing operation or a pesticide mixing or staging area. The only PCB detected, Aroclor-1016, was detected in only one surface soil sample at 0.98 mg/kg. PCBs and pesticides are not site-related contaminants of concern.

- The petroleum based hydrocarbons present are not related to petroleum sources such as releases from fuel storage facilities or disposal of lubricants. Rather, the hydrocarbons are associated with process oils and other raw materials used in the historical chemical manufacturing at the Site. Petroleum hydrocarbons were characterized using the MADEP's

EPH and VPH analytical methods that were developed to support the MCP. The concentrations of VPH fractions in surface soil were well below corresponding MCP standards. The three EPH fractions were each detected in more than 10% of the surface soil samples analyzed for EPH.. The EPH petroleum fractions in surface soil have been reported in the area of the former Lake Poly (soil has been excavated), adjacent to the Central Pond (sediments and oily soils have been removed), and in the floodplain of the lower South Ditch (between the Property line and the East Ditch). Concentrations of EPH fractions in surface soil were above corresponding MCP S-2 soil standards (industrial/commercial land use) only and in the floodplain of the lower South Ditch. Petroleum hydrocarbons impacts to surface soil are limited.

ES-1.3.2.3 Subsurface Soil-Current Conditions

Soil sample locations at the Site are shown on Figure ES-3. More than four hundred subsurface soil samples have been identified as representative of current, post-remedial conditions at the Site. These samples are a mix of investigation samples as well as post-remedial confirmatory surface soil samples. The following bullets summarize the major findings concerning subsurface soil.

- Among inorganics and metals detected in subsurface soils, only arsenic and chromium had at least one reported concentration greater than the corresponding published MADEP natural soil background concentration and the Region IX Industrial Soil PRG (if available). Only one arsenic concentration reported in 119 subsurface soil samples analyzed for arsenic was above the MADEP published background concentration of 20 mg/kg. Chromium concentrations in subsurface soil samples ranged from 3.5 mg/kg to 7,900 mg/kg. The majority of the remaining subsurface soil sample locations with total chromium concentrations greater than the Region IX Industrial Soil total chromium PRG of 450 mg/kg are located in the former Lake Poly area. As noted previously, the Region IX PRG for total chromium assumes a 1:6 ratio of hexavalent chromium : trivalent chromium. The PRG for trivalent chromium is 100,000 mg/kg while the PRG for hexavalent chromium is 64 mg/kg. Therefore, the PRG for trivalent chromium (100,000 mg/kg) is a more appropriate value to use for evaluating total chromium results for soil at the Site. Calcium, potassium, sodium, ammonia, and sulfate had at least one concentration in a subsurface soil sample that was above the site-specific soil background concentration, but no PRGs are available for those parameters. The implications of the concentrations of these parameters in subsurface soils are addressed in the risk assessments previously conducted for the Site.
- Eight VOCs were detected in at least 10% of the subsurface soil samples including 2,4,4-trimethyl-1-pentene; 2,4,4-trimethyl-2-pentene; 2-butanone; acetone; formaldehyde; methylene chloride; p-isopropyl toluene; and toluene. Only one VOC, hydrazine, was detected at a concentration greater than the corresponding Region IX Industrial Soil PRG. However, hydrazine was detected in only one of 30 subsurface soil samples. Region IX Industrial Soil PRGs are not available for five of the VOC compounds detected: 1,2,3-trichlorobenzene; 2,4,4-trimethyl-1-pentene; 2,4,4-trimethyl-2-pentene; 2-hexanone; and p-Isopropyl toluene. The TMPs are indicator compounds for the Facility and were detected in approximately 50% of the subsurface soil samples. The other three VOCs without

Region IX soil PRGs were detected at lower frequency in subsurface soil and are not considered significant contaminants at the Site based on limited frequency of detection.

- Trimethylpentenes were detected in the area of Lake Poly, the area of the East Pit and West Pit, near the former Plant D Tank Farm Area, and at the former Plant B Production Area (the EPH/VPH area at the current Plant B) and Plant B Tank Farm Area. At the locations with detectable TMPs, total trimethylpentene concentrations ranged from 0.001 mg/kg to 750 mg/kg. The highest detection was recorded in a location prior to the implementation of a remedial action using AS/SVE. This remedial action was successfully completed with approval for cessation of the action received from MADEP.

- BEHP and NDPA were the only SVOCs detected in at least 10% of subsurface soil samples. BEHP and NDPA are associated with historical operations at the Facility. BEHP was reported in subsurface soil samples in the former Plant B Production Area and Plant B Tank Farm, the former Lake Poly, Drum Area A, the Central Pond, and the on-PWD (confirmatory soil samples) and the South Ditch (confirmatory soil samples). BEHP subsurface soil concentrations above the Region IX Industrial Soil PRG were reported primarily within the containment structure (Drum Area A and beneath the On-Property West Ditch) and sporadically in Lake Poly, the Plant B Production Area, and beneath the South Ditch. NDPA was detected less frequently and at lower concentrations than BEHP in subsurface soil. Low levels of NDPA were reported in subsurface soil samples from the former Plant B Production Area and Plant B Tank Farm, the former Lake Poly, Drum Area A, and the Central Pond. However, fewer than five subsurface soil samples had NDPA concentrations greater than the Region IX Industrial Soil PRG of 350 mg/kg (in the former Lake Poly area). NDMA was not detected in the thirty-five subsurface soil samples from the Facility that were tested for NDMA.

- Nine pesticides were detected in subsurface soils but at frequencies of less than 10% of the samples that were analyzed for pesticides. None of the pesticides were detected at concentrations greater than the corresponding Region IX Industrial Soil PRGs. Several of the pesticides were detected only once in more than one-hundred subsurface soil samples. The distribution of total pesticide concentrations in subsurface soils is suggestive of residuals from use of pesticides for their intended use rather than a release of pesticides from a manufacturing operation. No PCBs were detected in subsurface soil samples. Fewer pesticides were detected in subsurface soil than in surface soil, and concentrations detected in subsurface soil were typically lower than in surface soil samples. PCBs and pesticides are not site-related contaminants of concern.

- The petroleum based hydrocarbons present are not related to petroleum sources. The three VPH fractions and the three EPH fractions were each detected in more than 10% of the subsurface soil samples analyzed for those parameters. VPH analysis has primarily been focused in areas of known or suspected releases of petroleum based hydrocarbons (or of trimethylpentenes) such as the former Plant B production area and the former Lake Poly disposal area. The total detected VPH concentrations (the sum of concentrations of C5-C8 Aliphatics, C9-C12 Aliphatics, and C9-C10 Aromatics) in subsurface soil samples ranged from 3.2 mg/kg to 1,100 mg/kg (location SVE-16 at the former Plant B Production Area was sampled and analyzed only prior to AS/SVE activities). The AS/SVE system effectively removed volatiles from this area. MADEP concurred with this conclusion and approved the shut down of the AS/SVE system in the EPH/VPH area. The available VPH subsurface soil data in the former Plant B production area are indicative of conditions prior to the completion of successful air sparge/ soil vapor extraction remedial activities in the area referred to as the EPH/VPH portion of Plant B. This area was the location of a

historical release of trimethylpentenes which are detected as a component of the VPH analysis. The two trimethylpentene compounds are compounds that are identified and quantified by the C5-C8 Aliphatic fraction of the VPH analysis.

- The AS/SVE system in the EPH/VPH area operated from 2001 to 2006 and successfully removed more than 2,035 pounds of VOCs (primarily trimethylpentenes) from the subsurface. The rate of mass removal of TMPs had diminished to de minimis levels and operation of that portion of the AS/SVE system was discontinued in 2006. Post-AS/SVE system operation soil sampling and analysis was not conducted in this area due to the final low removal rates. Therefore, the VPH data for the EPH/VPH area of the former Plant B Production Area overestimate the contaminant concentrations for current subsurface soil conditions.
- Total detected EPH concentrations (the sum of concentrations of C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) in subsurface soil samples ranged from 5.2 mg/kg to 3,800 mg/kg (location LPB-10). The MCP soil standards for category S-2 soil (industrial/commercial) in non-drinking water areas for C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) are 2,500 mg/kg, 5,000 mg/kg, and 2,000 mg/kg respectively. Only one sample had a total EPH concentration greater than 2,000 mg/kg (location LPB-10 in former Lake Poly Area). Detected EPH petroleum fractions in subsurface soil are located in the area of Plant B, former Lake Poly, and Central Pond.

ES-1.3.3 OU1 and OU2 Surface Water

The locations of surface water and sediment samples collected at the Site are shown on Figure ES-4. The full extent of the South Ditch and the Ephemeral Drainage area comprise the on-Property, or OU1, surface water. Off-Property, or OU2, surface water includes the East Ditch, the off-Property West Ditch and MMB wetland area.

The on- and off-Property surface water bodies are interconnected, except for the MMB wetland area, located north and west of the Property. The off-Property West Ditch flows to the South Ditch, which flows into the East Ditch just beyond its confluence with the Ephemeral Drainage area outside the eastern Property boundary.

In general, some shallow groundwater discharges into the on- and off-Property surface water bodies related to the Site. The characterization of nature and extent of contamination for these surface water bodies has focused on the indicator parameters associated with the Site including: ammonia, chloride, sulfate, aluminum, chromium, iron, sodium, TMPs, BEHP and NDMA.

OU1 Surface Water

- Metals and inorganics were detected throughout the length of the South Ditch. The South Ditch receives groundwater discharge within the first several hundred feet down stream of the weir. Groundwater discharge of dissolved inorganics and metals in the upper reach of South Ditch is not appreciably diluted by additional groundwater discharge downstream and analytes concentrations along South Ditch tend to be fairly uniform.
- No VOCs, PCBs, pesticides, herbicides or petroleum hydrocarbons were detected in the most recent on-Property surface water samples.
- NDMA was detected in OU1 surface water but at low concentrations. As demonstrated in several risk assessments, at the low concentrations detected in OU1 surface water, NDMA does not pose a risk to human health and ecological receptors.
- BEHP was detected consistently in surface water samples at only one sample location in the South Ditch.

OU2 Surface Water

- Inorganics and metals were detected throughout the East Ditch. Ammonia concentrations decline in a southerly direction from the site to a point where there is a substantial ammonia input from Landfill Brook to the New Boston Street Drainway. NDMA was detected in the East Ditch surface water at all locations except the most upstream location. Detected concentrations decrease downstream. At the low concentrations detected in this surface water, NDMA does not pose a risk to human health and ecological receptors.
- The average concentration of inorganics and metals in the off-Property West Ditch are lower than the corresponding average concentrations in the South Ditch. The construction and maintenance of the weir has successfully raised the surface water and suppressed discharge of impacted groundwater to the off-Property West Ditch. NDMA was detected in half of the samples collected from the off-Property West Ditch surface water. At the low concentrations detected in this surface water, NDMA does not pose a risk to human health and ecological receptors.
- Surface water within MMB Wetland has not been impacted by site related constituents, particularly the very mobile constituents such as ammonia and sulfate. Although NDMA has been sporadically detected, these detections have been near the method detection limit, have not been confirmed in both detectors during the analysis and may be false positives. These samples have been qualified NJ indicating only there was only presumptive evidence that NDMA was present.

ES-1.3.4 OU1 and OU2 Sediment

The locations of surface water and sediment samples collected at the Site are shown on Figure ES-4. The on-Property OU1 sediment is located in the West Ditch Wetland area, Upper South Ditch and the Lower South Ditch and Ephemeral Drainage areas. The former southern portion of the on-

Property West Ditch has been remediated and replaced by a concrete culvert. The off-Property, or OU2, sediment is located in the East Ditch, the off-Property West Ditch and MMB wetland area..

Sediment in the West Ditch Wetland area and the Upper South Ditch were remediated in 2000 and 2001. Confirmatory sediment samples were collected in the West Ditch Wetland, but sediment was excavated to native mineral soil in the Upper South Ditch and therefore, confirmatory soil samples, rather than confirmatory sediment samples, were collected from the Upper South Ditch. Post-excavation sediment samples collected in the Upper South Ditch as part of the PCMP sampling program were used to characterize nature and distribution of contamination in sediments of the previously remediated Upper South Ditch.

OU1 Sediment

- Concentrations of chromium, aluminum and iron in sediment were highest in the second of three PCMP sampling events in the Upper South Ditch. The third sampling event did not confirm the results of the second sampling event suggesting that the second event samples incorporated some floc. These results do not indicate a trend of increasing metals' concentrations in South Ditch sediment.
- In general, the highest concentrations of chromium and other metals detected in OU1 sediment were located in the Lower South Ditch.
- BEHP was detected in sediment samples collected throughout the West Ditch Wetland area and the Lower South Ditch. Concentrations in the Lower South Ditch samples were higher, on average, than those from the West Ditch Wetland.
- NDMA was not detected at any OU1 sediment sampling locations.

OU2 Sediment

- The East Ditch sediment samples collected downstream of the confluence of the South Ditch and East Ditch prior to the 1997 Phase II Report exhibited impacts by chromium, ammonia, sulfate, other inorganics, BEHP, di-n-butyl phthahalate, di-n-octyl phthalate, NDPA, and trimethylpentenes. Those samples exhibited a decreasing concentration trend for most of those analytes in the downstream direction. Although the highest concentrations of metals detected in the East Ditch were found at samples collected downstream of the confluence of the South Ditch and East Ditch, in the more recent East Ditch sediment samples, the sample collected immediately downstream of the South Ditch/East Ditch confluence (ED SD/SW3) has concentration of BEHP and chromium that are lower than concentrations reported for the two locations farther downstream (ED SD/SW4 and ED SD/SW5). Sediment sample chromium concentrations at locations ED SD./SW4 and ED SD/SW5 are consistent with the sediment sample chromium concentrations from the most downstream South Ditch sample locations

- The detected concentrations of PAHs in the East Ditch appear to be associated with railroad operations and the adjacent industrialized areas.
- The most recent East Ditch sediment samples exhibit, relative to historical samples, lower concentrations of BEHP. The down stream extent of BEHP in East Ditch sediment is bounded by the two sample locations farthest downstream in which BEHP was not detected.
- SVOCs and VOCs which were previously detected were not detected in the recent sediment samples (NDPA, di-n-buthyl phthtalate, di-n-octyl phthalate, and the trimethylpentenes).
- The concentrations of chromium, aluminum, and iron in historical and more recent East Ditch sediment samples are similar. Concentrations of metals and inorganics in sediments at the downstream locations also bound the downstream impacts in sediments. Therefore, the downstream extent of Site-related constituents in sediment in East Ditch has been delineated.
- The highest concentrations of inorganics and metals in the off-Property West Ditch sediments were detected in the northern portion of the ditch.
- Although ammonia was detected throughout the MMB wetland area, the ammonia in sediment was determined to be from natural causes—shallow groundwater is not a source of ammonia to surface water. No evidence of Site-related impacts to sediments of the MMB wetland has been observed. The shallow groundwater that interacts with surface water in the MMBA and MMB wetland is not contaminated by releases from the Property.

ES-1.3.5 OU3 Groundwater

The locations of monitoring wells installed at the site are shown in Figure ES-5. The nature and extent of groundwater impacts have been defined by investigation and monitoring activities completed at the Site. The vertical distribution of site-related constituents within the overburden groundwater aquifer system has been bounded. The lateral extent of impacted groundwater is defined by the presence or absence of NDMA to a detection limit of 0.000002 milligrams per liter (mg/L) which is equivalent to 2 parts per trillion or 2 nanograms per liter (ng/L). The down gradient limits of impact to groundwater outside of Zone II are defined by the lateral extent of NDMA and BEHP to the south east of the Property in proximity to East Ditch.

The following bullets summarize key findings concerning of the nature and extent of groundwater contaminants in the Zone II including groundwater below Plant B. Generally, the Zone II areas include groundwater from the northern portion of the Property and extending off-Property into MMBA.

- Analytes associated with the DAPL (sulfate, ammonia, chloride, calcium, sodium, iron, chromium, aluminum, trimethylpentenes, phenols and NDMA) are present within the MMBA. Chromium is rapidly attenuated by geochemical transformations and precipitation within the aquifer matrix in proximity to DAPL areas.
- The area of impacted groundwater is confined to the WBV and groundwater flow generally follows the axis of the MBV valley, extending to the northwest of the property and eventually turning northeast in the direction of MMB.
- The detected analyte concentrations are characteristically highest is deep groundwater, and attenuate rapidly vertically, such that shallow groundwater is not impacted
- The vertical distribution of NDMA has been extensively characterized by multiple well couplets and NDMA is not present in shallow groundwater in the MMBA. The temporal and spatial stability of solute concentrations in the aquifer, before and after cessation of pumping from the Wilmington municipal water supply wells, confirms that the vertical transfer of solutes in aquifer is limited by diffusion rates and the very small vertical gradients in the aquifer.
- Based on the distribution of the data collected to date, the lateral extent of overburden groundwater affected by releases from the Facility have been bounded based on comparison of indicator parameters concentrations to background (where available) and to non-detect values for NDMA.
- The only portion of the MMBA where NDMA remains unbounded is in the downgradient northeastern portion of the Site in deep groundwater within the center of the WBV.
- The northern extent of the unconsolidated glacial deposits along the northern edge of the WBV is the boundary of the aquifer system and therefore the northern limit of Site-related impacts to overburden Zone II groundwater.
- An extensive private well sampling program was conducted to verify that public health was protected. Some site-related contaminants are naturally occurring and their presence is expected in groundwater that has not been impacted by the releases from the Olin Property.
- Groundwater in vicinity of Plant B contains BEHP, NDMA, NDPA, trimethylpentenes and ammonia.
- Groundwater in vicinity of the Calcium Sulfate Landfill contains ammonia, calcium and sulfate, particularly adjacent to the eastern perimeter of the waste limit.

Groundwater outside the Zone II area also includes some areas within the Ipswich River Watershed but to a greater degree, includes areas within the Aberjona River Watershed. Generally, areas outside the Zone II include groundwater from below the properties located along Jewel Drive, below most of the Olin Property, and areas downgradient of the Property located to the southeast. The northeast portion of the Property including Plant B is located in the Zone II with the remaining portion of the Property, being located outside the Zone II area.

As discussed above, sources that may contribute to groundwater quality include historical releases that occurred on-Property and the chemical diffusion from the DAPL pools. The nature and distribution of site related analytical parameters is summarized below.

- The nature and distribution of site-related constituents in groundwater outside the Zone II area has been delineated. The saturated thickness of unconsolidated deposits underlying on-Property areas is thin compared to other areas, and influence of surface water features on solute migration in groundwater is more pronounced and important than within the MMB area. Site impacts to groundwater have been well documented through sampling of groundwater from the on-Property groundwater monitoring well network. The lateral and downgradient extent of impacts to groundwater has been limited by groundwater discharge to the surface water bodies including the Upper and Lower South Ditch. The down gradient extent of NDMA has been characterized but it may not be bounded. While there are two downgradient well clusters present southeast of the Property (GW-80 and GW-74), and an additional well is needed to verify the direction of groundwater flow in this portion of the Site and verify that the NDMA detected in groundwater is bounded in the downgradient direction.
- The interaction between shallow groundwater and surface water in the on-Property groundwater outside Zone II affects distribution of site-related constituents. Shallow groundwater samples from wells located near the Upper South Ditch and near Central Pond, indicate elevated concentrations of site-related solutes or parameters.
- Concentrations of DAPL related constituents and specific conductance values in groundwater from shallow wells that monitor upgradient groundwater in the central portion of the off-Property West Ditch Study Area are lower than concentrations in groundwater from shallow wells in proximity to the Upper South Ditch. Thus shallow groundwater impacts to the Upper South Ditch result from groundwater discharge occurring immediately under the South Ditch. Ammonia concentrations in shallow groundwater within the off-Property West Ditch Study Area are less than those observed in the South Ditch surface water.
- A similar pattern of vertical stratification of solutes in groundwater is apparent within the unconsolidated deposits underlying the Upper South Ditch area; with increasing concentrations occurring with greater depth. These areas are outside of the lateral extent of the Upper DAPL Pool and the on-Property Slurry Wall / Temporary Cap containment area. The impacts to groundwater in these areas predate the installation of the containment area. The shallow groundwater to surface water gradients turn rapidly upward immediately under the Upper South Ditch downstream of the weir. The impacted groundwater, immediately underlying this area, which existed at the time the Slurry Wall /Temporary Cap containment area was constructed, is the probable source of on ongoing discharge of ammonia, aluminum, chromium and related solutes to surface water from groundwater.
- BEHP has been detected in groundwater samples collected from monitoring well GW-74S, but the presence of BEHP at this location was attributed to another upgradient source. (GEI, 2002a, GEI, 2003a]. Low concentrations of chlorinated solvents and fuel compounds have been detected in GW-80 D, GW-80BR and GW-80S. These constituents are not attributable to the Olin Property.
- Groundwater along the eastern side of the Property, outside of the influence of Plant B, is expected to flow toward the topographic depression formed by the MBTA railroad line that

forms the East Ditch, and then follow the direction of surface water flow within the East Ditch. Groundwater on the northeast side of East Ditch is expected to also flow toward East Ditch, then along the ditch to the southeast. Thus the East Ditch is expected to be a shallow groundwater flow divide that limits easterly migration of solutes from the Property. There is only one groundwater well on the northeast side of the East Ditch and it is located across from Plant B.

ES-1.4 RISK CHARACTERIZATION

The following subsections summarize the results of human health and ecological risk assessments completed at the Site.

ES-1.4.1 Human Health Risk Assessments

Human health risk assessments have been conducted for the Olin Chemical Superfund Site under proposed scopes of work approved by MADEP. Each of the risk assessments has been submitted to and approved by MADEP.

Human exposures to analytical parameters detected in the soil, surface water, sediment, floc, air and groundwater have been assessed using various receptor scenarios. The receptors evaluated include industrial/commercial workers (both on-Property and off-Property), construction workers, utility workers, trespassers, and neighborhood residents. The areas occupied by former building foundations that will not be removed under the current proposed property redevelopment will be deed restricted to prohibit removal of the foundations. Soils that remain underneath the foundations do not represent a completed pathway for future industrial or commercial exposure conditions including construction workers.

- The Property has been determined to be suitable for industrial/commercial use. Risk assessments have assumed that institutional controls will be implemented to maintain industrial/commercial use and to control certain activities (such as excavation in remediated former source areas).
- A number of sources have been identified during investigations of the Site. Sources have been contained, eliminated or are currently being treated/controlled.
- No hexavalent chromium has been detected at levels of concern in any media.
- Olin actively identified and tested private drinking water wells in the area. Currently, there are no private drinking water wells within the boundaries of the Site.

- Risk assessments performed to evaluate potential off-Property exposures to surface water, sediment, and via vapor intrusion to buildings concluded that these potential exposure pathways are associated with a condition of no significant risk.
- Risk assessments conducted to evaluate the use of Town water while the MWSWs were still in use concluded there was no significant risk to the water consumers. No primary drinking water standards (Massachusetts MCLs) for site-related constituents were exceeded in samples from the five MWSWs located in the MMBA. Four of the five MMBA MWSWs were not in use when NDMA was detected and none have been in use since April 2003.
- A comprehensive investigation of the nature and extent of NDMA in groundwater (including private wells), surface water, sediment, and soil has been conducted. NDMA was not detected in sediment or soil. Risk assessments based on the results of the investigation have concluded that there is currently minimal potential for human exposure to NDMA, and the reported NDMA concentrations in groundwater and surface water do not currently pose a significant risk to human health risk.

ES-1.4.2 Ecological Risk Assessments

Twelve ecological risk assessments were conducted for the Site. Four major MCP risk assessments are summarized in Section 6.2, and full summaries for each of the risk assessments are included in Appendix F.2. The ecological risk assessments were conducted per the requirements of the Massachusetts Contingency Plan (MCP). All proposed Scopes of Work were submitted to MADEP for review and comment, and all were approved (conditionally or unconditionally). Assessments were performed for exposure areas which occur on-Property (terrestrial habitat at the Facility, on-Property West Ditch, South Ditch, Ephemeral Ditch, and Central Pond) and off-Property exposure areas (off-Property West Ditch, East Ditch, New Boston Street Drainway, and Maple Meadow Brook Wetland).

Ecological exposures to analytical parameters detected in surface water, soil, sediment, floc, and groundwater have been assessed for terrestrial and aquatic receptors including: red fox (terrestrial mammal), woodcock (terrestrial bird), earthworms (terrestrial invertebrate), green heron (semi-aquatic bird), amphibians, the benthic macroinvertebrate community (aquatic invertebrate), aquatic plants, terrestrial plants, and fish. Data used to evaluate potential risk have included analytical chemistry, soil and sediment toxicity testing, analysis of plant, benthic invertebrate, amphibian, and small mammal tissue obtained from specimens captured on-site, benthic macroinvertebrate community surveys, amphibian calling and population surveys, and habitat surveys (including weekly inspections of the ditch system from 1997 to 2005). Assessment endpoints generally

consisted of protection and maintenance of receptor populations, typically stated in terms of growth, survival, and reproduction.

Risk conclusions were based on a weight-of-evidence approach and have included the following methods, techniques, and measurement endpoints to evaluate risk, including: comparison of surface water, sediment, groundwater, and soil concentrations to benchmark screening values, upper concentration limits (UCLs), receptor specific toxicity reference values (TRVs), and/or other chronic and acute effects concentrations, as applicable; calculation of hazard quotients (HQs) and hazard indices (HIs); frog embryo teratogenesis assay *Xenopus* (FETAX) and earthworm toxicity tests for survival and growth; earthworm bioaccumulation testing; use of toxicity test and dilution studies to attempt to derive concentration response curves; population modeling to identify adverse effects to receptor populations or their prey bases; food chain models using site-specific prey tissue concentrations to estimate total daily does from OHMPCs, and comparison of modeled doses to published TRVs indicative of potential impairment; comparison of study area conditions to background, reference, or local conditions; and quantitative evaluation of benthic macroinvertebrate community data.

Collectively, the ecological risk assessments have concluded the following:

- The most recent of the risk assessments have repeatedly demonstrated a condition of No Significant Risk for terrestrial receptors at the Facility.
- Imminent hazard Assessments (IHAs) at the South Ditch have repeatedly concluded no readily apparent harm.
- A condition of No Significant Risk has been concluded at the Ephemeral Drainage and the Off-Property West Ditch.
- Based on Site-specific risk assessments using multiple lines of evidence and based on sediment remedial activities in the On-Property West Ditch and the Upper South Ditch, as well as the sediment removal and culverting of the On-Property West Ditch, there is negligible risk associated with sediments within most of the ditch system, including the East Ditch and New Boston Street Drainway. The Lower South Ditch sediments require further risk evaluation. The Site-specific risk assessments conducted to date have not documented significant impacts to aquatic life associated with surface water quality. However, the assessments conducted per the MCP require that Massachusetts Ambient Water Quality Criteria (AWQC) be considered applicable environmental standards. Since there have been concentrations of inorganics and metals in surface water above corresponding AWQC, the MCP risk assessments could not conclude that a condition of no significant risk to the environmental exists with respect to surface water in the ditch system. The AWQC may be overly conservative for Site specific habitat conditions.

- Overall, in the ditch system, ammonia is the parameter that most consistently has been detected above surface water criteria. Despite that, stress to aquatic receptors has not been observed within the ditch system. Risk associated with ammonia based on comparison to generic criteria is likely overestimated.
- In the Maple Meadow Brook Wetland, there is no ecological risk associated with aquatic and benthic exposure areas. Concentrations of groundwater constituents above groundwater UCLs, particularly in the deep DNAPL pools prevent a finding of no significant risk to the environment.
- NDMA has never been identified as a risk driver in any of the terrestrial, aquatic, or benthic exposure areas.

ES -1.5 CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE WORK

The nature and distribution of site-related impacts to Site soil, surface water, sediment and groundwater have largely been determined from previous investigations and distributions have been bounded at concentrations consistent with background (for those analytes with media specific background values), at analytical detection limits, or by physical barriers to placement or migration of contaminants.

- The sampling and analysis of environmental media has been comprehensive and representative;
- The chemical analysis has been conducted using USEPA and/or MADEP published analytical methods and the data have been subjected to chemist reviews and data validation to insure the usability of the data for determining nature and extent of contamination, to support risk assessments, and to evaluate the need for remedial action;
- The current nature and distribution of contamination in environmental media represents an improved condition relative to conditions prior to the numerous remedial actions that have been completed for the Site.

The location and extent of secondary source materials such as LNAPL and DAPL has been determined and the processes controlling migration of additional solutes from those sources (particularly the DAPL) to groundwater has been extensively studied and is well documented. The secondary sources are not migrating and some of the sources have been contained / controlled by remedial actions.

The interaction of Site groundwater and surface water has also been extensively studied and the relationship between the discharge of impacted groundwater and impacts to surface water has been verified and bounded. In addition, the down stream migration of site-related constituents in surface water has been studied and the down stream extent of Site-related impacts has been characterized. While the same is true for sediment, the delineation of nature and lateral extent of contamination in

floodplain soil immediately adjacent to the Lower South Ditch has not been delineated completely. Some data collection is needed to complete delineation of nature and extent of contamination in soil in that area. Human health and ecological risk assessments would then be completed for that area and the wetland area to the north of the Lower South Ditch. In the latter area, soil sampling and analysis has been conducted, but risk assessments have yet to be conducted.

Based on currently available data and previously completed risk assessments, the following conclusions have been reached:

- The former Facility is suitable for industrial/commercial redevelopment in conjunction with institutional controls that would maintain industrial/commercial use and that would prevent access to subsurface soils in certain former source areas (such as Lake Poly);
- There are no private potable or non-potable wells in use within the boundaries of impacted groundwater;
- The MWSWs in the Maple Meadow Brook aquifer are not currently in use. The detection of NDMA in four of the MWSWs has resulted in the suspension of pumping of the MWSWs;
- Human health risks as defined by the MCP are not significant for any current or reasonably foreseeable exposures to or associated with off-Property surface water, sediment, or groundwater;
- There are concentrations of Site-related constituents above drinking water standards in monitoring wells (but not in water supply wells) within category GW-1 groundwater at the Site. The MCP considers these standards applicable public health standards at those monitoring wells.
- A condition of no significant risk exists for terrestrial ecological receptors at the Property;
- Numerous hazard assessments for the South Ditch have concluded there is no readily apparent harm to ecological receptors;
- A condition of no significant risk as defined by the MCP exists for ecological receptors at the Ephemeral Drainage and the Off-Property West Ditch.
- Sediments that had been identified as posing significant risk to ecological receptors were excavated and removed from the Site during the remediation of the on-Property West Ditch and associated wetland, the Upper South Ditch, and the Central Pond. No significant risks to ecological receptors have been identified for sediments in the off-Property West Ditch, the East Ditch, or the New Boston Street Drainway. Sampling and analysis of sediments in the Lower South Ditch was conducted after the most recent ecological risk assessment for that area. The Lower South Ditch sediments require further risk evaluation.
- The Site-specific risk assessments conducted to date have not documented significant impacts to aquatic life associated with surface water quality. However, the MCP requires that Massachusetts Surface Water Quality Standards be considered as applicable environmental standards. Since there have been concentrations of inorganics and metals in surface water above corresponding standards, the MCP risk assessments did not conclude

that a condition of no significant risk to the environmental exists with respect to surface water in the ditch system. The generic surface water quality standards may be overly conservative for Site habitat conditions.

- In the Maple Meadow Brook Wetland, surface water data indicate there is no significant ecological risk associated with aquatic and benthic habitats. Despite this, because the MCP considers groundwater UCLs as a measure of potential future environmental risk, concentrations of groundwater constituents above groundwater UCLs, particularly in the deep DAPL pools have prevented a finding of no significant risk to the environment.
- NDMA concentrations in surface water are below levels of concern for ecological receptors. NDMA has not been detected in sediments or soil. NDMA is not a bioaccumulating substance. Therefore, NDMA poses negligible risk to environmental risk to environmental receptors.

Recommendations for future work are summarized by Operable Unit and media below.

OU1 Soil

- Conduct sampling and analysis of floodplain soil immediately adjacent to the Lower South Ditch for metals, inorganics, and SVOCs.
- In proposed development plans of the Property, some buildings and foundations would be removed (Figure ES-2). In consideration of final development plans, characterization of subsurface soils would be conducted for those foundations scheduled for removal. Investigations have been conducted within the East and West Warehouses and the Plant B Production Area, and data collected do not indicate further investigation is warranted. Proposed development would increase soil cover over the warehouse foundation areas, further limiting access to existing subsurface soil. Building foundations left in place will prevent access to site soil, would be subject to land use restrictions, and would not be investigated. Furthermore, groundwater analytical data from wells located downgradient of and in vicinity of Plant A and Plant C foundations do not indicate these areas as sources of groundwater contaminants.
- Conduct post-remedial subsurface soil confirmatory sampling and analysis (VOCs, VPH and EPH, and SVOCs) in the EPH/VPH area west of Plant B to reduce uncertainty concerning current nature and extent in that remediated area.

OU1 Surface Water

- Continue PCMP monitoring program as described in the Interim Response Steps Work Plan (MACTEC, 2007) for groundwater and surface water in the area of the South Ditch. This program provides information concerning groundwater/surface water interaction and will support the development and evaluation of remedial alternatives to address the groundwater impacts on South Ditch water quality.

OU1 Sediment

- Continue annual sediment sampling as a component of the PCMP monitoring program for the South Ditch as described in the Interim Response Steps Work Plan. This program

characterizes impacts over time on South Ditch sediment quality associated with groundwater discharge to the ditch.

OU2 Surface Water

- OU2 surface water in the off-Property West Ditch and in East Ditch has been adequately characterized to support assessment of the nature and extent of contamination, human health and ecological risk assessments, and evaluation of remedial alternatives. No additional characterization of these surface waters is recommended.
- MMB wetland surface water has not exhibited Site-related impacts. Current data are adequate to support assessment of the nature and extent of contamination, human health and ecological risk assessments. No additional characterization of these surface waters is recommended.

OU2 Sediment

- OU2 sediment in the off-Property West Ditch and in East Ditch has been adequately characterized to support assessment of the nature and extent of contamination, human health and ecological risk assessments, and evaluation of remedial alternatives. No additional characterization of these sediments waters is recommended.
- OU2 sediment in the MMB wetland does not exhibit Site-relate impacts. Current data are adequate to support assessment of the nature and extent of contamination, human health and ecological risk assessments. No additional characterization of these surface waters is recommended.

OU3 Groundwater

- Install two well pairs to complete downgradient boundary delineation of the NDMA plume within the WBV in the MMBA.
- Install two well pairs on properties located east of the MBTA railroad line and across from the Olin Property to verify that site related impacts to groundwater do not extend in this direction.
- Install one well pair down gradient of the Property on the eastern side of the MBTA rail line in vicinity of New Boston Street to verify groundwater flow direction.
- Collect a comprehensive synoptic round of low water and high water groundwater levels from Site wells to support existing interpretations of groundwater flow directions, and

Develop and implement a final groundwater sampling plan to provide a comprehensive data set for use in risk evaluations.

1.0 INTRODUCTION

This Focused Remedial Investigation (RI) Report has been prepared for the Olin Chemical Superfund Site (the Site) in Wilmington, Massachusetts on behalf of Olin Corporation (Olin) by MACTEC Engineering and Consulting, Inc. (MACTEC). The Olin Property location is shown in Figure 1.0-1. The Site comprises the Olin Property (Property), an approximately 50-acre parcel, at 51 Eames Street in Wilmington, Massachusetts and adjoining off-Property areas impacted by hazardous substances from this parcel. The northern part of this property was formerly the site of a chemical manufacturing facility.

The Site was listed on the National Priorities List (NPL) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 105, 42 U.S.C. ' 9605 on April 19, 2006 (71 FR 20,016). Prior to the NPL listing, the Site has been the subject of many years of investigations and remedial actions / response activities carried out by Olin Corporation and supervised by Massachusetts Department of Environmental Protection (MADEP) under Chapter 21E of the General Laws of Massachusetts and the Massachusetts Contingency Plan (MCP). The Site has been a Priority site under the MCP since 1993, and a Tier I site since 1994.

Respondents, Olin Corporation, American Biltrite Inc., and Stepan Company have voluntarily entered into an Administrative Order On Consent (AOC) with the United States Environmental Protection Agency (USEPA) to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the Site. The effective date of the AOC is July 3, 2007. The Scope of the RI/FS is described in the Statement of Work (SOW), Remedial Investigation and Feasibility Study, Olin Chemical Superfund Site, prepared by the USEPA Region I – New England and dated June 28, 2007. This Focused RI Report has been prepared in conformance with Section 1.III.C, Section 1.III.D, and Section 1.III.E, of the SOW.

This introduction describes the purpose of this Focused RI report, provides Site background information, a Site description, describes the Site history, including ownership and former facility operations and discusses the organization of the remainder of this Focused RI report.

1.1 PURPOSE OF REPORT

The USEPA recognizes that a significant amount of Site data and other information has already been collected during prior environmental sampling and response activities performed by Olin under the MCP. The purpose in preparing this Focused RI Report is to avoid duplication of previously completed efforts and maximize the efficiency of future RI data collection activities. This is to be accomplished by merging previously compiled environmental reports, results of testing, and other relevant information, into Operable Unit (OU) specific summaries and providing an evaluation of existing data relative to spatial coverage, and EPA data quality and usability objectives. The Focused RI report identifies existing data gaps to support the Operable Unit specific data needs to be presented in an RI/FS Work Plan. The information in the Focused RI Report also supports operation and maintenance activities proposed in the Interim Response Steps Work Plan.

More specifically, this report:

- presents an overview of investigation and remedial actions / response activities completed by Olin and other respondents to date;
- summarizes data previously collected, and evaluates the spatial coverage, quality and usability of those data under EPA standards identified in the SOW;
- presents the results of previously completed investigations and identifies any part of those investigations that is dependent on data that may not meet EPA standards;
- presents previously completed risk assessment calculations and conclusions, including an assessment of whether these calculations and conclusions are consistent with the risk assessment methodology and standards described in the SOW,
- provides discussions that clearly identify and explain the rationale for exclusion of data sets and/or previou
- provides a summary of existing conditions at the Site, and
- presents a discussion of the nature and extent of contamination in each OU.
- identifies existing data gaps to support the Operable Unit specific data needs to be presented in an RI/FS Work Plan

As a result of the hydrogeologic setting and history of releases, current and/or former environmental media affected by past chemical releases includes on-Property soil, surface water, sediment, and groundwater, in addition to off-Property surface water, sediment, and groundwater.

EPA has exercised its discretion to subdivide the Site into three OUs described as follows from the SOW.

Operable Unit 1 ("OU1"): Defined as the approximately 50-acre Olin Property including the former facility area, the established conservation area, the on-Property ditch system, the Calcium Sulfate Landfill, and the Slurry Wall Containment Area..

Operable Unit 2 ("OU2"): Defined as off-Property surface water and sediment areas, including at a minimum, the off-Property East Ditch, South Ditch, and West Ditch.

Operable Unit 3 ("**OU3"):** Defined as all on- and off-Property groundwater areas including Maple Meadow Brook Aquifer, groundwater beneath the Olin Property, and groundwater located south and east of the Olin Property.

In this Focused RI Report, surface water and sediment conditions in portions of Maple Meadow Brook and Sawmill Brook will be discussed under OU2.

Prior studies have included site investigations, and site assessments, feasibility studies, and corrective action studies, along with human health and ecological risk assessments. Response activities have also occurred within on-Property areas of the Site and include several soil removal actions, a sediment removal action, installation, and operation of soil vapor extraction, air sparging and groundwater extraction and treatment systems, as well as construction and monitoring of a slurry wall containment area at a portion of the Site. Collectively, these investigations, studies and response actions address contamination previously identified in on-Property soil, surface water, sediment and groundwater, in addition to off-Property surface water, sediment and groundwater. These earlier investigations, studies and response actions addressed specific areas of contamination, specific attributes of those contaminants and contaminated media, but were not organized on a media- or location- based Operable Unit structure.

This report also presents an assessment of the quality and usability of analytical data used in prior environmental and human health risk assessments. The investigations and response actions related to soil, sediment and groundwater have resulted in collection of more than 12,600 samples for chemical analysis from approximately 1,500 locations. These sampling activities have generated

approximately 348,000 analytical results, of which approximately 243,000 have been generated in the last ten years (since January 1997).

This report provides the available data collected at the Site. Data collected prior to 1997 were previously compiled and submitted to MADEP in a comprehensive site assessment document titled Supplemental Phase II Report (Smith, 1997) and those data are reproduced as an appendix to this Focused RI report. Analytical data collected since publication of the 1997 Supplemental Phase II report (i.e., the approximate past ten years since January 1, 1997) are presented in a separate appendix and the results are discussed within OU specific summaries.

1.2 SITE BACKGROUND

The Olin Chemical Superfund Site includes the approximate 50 acre Olin Property (the Property) and adjacent off-Property areas that have been impacted by manufacturing and waste disposal activities at the Property. The Property is located in a heavily industrialized area within the southern portion of the Town of Wilmington and is the location of a former manufacturing facility that produced specialty chemicals for the rubber and plastics industry from 1953 to 1986. From 1953 to 1980 the facility was owned by several companies whose operations resulted in environmental contamination to on-Property soil, groundwater, sediment, and surface water.

Process waters and liquid wastes were discharged to unlined excavations in the native soil and percolated into the soil or overflowed into on-Property ditches until the early 1970's when a treatment plant was installed. The liquid wastes had high concentrations of dissolved inorganic constituents and fluid densities greater than water allowing these dense liquids to penetrate the underlying overburden water table and migrate vertically downward to the bedrock surface, where a dense aqueous phase liquid (DAPL) pooled in bedrock depressions. The DAPL material, which moved primarily in response to gravity, migrated to the west and northwest within a sloping bedrock valley (the Western Bedrock Valley) and remains as several isolated DAPL pools in bedrock depressions located both on- and off-Property. The migration of this dense fluid was accompanied by convective mixing with groundwater and an extensive area of dissolved DAPL constituents resulted in the overburden aquifer. The primary constituents associated with these chemical releases include inorganic compounds, although specific volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were also associated with chemical processes used at the Property. The DAPL is characterized by low pH, high concentrations of total

dissolved solids, and its principal constituents include sodium (Na), calcium (Ca), chloride (Cl), iron (Fe), manganese (Mn), sulfate (SO_4), ammonia (NH_3) or ammionium ion (NH_4^+), aluminum (Al), and chromium (Cr). The DAPL and groundwater that immediately overlies DAPL also contain low level concentrations of VOCs and SVOCs. VOCs that are most commonly detected include acetone, bromoform, 2-butanone, 2-hexanone, toluene and trimethylpentenes. Detected SVOCs most commonly include benzoic acid, bis-2-ethylhexlphathalate (BEHP), phenols, naphalene, n-nitrosodiphenylamine (NDPA), and n-nitrosodimethylamine (NDMA). Environmental contamination has migrated by surface water and groundwater pathways to off-Property locations.

Olin purchased the property in 1980 and ceased operations in 1986. History of ownership and facility operations are described in greater detail in Section 1.4. After Olin initiated closure of the site in 1986, the chemical manufacturing buildings were demolished and removed along with the closure of the lined lagoons. Since 1987 Olin has conducted numerous environmental investigations, risk assessments and remedial actions to develop an understanding of the nature of environmental impacts and to protect human health and the environment. These investigations and cleanups were carried out by Olin Corporation and supervised by MADEP under Chapter 21E of the General Laws of Massachusetts and the MCP. The investigations and assessments were based on data collected, and analyzed in accordance with work plans approved by the MADEP. Data generated are of known data quality and usability determined by data validation procedures that met the MCP requirements. A detailed summary of prior environmental investigations and remedial activities is presented in Section 2 of this document.

Currently, the approximate 50- acre Property is largely undeveloped and contains a vacant office and laboratory building, two warehouses, a building which houses a groundwater recovery and treatment facility (Plant B), and a closed landfill (Calcium Sulfate Landfill). In 2006, Olin installed a 40-foot office trailer near Plant B for use by the Olin employees who operate Plant B and maintain the Property. These operations are conducted during most weekdays during daytime hours. Property access is controlled along the entire Property perimeter by an eight foot high fence and all access gates are locked when Olin employees are not on the Site.

The Olin Property is situated over glacial outwash deposits that overly glacial till and igneous and metamorphic bedrock. The glacial outwash deposits consist mainly of unconsolidated sand and gravel, and are capable of transmitting large quantities of groundwater. The saturated thickness of

these glacial deposits increases within a buried bedrock valley to the northwest of the Property forming an aquifer underlying Maple Meadow Brook and Saw Mill Brook known as the Maple Meadow Brook Aquifer (MMBA). The Town of Wilmington operated a municipal water supply wellfield located over one half mile northwest of the Property within the MMBA. During 2002, the town wells were in use intermittently, with certain wells being taken off-line by the Town during different time periods in response to concerns of potentially exceeding nitrite standards in the distribution system. In October 2002 the Town ceased use of all the wells in the MMBA except the Town Park Well. The use of this wellfield was suspended by the Town of Wilmington Water Department in April 2003 due to the detection of NDMA in four of the five MMBA MWSWs (NDMA was not detected in the Town Park Well). NDMA was not detected within the water supply distribution system sampling.. Even though the NDMA concentrations in the wells were below the immediate action level, based on these sampling results, Olin worked with the town of Wilmington to develop a supplemental water source through a water purchase agreement from adjacent communities. This supplemental water source remains in service. In order to provide a permanent supply, the town is currently constructing a new connection to the MWRA system that is funded by Olin and the other respondents.

In September 2005, USEPA identified the Site as a Proposed Site for the NPL. The primary hazardous substance used by USEPA to score the Site was NDMA (USEPA, 2005). The primary exposure pathway evaluated by USEPA was groundwater. Other principal contaminants noted included chloride, sodium, sulfate and ammonia.

1.3 SITE DESCRIPTION

The Site encompasses the approximate 50 acre Olin Property and surrounding areas to the west, east and south, that where contaminants have migrated by surface water and or groundwater transport. The current site features on the Property are shown in Figure 1.3-1. Site features in the surrounding off-Property area are shown in Figure 1.3-2. The Property is bounded on the east by the Massachusetts Bay Transit Authority tracks, on the south by the Woburn/Wilmington Town Line, on the west by an inactive Boston and Maine Railroad spur, and on the north by Eames Street. The Property is located in an industrialized area of Wilmington within a General Industrial zone. Intensive industrial land use occurs on the eastern, northern and western sides of the Property. The southern side of the property is bounded by the Woburn Landfill, a former municipal solid waste landfill that has been closed. Another landfill, constructed on property

owned by the Spinazola Trust is located north west of the Woburn Landfill. Residential properties are located along Main Street and Cook Avenue located to the west of the Property and along Eames Street before it intersects with Woburn Street. A more detailed description of the surrounding land use and socioeconomic setting is provided in Section 3.0 of this report. The following paragraphs describe existing site features relevant to understanding existing site conditions and environmental setting.

Buildings and Building Foundation Slabs

The former facility is located on the northern half of the Property which is currently unused and contains a vacated office building, a small metal butler building, a former guard shack, two vacant warehouses, paved and grassed areas, and concrete slabs from other former buildings. In 2006, Olin installed a forty foot office trailer and two metal storage trailers in the north east quarter of the Property near Plant B which houses a groundwater treatment system.

Plant B Groundwater Extraction and Treatment System

The Plant B groundwater recovery/treatment system has been in operation since 1982 with continued operation from 1997 to present as an Immediate Response Action (IRA) under the MCP. The system was installed in response to the seepage of a light non-aqueous phase liquid (LNAPL), from spills of previous owners, into the East Ditch that is located at the eastern perimeter of the former facility property. The LNAPL is a processing oil that contains BEHP, NDPA, and trimethylpentenes. The system was designed to create a groundwater cone of depression to prevent migration of the LNAPL and allow for mechanical removal of the material. Groundwater extracted during operation of the system is treated to remove iron and ammonia as well as dissolved organic compounds. The treated groundwater is discharged to surface water on the former facility property in compliance with a Remediation General Permit (RGP). The Plant B groundwater extraction and treatment system includes a larger building which houses the treatment plant and a smaller building which houses a transfer pump and electrical panels (Figure 1.3-1). This system makes use of three pre-existing insulated above ground storage tanks (ASTs) (Tanks 1, 2 and 7) for storing treated and untreated water. Two other non-insulated ASTs (Tanks 3 and 4) exist but are not used in the treatment system, except to store or circulate water over weekend periods. Two other small tanks (Tanks 5 and 6) are located within the treatment building and are used as pre-carbon treatment hold tank and a residence tank.

Treated groundwater is discharged to the South Ditch via the on-Property West Ditch. Treated groundwater is discharged in batches daily between Monday and Friday during normal working hours. Groundwater extracted on weekends is stored in tanks on the Olin property for Monday discharge.

Slurry Wall / Cap Containment Area

The Slurry Wall/Cap is a containment structure that was constructed in 2000/2001 as a Release Abatement Measure (RAM) consistent with the MCP and approved by MADEP. The intent of this source control action was to eliminate, to the extent feasible, the on-Property DAPL source material as a source of dissolved constituents to groundwater. The containment structure is comprised of a perimeter slurry wall keyed into bedrock and a temporary cap to minimize infiltration of precipitation into the containment area. Construction of the slurry wall was preceded by a pre-design boring program to determine the depth to bedrock. The slurry wall fully contains the on-Property DAPL and overlying groundwater located within the containment structure. Along the northern, eastern and southern portions of the slurry wall, the DAPL contained within the perimeter of the slurry wall is at an elevation below the point where the slurry wall is keyed into bedrock. On the western, hydraulically upgradient side of the slurry wall, a gravel equalization window was constructed in the top of the slurry wall to maintain equal hydraulic pressure between groundwater inside and outside of the containment structure. The temporary cap is a scrim reinforced polyethylene sheet cover, with sewn seams, held in place by sandbags.

On-Property Ditch System and Surface Water Bodies

The on-Property ditch system consists of natural drainages that were modified in the early 1950s to improve drainage during site development (the on-Property West Ditch and the on-Property South Ditch) and a natural wetland drainage complex (Ephemeral Drainage). The on-Property South Ditch is subdivided into the Upper South Ditch (west of the Delta Area) and the Lower South Ditch (east of the Delta Area). These features are shown in Figure 1.3-2. A surface water body, known as the Central Pond, and a large wetland area known as the Central Wetland is located north of and adjacent to the Lower South Ditch. Central Pond does not outlet to South Ditch. The Ephemeral Drainage is a natural groundwater discharge area, and when groundwater water levels support flow along its southern channel, the Ephemeral Ditch flows into the Lower South Ditch.

Treated groundwater from Plant B is piped underground to an outfall located approximately 100 feet west of the West Warehouse. Treated water from the outfall flows into the on-Property West

Ditch which flows along the western side of the Property, and is contained in a culvert along the western side of the Slurry Wall/Containment Area. The culverted on-Property West Ditch terminates in a concrete outlet structure that functions like a broad crested weir, allowing the water to flow out and over a gravel apron into the Upper South Ditch. This confluence is located immediately downstream of a concrete weir that was constructed in the Upper South Ditch in 2000. The weir controls water levels in the up stream off-Property West Ditch System, which flows into the on- Property South Ditch.

Established Conservation Area

The southern half of the Property is forested, except in the southwestern corner where the closed Calcium Sulfate Landfill is located. The forested area and the formerly developed area are separated by the South Ditch and bordering wetland areas of the Ephemeral drainage. Approximately 20 acres within this forested area is subject to the terms of an Environmental and Open Space Restriction that restricts future commercial development activities on the portion of the Property.

Calcium Sulfate Landfill

The Calcium Sulfate Landfill (CSL) location and plans were approved by the Massachusetts Department of Public Health (MADPH) and the Town of Wilmington Board of Health in 1974. The Site was operated as a mono-fill from 1975 to 1987, receiving fine-grained gypsum sediment removed from the former facility settling ponds. The CSL is approximately 2.5 acres in size with a volume of approximately 37,000 cubic yards. In 1987 the CSL was capped, covered with top soil, and seeded with final closure status requested in 1988. Olin has requested final closure certification of the CSL in accordance with the Massachusetts Solid Waste Management Regulations (310 CMR 19.000). An application for final closure certification and a Post Closure Monitoring Plan have been submitted to the MADEP for review and approval (MACTEC, 2006a, MACTEC, 2006b).

Off-Property Surface Water

Off-Property surface water bodies included within the OU2 are located to the east and west of the Olin Property. To the east, a railroad drainage ditch known as the East Ditch, flows south and is intersected by the off-Property portion of the South Ditch. From here the East Ditch flows southeast and south into the New Boston Street Drainway. A ditch system known as the off-

Property West Ditch is located on the west side of the Olin Property and flows into the on-Property South Ditch.

A large wetland complex located further to the west of the Olin property occurs on the western side of Main Street and includes two named streams including Maple Meadow Brook (MMB) and Sawmill Brook.

Off-Property Groundwater

Groundwater occurs in two primary geologic units including the unconsolidated sand and gravel deposits and the underlying fractured crystalline bedrock. The unconsolidated overburden deposits are locally heterogeneous, however over the Site scale these sand and gravels are found to exhibit fairly uniform properties (Geomega, 2001a) typically with high porosity and permeability, and are capable of transmitting large quantities of water. Approximately 2,000 feet northwest of the Property under the Maple Meadow Brook (MMB) wetland, the unconsolidated deposits attain appreciable thicknesses and form a highly transmissive, though shallow, overburden aquifer above the Western Bedrock Valley. Under the Property and to the south east, these overburden deposits are thinner and bedrock is more frequently exposed at ground surface. Groundwater in bedrock occurs principally in secondary porosity features (e.g., fractures) as the bedrock has limited primary porosity. Where studied, the bedrock groundwater system has low permeability and low yield and transmits a small amount of groundwater compared to the overburden aquifer.

An overburden groundwater divide bisects the Site and the northern half of the Property, from north east to south west. The location of the divide is sensitive to relatively small changes in groundwater elevation and moves laterally seasonally in response to changing precipitation patterns. Groundwater within the Site flows away from this divide both to the northwest towards the Ipswich River Watershed and to the south east toward the Aberjona River Watershed. The major drainage basins in the area of the Site are presented on Figure 1.3-3.

The Site is bisected by a sub-regional watershed divide located approximately along Main Street to the west, and Eames Street to the north of the Property. Most streams in the Wilmington area are supported by shallow groundwater discharge (IEP, Inc., 1990) and consequently groundwater flow patterns tend to closely mimic those of surface water. Surface water (and groundwater) to the north and west of this divide flows to the Ipswich River Watershed and to the south and east of this divide, flows to the Aberjona River Watershed.

As indicated previously, the MMB wetland overlies a buried bedrock valley in filled with glacial till and outwash deposits, known as the MMBA. In 1961 Wilmington installed a municipal well, known as the Chestnut Street well No. 1, at the northwestern end of this wetland, screened at shallow depth (40-55 feet below ground surface (bgs)). This well was supplemented by the Town Park Well in 1965 (screened from 29-39 feet bgs), the Butters Row No. 1 well in 1971 (screened at 39-52 feet bgs), and the Butters Row No. 2 well in 1979 (screened at 36-46 feet bgs). In 1981, Wilmington built a treatment plant on the Butters Row Site for treatment of groundwater extracted from these four wells. Finally in 1991, the Chestnut Street well No. 2/1A was installed and screened from 45 to 50 feet bgs. The Butters Row Treatment Plant also treats water from one other well designated as the Shawsheen Avenue Well

The Town of Wilmington operates a public water system that includes the Butters Row Treatment Plant (BRTP) and five wells within the MMBA including the Chestnut Street No. 1 and No. 1A/2 wells, the Butters Row No. 1and No. 2 wells, and the Town Park Well. The BRTP also treats water from one other well designated as the Shawsheen Avenue Well.

The wells were not in use immediately prior to sampling in February 2003. During 2002, the Town wells were in use intermittently, with certain wells being taken off-line by the town during different time periods in response to concerns of potentially exceeding nitrite standards in the distribution system. In October 2002, the town ceased use of all the wells (except Town Park) in the MMBA. In February 2003, the Town activated the two Butters Row wells and the two Chestnut Street wells and pumped them to waste for two days to allow collection of raw water samples (untreated) from these wells on February 26, 2003. A raw water sample was also collected from the Town Park Well that was in operation prior to and after the sampling. The results of the NDMA analysis of raw water samples from these wells ranged from not detected (ND) in the Town Park Well (reporting limit of 0.000002 mg/L) to 0.000166 mg/L. The MADEP office of Research and Standards derived a water guideline for NDMA for a thirty year exposure period at a concentration of 0.000010 mg/L (10 ng/L) and an immediate action level of 0.000200 mg/L (200 ng/L). Although detected concentrations of NDMA were below the immediate action level, based on these sampling results, the Wilmington Water Department suspended operation of all five wells in the MMBA in April 2003. The five MWSWs have remained off-line since February 2003.

On February 25, 2003, samples were collected from the Butters Row Treatment Plant (untreated incoming water & treated water leaving the plant) and analyzed for NDMA. Additionally, eleven samples from the distribution system and storage tanks were collected and analyzed for NDMA. NDMA was not detected in any of these samples at a reporting limit of 0.000002 mg/L (2 ng/L). At the time of this sampling, water from the Shawsheen Avenue Well and the Town Park Well was being treated at the Butters Row Treatment Plant.

Even though the wells were below the immediate action level, based on these sampling results, Olin worked with the town of Wilmington to develop a supplemental water source through a water purchase agreement from adjacent communities. This supplemental water source remains in service. In order to provide a permanent supply, the town is currently constructing a new connection to the MWRA system that is funded by Olin and the other respondents. Tentative completion of this line is scheduled for the end of 2007.

Three DAPL areas have been identified and characterized within the Western Bedrock Valley. The chemical and physical criteria that defines DAPL and discussion of investigations pertaining to delineation of the DAPL is described in Section 2 of this report. Each area of DAPL is contained by a bedrock ridge or saddle aligned across the bedrock valley, forming a bedrock depression. These areas include an Upper DAPL Pool, the Main Street DAPL pool, and a very small area within the Western Bedrock Valley. The Upper DAPL pool is situated under the Olin Property and adjacent properties along Jewel Drive. Olin has contained the on-Property portion of this DAPL area by installing a slurry wall keyed into bedrock. . The Main Street DAPL pool is located between the Upper DAPL Pool and Main Street. The locations and relationship of these DAPL areas to the groundwater system are discussed in detail in Sections 3 and 4 of this report. The DAPL is a residual source material contributing some dissolved constituents to groundwater through chemical diffusion. As noted previously, the initial introduction of dissolved phase contaminants to groundwater resulted from convective mixing during initial disposal and migration of the dense fluids while the facility was being operated. The disposal into unlined pits and lagoons was discontinued after the installation of a treatment facility in the early 1970's, prior to Olin's purchase of the facility.

1.4 SITE HISTORY

The following sections provide a more detailed summary of the ownership and operational history of the former facility.

1.4.1 Ownership

The Property is a former chemical manufacturing facility located in Wilmington, Massachusetts that was owned and operated by several companies over its history. The facility was used to manufacture chemical blowing agents, stabilizers, antioxidants and other specialty chemicals for the rubber and plastics industry. The detailed ownership and operational history of the Property are presented in a 1993 Phase II Field Investigation Report by Conestoga-Rover and Associates (CRA, 1993). The chemical manufacturing facility was constructed in 1953 and was operated by National Polychemicals, Inc. (NPI). From 1953 to 1968 the business conducted by NPI was owned by three different corporations: American Biltrite Rubber Co., Fisons Limited, and Fisons Corporation, now known as NOR-AM Agro LLC. In 1968 Stepan Chemical Company bought the business, and continued to operate the facility until 1980, when the facility was purchased by Olin Corporation. Olin submitted closure plans for the plant facilities to MADEP and USEPA in April 1986 and closed the facility in the same year. Olin remains the current owner.

1.4.2 Former Facility Operations

The former manufacturing processes generated liquid wastes which contained sulfuric acid, sodium chloride, sodium sulfate, ammonium chloride, ammonium sulfate, chromium sulfate and other constituents. Former manufacturing operations included Plants A, Plant B, Plant C-1, C-2, C-3, and Plant D (Figure 1.4-1). Between 1953 and approximately 1970, all liquid wastes generated at the chemical factory were disposed of in unlined pits on the northern half of the property. These pits included Lake Poly, East and West Pits and the Acid Pits (Figure 1.4-1). The unlined pits, which were operated prior to Olin's ownership of the Property, were the most significant disposal areas (Smith, 1997).

Lake Poly was an unlined surface impoundment approximately one-fifth of an acre in size located near the on-Property West Ditch. The liquid waste stream to Lake Poly included process wastes, cooling tower and boiler blow down waters, discharge from yard and floor drains, and the

laboratory (Smith, 1997). Sodium dichromate was used in the Kempore process and acidic wastes containing chromium were discharged to unlined pits until 1967. After 1967 sodium dichromate was no longer used. These wastes percolated through the porous soil underlying the pits and overflowed into the on-Property ditch system. Prior to 1964, the West and East Pits also received the Kempore process and acidic liquid wastes (Smith, 1997). These pits were filled in sometime between 1964 and 1965 prior to construction of the West and East Warehouses. After construction of the East and West Warehouses the Acid Pits were excavated further to the south and consisted of three unlined pits located between the warehouses and the South Ditch.

In the early 1970's, two lined lagoons and an acid treatment and neutralization system were added to the Property to replace the unlined Acid Pits and Lake Poly, both of which were subsequently filled in. The lined lagoons received mainly acidic wastes that did not contain sodium dichromate wastes and were neutralized with lime. The acid treatment and neutralization system initially discharged to on-Property ditches. In approximately 1972 the system was connected to a municipal sewer. The acid neutralization in the lined lagoons resulted in precipitation of calcium sulfate (gypsum) and the lagoons were periodically dredged of this material. The gypsum dredge spoils were managed at the Calcium Sulfate Landfill. According to monitoring data from the late 1970s, the lined lagoons were leaking. Upon purchase of the property in 1980, Olin made several improvements to the facility. The lagoons were re-lined in approximately 1981 and 1983. The original liners were polyvinyl chloride (PVC) and were replaced by Olin with 36 mil thickness hypalon liners. Leaks in process sewer lines were also repaired in approximately 1983 and 1984.

Plant B Area operations included a former chemical production area and a former tank farm for storing raw materials such as BEHP, NDPA, and "process oils" (Smith, 1997). The reported occurrence of an oily seep in East Ditch was reported as early as 1973 in communication from MADEP to Stepan Chemical Corporation. In 1981, Olin installed a concrete pad and curb under the above ground storage tanks as a spill containment measure. Contaminated soil encountered during construction of the containment structure was excavated and disposed off-site at facility licensed to receive such materials.

The former facility also contained buried drum areas and a buried debris area that predated Olin's ownership of the facility (Figure 1.4-1), but were discovered by Olin during 1980 maintenance activities (relining of Lagoon II) and post closure environmental assessments described in Section 2. Drum Area A consisted of drums, drum remnants, debris and miscellaneous waste.

Contaminants detected included NNDPA, BEHP, trimethylpentenes, and chromium. Drum Area B consisted of drums remnants, laboratory bottles, debris and miscellaneous wastes. Contaminants detected included NNDPA, BEHP, phthalates, and chlorobenzenes. The buried drum areas also contained Opex (dinitrosopenta-methylenetetramine) and Kempore (azodicarbonamide). Opex was used as a nitrogen–releasing expanding agent in the preparation of natural and synthetic rubbers, PVC plastisols, and epoxy, polyester and silicone resins. Kempore was used as a foaming or blowing agent for cellular and thermoplastic resins (Smith, 1997). The Buried Debris Area contained mostly debris which was similar to the material in Lake Poly (Smith, 1997). Details of the environmental assessment and response actions at these areas are described in Section 2.

In September and October 2000 and again in May 2001, impacted peat and organic sediments were excavated from the Buried Debris area and the excavated material was disposed of off-site at a facility approved to receive this material (GEI, 2001a, GEI, 2001b).

Olin ceased operations in 1986 and, in accordance with lagoon closure plans approved by MADEP, closed the lined lagoons, and disposed of remaining gypsum spoils and the liner material in the Calcium Sulfate Landfill. Subsequently buildings that are no longer present were demolished and removed from the Property.

Prior to and subsequent to ceasing operations at the former facility, predecessor owners and Olin initiated environmental assessments and investigations at the Site. These previous investigations are discussed in Section 2.

1.5 REGULATORY FRAMEWORK

The Site was listed on the NPL pursuant to CERCLA Section 105, 42 U.S.C. § 9605 on April 19, 2006 (71 FR 20,016). Olin has entered into an Administrative Settlement Agreement and Order on Consent with the USEPA to conduct an RI/FS. The Settlement Agreement is issued under the authority vested in the President of the United States by Sections 104, 107 and 122 of CERCLA, as amended, 42 U.S.C. § 9604, 9607 and 9622. This authority is further delegated to the Director, Office of Site Remediation & Restoration (OSRR), by EPA Region I Order No. 1200, dated June 30, 1995. The effective date of the Settlement agreement is July 3, 2007.

The work conducted under this Settlement Agreement is subject to approval by EPA and will be completed in compliance with CERCLA, the NCP, and all applicable EPA guidance, policies, and procedures and specifically the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, EPA 540/G-89/004 OSWER-Dir. 9355.3-01, October (USEPA, 1988). The scope of work for the RI/FS is contained in the Statement of Work – Remedial Investigation and Feasibility Study – Olin Chemical Superfund Site dated June 2007 ("the SOW") and incorporated by reference into the Settlement Agreement. The scope of work defines specific work activities, deliverables, and schedules and provides references to additional guidance and requirements for the work to be performed.

The lead Agency for oversight of this RI/FS is Region 1 USEPA. USEPA is responsible for review, comment and acceptance of documents prepared and submitted by and on behalf of Olin and /or other respondents.

1.6 REPORT ORGANIZATION

As discussed previously, the purpose in preparing this Focused RI Report is to avoid duplication of previously completed efforts and maximize the efficiency of future RI data collection activities. This is to be accomplished by merging previously compiled environmental reports, results of testing, and other relevant information, into OU specific summaries and providing an evaluation of existing data relative to spatial coverage, and EPA data quality and usability objectives.

This report is organized in accordance with the USEPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988), and the example RI outline appended to the SOW.

The Site has been subjected to many years of investigations and cleanups (response actions) carried out by Olin and supervised by MADEP under Chapter 21E of the General Laws of Massachusetts and the MCP. The Site has been a Priority site under the MCP since 1993, and a Tier I site since 1994. This document provides a compilation and summary of previous work conducted at the Site and incorporates that information in a format consistent with the RI report format. Prior MCP work scopes were developed to meet Site objectives and priorities that arose in response to data from phased investigations for specific media or areas at the Site. These individual investigations often comprised data collection and assessment activities involving multiple media, and over areas

that overlap current, proposed OU boundaries. The data developed in accordance with the MCP were reviewed and validated in accordance with MCP data validation criteria and are of known quality and usability, comparable to USEPA criteria. This report includes a summary of prior analytical programs and includes a data quality assessment. These data are summarized and presented on a Site-wide and OU-specific basis to describe the nature and distribution of Site related contaminants. The discussion on the nature and extent of contaminants forms the basis for assessing data gaps and recommendations for future work.

This report is organized as follows:

Section 2 Study Area Investigations

Section 2 presents detailed summaries of previous investigations and investigation methods. This includes summaries of contaminant source area investigations and/or removal actions for Lake Poly, Plant B, Former Drum and Debris Areas, Acid Pits, the Sewer System, the on-Property and off-Property DAPL pools. The Calcium Sulfate Landfill is being closed under the Massachusetts Solid Waste regulations and but is also discussed in Section 2. This section also presents summaries of prior investigations and / or removal actions concerning surface water and sediment related to on-Property and off-Property ditches. Geological investigations are summarized including results of bedrock coring and seismic studies and investigations concerning vadose zone soils are also presented. The sequence of investigations concerning on-and off-Property groundwater is summarized followed by other media including indoor air, biota, human population and ecological surveys. Section 2 also describes groundwater, and surface monitoring programs, in addition to prior groundwater modeling studies. The section concludes with a summary of the analytical program and an assessment of data quality including MCP data validation procedures and their comparability to current USEPA protocols, and resulting analytical data quality and usability.

Section 3 Physical Characteristics of the Study Areas and Land Use

Section 3 describes the physical characteristics of the Site and includes a review of topography, geology, hydrogeology, surface water, meteorology, demography, land use, and ecology. The current MADEP groundwater classifications that pertain to the Site are discussed under land use.

Section 4 Nature and Extent of Contaminants

Section 4 presents the nature and distribution of contamination in soil, surface water, sediment and groundwater. This section is organized according to OUs and includes subsection 4.1 for OU1, subsection 4.2 for OU2 and subsection 4.3 for OU3. Each of these subsections presents tables of detected analytes, and a discussion of background conditions where appropriate. The nature of detected analytes is summarized by chemical class and distribution of analytes is outlined through a series of figures that includes the major indicator parameters that have been identified for the Site. The figures are not inclusive of every detected compound, rather those that contribute to an understanding of the nature and extent of site-related impacts. Each media subsection contains a data gap assessment.

OU 1 (Subsection 4.1) includes on-Property vadose zone soil, surface water, sediment, indoor air and biota. The objective of this section is to present data on current conditions (contaminants remaining in place after response actions). The figures for this section include confirmation sample results for areas where removal actions occurred, but do not present distribution of the contaminants that have been removed via remedial actions.

OU 2 (Subsection 4.2) includes off-Property surface water and sediment and presents the nature and distribution of contamination and a discussion of background conditions for each of these media. This operable unit includes the MMB Area, off-Property West Ditch, off-Property East Ditch/ New Boston Street Drainway, and North Pond.

OU3 (Subsection 4.3) includes on-Property and off-Property groundwater. Previous investigations have evaluated groundwater in the context of groundwater usage and MCP groundwater categories. The MCP defines current and potential drinking water source areas as category GW-1 groundwater. Current and potential drinking water sources areas may be identified as such due to current or potential future public, community or private water supplies. Within the boundaries of the Site, there are currently no community or private water supplies. There is currently no known potable use of Site groundwater. Residential properties within the Site are connected to the public water supply. A municipal water supply for the Town of Wilmington, including five municipal water supply wells, is located within the boundaries of the Site. A consultant for the Town of Wilmington has previously identified the zone of contribution for the five MWSWs (IEP, 1990). That zone of contribution is referred to as the Zone II of the public water supply system. Currently, within the boundaries of the Site, the groundwater area identified as Zone II is the groundwater that

is classified as category GW-1 per the MCP. Based on these designations, the groundwater discussion in this Focused RI Report has been subdivided into groundwater within Zone II and groundwater outside of Zone II in accordance with current water use classification

Section 5 Contaminant Fate and Transport/Conceptual Site Model

Section 5 presents discussion of contaminant fate and transport and the current conceptual site model. This discussion relates sources of contamination with the hydrologic setting in discussion of potential routes of contaminant migration and exposure including groundwater, surface water, sediment and air. The chemical and physical properties of contaminants and their setting are discussed in the context of contaminant persistence and ultimate environmental fate. Contaminant migration in each media is summarized including a separate subsection on groundwater/surface interaction.

Section 6 Risk Assessment

Section 6 presents and summarizes historical risk assessments that have conducted since 1991 to quantify and address human health and ecological risk management at the Site. The equivalency of the procedures used to USEPA risk assessment methods are discussed. More than 30 individual multi-media risk assessments and supplements, focused risk assessments, risk screenings and Imminent Hazard Evaluations have been conducted. Detailed summaries of these risk assessments are included in a comprehensive Appendix.

Section 7 Summary and Conclusions

The final section, presents the summary and conclusions related to nature and extent, fate and transport of contamination, and risk assessment.. This section summarizes relevant limitations of data represented in the Focused RI Report and provides recommendations for future work to be addressed by the next deliverable, the RI/FS Work Plan.

2.0 STUDY AREA INVESTIGATIONS

Environmental investigations have been conducted at the Site beginning prior to 1980. These investigations were related to wastewater, groundwater, and surface water as well as the development and operation of the Calcium Sulfate Landfill (CSL). Geotechnical Engineers, Inc. (GEI) conducted groundwater and surface water investigations described in the document titled Report on Groundwater and Surface Water Study, Stepan Chemical Company, Wilmington, Massachusetts (GEI, 1978). New England Pollution Control Company conducted a soil and groundwater investigation along the eastern boundary of the facility concerning the LNAPL release in that area (NEPCO, 1980). Ecology & Environment, Inc. produced for USEPA the Site Inspection Report for the Facility in December 1980 (Ecology & Environment, Inc., 1980) which focused on water pollution control and RCRA compliance. On behalf of the Massachusetts Department of Environmental Quality Engineering (MADEQE), now known as MADEP, Wehran Engineering Corporation produced a Phase I Site Inspection Report for the Facility (Wehran, 1986).

The earlier historical investigations were focused on potential source areas associated with the operation of the Facility. The 1993 Comprehensive Site Assessment, hereafter referred to as the 1993 CSA (CRA, 1993), was focused on potential source or release areas identified as Solid Waste Management Units (SWMUs). This Resource Conservation and Recovery Act (RCRA) approach was used to structure this MCP submittal (Phase II Report) and was subsequently augmented by investigations intended to delineate nature and extent of release of oil and/or hazardous materials and to characterize the representative concentrations in environmental media to support risk characterizations and evaluation of remedial requirements. These investigations were conducted in a manner that is in compliance with the Massachusetts Contingency Plan (MCP). The 1997 Supplemental Phase II Report (Smith, 1997) was a comprehensive report of investigations conducted for the Facility and the remainder of the MCP Site (MADEP Release Tracking Number 3-0471).

2.1 PREVIOUS INVESTIGATIONS

Results of previous environmental investigations, studies and assessments have been documented in numerous reports over the past three decades. Table 2.1-1, starting in1993, lists several of the

major reports important relative to the Site understanding that has evolved over this period of time. These reports are complied on CD as a reference to this Focused RI Report. This CD is located at the end of the references. The Section 2.1 discussion of the previous investigations is organized by the following topics in separate subsections:

- Surface Features
- Contaminant Source Investigations and Removal Actions
- Meteorological Investigations
- Surface Water and Sediment Investigations
- Geological Investigations
- Soil and Vadose Zone Investigations
- Groundwater Investigations
- Indoor Air Investigations
- Biota Investigations
- Human Population Surveys, and
- Ecological Surveys.

Documentation of the investigations described in this section has been previously submitted to MADEP during the course of MCP activities. The 1993 Comprehensive Site Assessment (CRA, 1993) and the 1997 Supplemental Phase II Report are the two main sources of information concerning investigations conducted prior to June 1997. The 1997 Supplemental Phase II Report (Smith, 1997) is the most recent comprehensive site assessment document for the Site that has been prepared and submitted to MADEP. Since June 1997, a large number of investigations, removal actions, remedial actions, and monitoring programs have been conducted under the jurisdiction of the MADEP and in compliance with the MCP. Formal reports for each of those activities have been prepared and submitted to MADEP and to the public repository for the Site. This Focused RI Report includes a comprehensive review of investigation and remedial activities conducted for the Site, including activities conducted before and after the 1997 Supplemental Phase II Report.

The investigations conducted since 1997 have resulted in refinements in the understanding of the Site (including the boundaries of the Site) and removal actions and remedial activities have resulted in changed conditions at the Site, particularly at the former Facility. These changed conditions include removal and containment of contaminant source areas, modification of surface hydrology, and subsurface hydrogeologic conditions. This section (2.1) identifies and summarizes the

investigations conducted to date, but does not present detailed findings and conclusions of those investigations. Section 4.0 (Nature and Extent of Contamination) and Section 5.0 (Fate and Transport) present and summarize the findings and conclusions of many of the investigations that are identified in the current section of the Focused RI Report.

Tables and figures have been prepared to assist in the identification and summary of previous investigations. These figures and tables are intended to complement the text contained in Section 2.1 as well as the following sections of this report. The figures and tables include:

- Figure 2.1-1 Surface Soil Sample Locations
- Figure 2.1-2 Subsurface Soil Sample Locations
- Figure 2.1-3 Soil Sample Locations That No Longer Represent Site Conditions (Excavation)
- Figure 2.1-4 Surface Soil Sample Locations Representative of Current Site Conditions
- Figure 2.1-5 Subsurface Soil Sample Locations Representative of Current Site Conditions
- Figure 2.1-6 Monitoring Well Sample Locations and Municipal Water Supply Well Locations
- Figure 2.1-7 Surface Water Sample Locations
- Figure 2.1-8 OU1 Sediment Sample Locations
- Figure 2.1-9 OU2 Sediment Sample locations
- Figure 2.1-10 OU1 Sediment Sample Locations That No Longer Represent Site Conditions (Excavation)
- Figure 2.1-11 OU1 Sediment Sample Locations Representative of Current Site Conditions
- Figure 2.1-12 Lake Poly Field Investigation -2001
- Figure 2.1-13 2004 Lake poly Excavation Limits
- Figure 2.1-14 Location of Remediation-Related Stockpiles
- Figure 2.1-15 Surface Water and Sediment Background Locations
- Figure 2.1-16 Soil Background Sample Locations
- Figure 2,1-17 Main Street Bedrock Saddle Investigations
- Figure 2.1-18 Residential Well Sample Locations

Figures 2.1-1 and 2.1-2 contain the locations of surface soil and subsurface soil samples respectively collected at the Site (including excavated samples that no longer represent Site

conditions). These figures should be consulted during the discussions of soil investigations, removal actions, and confirmatory sampling events. Figure 2.1-3 contain the locations of soil samples that no longer represent current Site conditions (excavation). Figures 2.1-4 and 2.1-5 contain the locations of all surface soil and subsurface soil samples respectively collected at the Site that are representative of current site conditions. The locations of samples collected from soils that were subsequently excavated are not included on those figures. Figure 2.1-6 identifies monitoring well and municipal water supply well sampling locations. Figure 2.1-7 includes all surface water sampling locations. Figure 2.1-8 includes OU1 sediment sample locations and Figure 2.1-9 identifies OU2 sediment sample locations. Figures 2.1-10 and 2.1-11 contain locations of all OU1 sediment samples collected and only those OU1 sediment sample locations that have not been excavated respectively. Figures 2.1-12 and 2.1-13 identify Lake Poly sample locations and excavation limits. Surface water and sediment background locations are identified in Figure 2.1-15 and background soil sample locations are identified in Figure 2.1-16. Figure 2.1-18 identifies the location of residential well samples.

- Table 2.1-1 Listing of Primary Reports
- Table 2.1-2 Summary of Soil Samples Collected to Date – By Area
- Table 2.1-3 Summary of Soil Samples Collected to Date – By Date
- Table 2.1-4 Summary of Sediment Samples Collected to Date – By Area
- Table 2.1-5 Summary of Sediment Samples Collected to Date – By Date
- Table 2.1-6 Summary of Surface Water Samples Collected to Date – By Area
- Table 2.1-7 Summary of Surface Water Samples Collected to Date – By Date
- Table 2.1-8 Summary of the Construction-Related Release Abatement Measure (C-RAM)
- Table 2.1-9 July 2001 Soil Samples From Lake Poly Area Submitred for Laboratory Analysis
- Table 2.1-10 Stockpile/Waste Characterization Sample and Imported Soil Sample Summary
- Table 2.1-11 Chronological Summary of Surface water and Sediment investigations
- Table 2.1-12 Groundwater Monitoring Wells – Chronological Order
- Table 2.1-13 Summary of Water Samples Collected from Wells at Private Residences
- Table 2.1-14 Summary of Town Wells and Butters Row Treatment Plant Groundwater Samples
- Table 2.1-15 Summary of biological Tissue Samples Collected To Date

Table 2.1-2 lists all soil samples that have been collected at the Site (excluding soil stockpile and waste characterization samples which are not representative of site conditions). In this table, samples are grouped by physical location (or area of interest). For example, all soil samples associated with the Lake Poly Area are grouped together (in the "Area" column, the samples are identified as "Lake Poly") and are listed chronologically for that area. The table indicates what analytical parameters are associated with each sample. For each chemical parameter group (e.g. VOCs, SVOCs), the table indicates the number of chemical parameters (number of compounds) listed for each sample. The table also indicates which soil samples are no longer representative of Site conditions because they have been excavated. This table supports the discussions of soil investigations and removal actions for specific source areas in the following sections. Table 2.1-3 lists all soil samples that have been collected at the Site in chronological order. This table supports the discussions of the overall soil investigations that have been conducted at the Site.

The corresponding tables for sediment and surface water are structured in the same manner as Table 2.1-2. Summary tables are also presented for groundwater sampling.

2.1.1 Surface Features

Surface features at the Site have been characterized using aerial and on-site topographic survey techniques. The topography of the Site is discussed in Section 3.0. Studies have also been conducted to determine the shape of the bedrock surfaces and those investigations are discussed in Section 2.1.5 and in Section 3.0.

2.1.2 Contaminant Source Investigations and Removal Actions

This section identifies and summarizes source area investigations and removal actions at the Site. Specific source areas that are discussed include the Former Lake Poly Liquid Waste Disposal Area (Lake Poly), the DAPL source areas, the former Plant B Area, Drum Areas A and B, the Buried Debris Area, the East and West Pits (beneath the warehouses), the Sewer Lines, and the Calcium Sulfate Landfill. A discussion of a comprehensive investigation, removal, and remediation program precedes individual source area discussions.

Some initiatives taken at the site were multi-media programs that are not limited to single specific subsections below. For example, the Construction-Related Release Abatement Measure (C-RAM)

was a multi-component program that involved investigation, removal actions, remedial activities, and monitoring programs. Not all of the activities were focused solely on source areas, but rather on receiving media as well (for example, sediment). Because the C-RAM was such an extensive activity and its components involve multiple source areas and multiple media, the C-RAM activities are summarized here prior to the discussions of individual source area and medium-specific investigations. The C-RAM was conducted after the Phase II Investigation by Smith (Smith 1997)

The C-RAM Plan was submitted to MADEP in two components (Part 1 and Part 2). The Part 1 of the C-RAM Plan was submitted to MADEP on April 6, 2000 (GEI, 2000a) and was conditionally approved by MADEP on June 26, 2000 (MADEP, 2000a). Part 1 of the C-RAM Plan contained a Focused Site Characterization (FSC), Focused Risk Assessment (FRA), and Focused Feasibility Study (FFS) consistent with the MADEP's Policy No. WSC-00-425, Construction of Buildings in Contaminated Areas (MADEP, 2000b). Part 1 of the CRAM Plan was submitted to support the proposed redevelopment of the property and its use as a warehouse facility. That proposed redevelopment plan was not implemented.

Part 2 of the Construction-Related RAM Plan was submitted to MADEP on July 24, 2000 (GEI, 2000b) and was conditionally approved by MADEP on August 9, 2000 (MADEP,). Part 2 of the Construction-Related RAM Plan proposed activities intended to make the property suitable for the specific warehouse redevelopment plan that had been proposed in 2000. The original Part 2 C-RAM objectives were to:

- Remove chromium- and phthalate-impacted sediments from selected portions of the on-Property Ditch System that exceeded MCP Upper Concentration Limits (UCLs) and to achieve, to the extent feasible, background concentrations of chemicals of concern; and

- Contain residual on-Property DAPL and overlying contaminated groundwater within a subsurface containment system to reduce the discharge of contaminated groundwater and thereby mitigate the impact on surface water and sediments in the on-Property Ditch System.

Additional C-RAM objectives were added via RAM Plan Modifications. The additional objectives included:

- Eliminate three locations (Lake Poly-1, A8CW-1, and RSO-6) of soil contamination (areas termed "hot spots"per the MCP);
- Initiate a monitoring plan to monitor groundwater and surface water quality after the completion of the C-RAM activities (referred to as the Post Construction Monitoring Plan (PCMP);
- Delineate the historical limits of the former Lake Poly Liquid Waste Disposal Area and excavate soil with chemical concentrations exceeding soil UCLs;
- Excavate oily soil along the banks of the Central Pond; and
- Develop a plan for dismantling the Bioremediation Cell and for the reuse or disposal of the Bioremediation Cell drainage sand.

The Part 2 Construction-Related RAM activities were conducted from 2000 through 2004. Several activities included pre-remedial investigations, removal actions, additional delineation activities with additional removal actions, and confirmatory sampling programs. Table 2.1-8 lists the C-RAM plans, modifications to the plans, approvals, status reports, and completion report. The activities have been documented in several Part 2 Construction-Related RAM Status Reports and Interim Status Reports (GEI, 2000c, GEI, 2001b, GEI, 2001c, GEI, 2002a, GEI, 2002b, GEI, 2003a, GEI, 2003b, GEI, 2004a, and GEI, 2004b). Status Report No. 8 summarizes all of these activities. The Completion Statement and Addendum to Status Report No. 8 (GEI, 2004c) is the closure document for the C-RAM. The activities that were conducted included those approved in the original Part 2 RAM Plan as well as those activities that were included in the approved modifications to the Part 2 Construction-Related RAM Plan (GEI, 2000d, GEI, 2000e, GEI, 2000f, GEI, 2001d, GEI, 2001e, GEI, 2001f, GEI, 2001g, GEI, 2001h, GEI, 2001i, GEI, 2001j, GEI, 2002c, and GEI, 2002d). The MADEP approved (in some cases with conditions) the original RAM Plans as well as modifications (MADEP, 2000d, MADEP, 2000e, MADEP, 2000f, MADEP, 2001a, MADEP, 2001b, MADEP, 2001c, MADEP, 2002b, MADEP, 2003a, MADEP, 2004a, MADEP, 2005a).

The following activities were completed during that time (as summarized in the C-RAM Status Report No. 8 (GEI, 2004b):

- Pre-Construction Activities
  - Fifteen soil borings along the alignment of the slurry wall
  - Former industrial use production well (MW99) was formally closed and abandoned

  - Five surface water samples were collected from the on-property ditch system to establish pre-construction surface water quality and support an application for an NPDES Permit Exclusion
  - Pre-construction sediment characterization of the on-Property West Ditch Wetland demonstrated that much of the southern and western area of the on-Property West Ditch Wetland was not significantly impacted by historical waste disposal practices
- Construction Activities
  - Containment Wall/Cap System
  - Bioremediation Cell
  - Surface Water and Storm Water Management Structures
- Sediment Excavation and Confirmatory Sampling
  - On-Property West Ditch and West Ditch Wetland
  - Buried Debris Area
  - South Ditch and the Delta
  - Central Pond/Central Drainage Area
- Hot Spot Excavations/Lake Poly
  - Lake Poly-1
  - A8CW-1
  - RSO-6
- Central Pond Oily Soil Remediation
- Remediation Waste and Soil Management
  - Soil Transported Off-Property
  - Pending off-site disposal was completed (addendum and completion report)
  - Soil Re-Used on the property
  - Soil Currently Stockpiled On-Property
    - Topsoil
    - Biocell Drainage Sand
    - Other Soil Stockpiles
    - Dewatering effluent
- Monitoring Activities
  - Monitoring during Construction and Remediation Activities
  - Post-Construction Monitoring
    - Surface water monitoring
    - Groundwater monitoring
    - Sediment monitoring

  - Temporary cap Inspections
  - Analysis of PCMP Data /Slurry Wall and Cap performance evaluation
- Assessment of the C-RAM Impacts on Site Characterization

A Drum Removal RAM (D-RAM) was conducted with the Construction-Related RAM to remove drums, debris, and associated impacted soil from the Property. The Status Report No. 2 and Completion Statement for the Drum Removal RAM (D-RAM) was submitted to MADEP on July 12, 2001 (GEI, 2001k). The D-RAM activities are discussed in detail in Section 2.1.2.4.

2.1.2.1 Lake Poly

The former Lake Poly was a source area that had been the subject of several investigations and remedial actions. This area was an unlined pond that received acidic, chromium-containing liquid manufacturing wastes from manufacturing operations. The following subsections summarize the investigations and remedial actions conducted at the former Lake Poly Area.

2.1.2.1.1 Investigations

Soil and groundwater investigations, soil removal activities, and post-excavation confirmatory sampling have been conducted in the Lake Poly area. The soil and groundwater investigations have been conducted to identify nature and extent of soil and groundwater impacts associated with activities at Lake Poly and to support risk assessments for the area.

2.1.2.1.1.1 Soil Investigations

Table 2.1-2 identifies the soil samples collected for the Lake Poly area. Table 2.1-2 also identifies the sampling depth; the chemical analysis performed for each of the samples, and also indicates if the soil associated with the sample has subsequently been excavated. Figures 2.1-1 and 2.1-2 identify the surface soil and subsurface soil sampling locations in the Lake Poly area.

In the June 1991 CSA Subsurface Soil Investigation, subsurface soil samples BH12, BH14, BH16, BH17, and BH18 were collected in and around the former Lake Poly (CRA, 1993). These samples were analyzed for the full Site-Specific Parameter List (SSPL) including ammonia, chloride, cyanide, and sulfate.

In January 1995, four subsurface soil samples were collected by Smith (LPB-1(4-6 ft bgs), LPB-1(6-8 ft bgs), LPB-2(7-8 ft bgs), and LPB-2(8-9 ft bgs) from locations identified as LPB-1 and LPB-2 respectively (Smith, 1997). These samples were analyzed for SSPL (including ammonia, chloride, and sulfate) but excluding pesticides and PCBs.

In December 1996, Smith collected four surface soil samples (0-1 ft bgs) from locations LAKE POLY-1, LAKE POLY-2 (two samples), and LAKE POLY-3 (Smith, 1997). These samples were analyzed for SSPL including ammonia and sulfate but excluding PCBs.

In response to the February 27, 1998 MADEP letter (MADEP, 1998a) providing Conditional Approval of the Supplemental Phase II Report (Smith, 1997) and comments provided in a meeting at MADEP on June 23, 1998, Harding Lawson Associates (HLA) collected additional soil samples to determine if hexavalent chromium was present in soils and to determine if additional risk assessment was warranted to address potential for allergic contact dermatitis. On November 24, 1998, HLA collected six surface soil samples (0 – 2 ft bgs) including one duplicate and five subsurface soil samples (6 – 8 ft bgs) from within the former Lake Poly area to determine if hexavalent chromium was present in soil from this area where chromium concentrations were indicative of releases of chromium. Samples were designated as SS101XXLPX through SS105XXLPX (plus the duplicate SS103XXLPD) and SB101XXLPX through SB105XXLPX. The locations identifiers for all of these November 1998 soil samples are LP-101 through LP-105.

Samples were submitted to STL for analysis of total chromium (Method ICP 6010A), hexavalent chromium (Methods 3060A/7196A), total organic carbon (Method IR 9060), soil pH (Method 9045), and oxidation-reduction potential (Eh via electrode). On November 30, 1998, three additional surface soil samples (chain of custody sample IDs 101A, 102A, and 104A) and three additional subsurface soil samples (chain of custody sample IDs 101B, 102B, and 104B) were collected and submitted for analysis of chromium, hexavalent chromium, and percent solids. These samples were collected from locations LP-101, LP-102, and LP-104.

In November 1999, LAW collected two soil samples and a duplicate from the Lake Poly area (locations LP-1 and LP-2) and submitted the samples for analysis for the pesticide Fenazaflor and degradation products. A total of nine soil samples, including one duplicate, were collected during

this sampling event from the Lake Poly area as well as from the Central Pond area, the warehouses, and the on-Property West Ditch. This other program is discussed in the Subsection 2.1.6.1.2.6.

In May 2001, two trenches were excavated via test pitting to determine the extent of the Kempore seam that had been observed during the November 2000 chromium hot spot removal and to assess subsurface conditions that might contribute to chromium soil concentrations greater than the corresponding MCP UCL of 10,000 mg/kg. Two subsurface soil samples (4.5 ft bgs) were collected from the two excavated trenches at locations LAKE POLY1-01 (western end of Trench No. 1) and LAKEPOLY1-02 (southern end of Trench No. 2) (GEI, 2001c October interim Status Report). These samples were analyzed for cadmium, chromium, lead, VOCs, SVOCs, and ammonia. Modification No. 8 of the Part 2 Construction-Related Release Abatement Measure Plan prepared by GEI and submitted to MADEP in June 2001 (presented as Appendix B of the 2001 Interim Status Report for Lake Poly) documents the trenching activities, the collection of the soil samples from the trenches, and presents the analytical data for those samples (GEI, 2001i).

The text and Appendix B (Supporting Documents), Appendix C (Field Investigation Methods/Procedures), and Appendix D (Boring and Monitoring Well Logs) of the Interim Status Report – Former Lake Poly Area Assessment, Part 2 Construction-Related Release Abatement Measure Plan (GEI, 2001c) document the soil and groundwater investigations in the Lake Poly area in July 2001. Appendix B to the Interim Status Report is Modification No. 8 of the Part 2 Construction-Related Release Abatement Measure Plan prepared by GEI and submitted to MADEP in June 2001. The July 2001 soil and groundwater investigations were proposed in Modification No. 8 of the Construction RAM Plan. MADEP approved Modification No. 8 verbally on June 19, 2001.

As reported in the October 12, 2001 Construction-Related Release Abatement Measure Interim Status Report – Former Lake Poly Assessment (GEI, 2001c), in July 2001, GEI collected surface and subsurface soil samples from varying depths at locations LPB1 through LPB34 in order to delineate the horizontal and vertical extent of soil impacts by chromium in the Former Lake Poly area. The samples were collected, and a tiered approach to submittal of samples for laboratory analysis was used. A total of 83 soil samples were collected from 32 soil boring locations (LPB1 through LPB34 (no samples were collected from LPB20 or LPB21)). At each location, a sample was collected to represent each of three strata (if present). The three strata were: potentially unaffected surficial granular fill; potentially affected soil, sediment (of the former Lake Poly) or

disposal material; and potentially unaffected soil underlying or bordering other areas. All soil samples were field-screened for VOCs by jar headspace analysis using PID. All soil samples were submitted for expedited laboratory analysis of total chromium and, in selected cases, for ammonia.

Based on these results, the soils (and soil volumes) within the investigation area were classified into one of three categories: Zone A (little or no evidence of impacted soil or disposal materials); Zone B (soils close to proposed redevelopment areas); and Zone C (evidence of impacted soil or disposal materials). Based on this classification of soils, additional samples were submitted to the laboratory as shown in Table 2.1-9. The confirmatory analytical suite included VOCs, SVOCs, pesticides, arsenic, cadmium, chromium, lead, EPH, and VPH. The disposal analytical suite included the confirmatory suite plus PCBs, barium, mercury, selenium, silver, reactivity, ignitability, and corrosivity. Selected samples representative of the Zone B and Zone C soils were also submitted for Toxicity Characteristic Leaching Procedure (TCLP) chromium analysis. Figure 2.1-12 shows the three zones identified based on the sampling and analysis (GEI, 2001c).

On August 27, 2003 a Scope of Work for further investigations to assess the potential presence of NDMA, formaldehyde, and hydrazine in the vicinity of the former Lake Poly (MACTEC, 2003a) was submitted to MADEP as an addendum to Modification No. 8 of the C-RAM Plan. MADEP conditionally approved the SOW on November 7, 2003 (MADEP, 2003a). On November 19, 2003, GEI submitted a letter (GEI, 2003c) to MADEP confirming additional modifications to the SOW. A November 20, 2003 letter from MADEP to the Massachusetts Secretary of Environmental Affairs (MADEP, 2003b) indicated that in support of the proposed redevelopment of the property, additional evaluation of NDMA, formaldehyde, and hydrazine must be completed and the previously prepared Focused Site Characterization, Focused Risk Assessment, and the Focused Feasibility Study would need to be updated based on information concerning NDMA, formaldehyde, and hydrazine.

On December 12, 2003 MADEP issued a Final Conditional Approval letter for the additional investigations in the area of the former Lake Poly (MADEP, 2003c). In December 2003 MACTEC collected surface and subsurface soil samples at locations LPB-40 through LPB-50 from up to three distinct soil horizons including surficial soil (samples designated as OVR), a layer of visually impacted material (samples designated as VI), and a deeper horizon (samples designated as BLW). Visually impacted material was observed and sampled in the borings at six locations (LPB-40, LPB-41, LPB-42, LPB-43, LPB-48, and LPB-50). All samples were analyzed for acetaldehyde

and formaldehyde (SW846 Method 8315a), hydrazine and monomethylhydrazine (MMH) and unsymmetrical dimethylhydrazine (UDMH) via method STL-DEN-WC-0048, and NDMA via EPA Method MOD 8270C. The field activity report, including soil boring logs, analytical results, and a risk assessment, was submitted to MADEP on February 10, 2004 (MACTEC, 2004a). NDMA, MMH, UDMH, and acetaldehyde were not detected in any of the soil samples. Hydrazine was detected in only one soil sample and formaldehyde was detected in only two samples. The report concluded that the target compounds do not indicate a direct contact risk for commercial/industrial workers or construction workers and therefore changes to the planned excavation of the ammonia hot spot in the area of Lake Poly was not necessary for those constituents.

In June 2004, upon completion of the Lake Poly soil excavation activities for ammonia, confirmatory subsurface soil samples were collected from the bottom of the excavation (LP-BOT-A through LP-BOT-C) and the sidewalls of the excavation (LP-C01 through LP-C09) plus one duplicate sample (GEI, 2004b, Appendix D). The confirmatory samples from the excavation bottom were composite samples each comprised of four discrete samples. The bottom of excavation samples were collected from approximately 8.5 feet bgs. The sidewall samples LP-C01 through LP-C08 were collected on June 9, 2004. Each of the sidewall samples was collected over an approximate two-foot interval near the bottom of the excavation. These samples were analyzed in the laboratory for total chromium (EPA Method 6010B) and ammonia nitrogen (LAC 107061B) in order to evaluate soil concentrations relative to the MCP soil UCLs. All ammonia and chromium concentrations in the bottom of excavation samples and in sidewall samples LP-C02 through LP-C08 were below the corresponding UCLs. However, the ammonia concentration in sample LP-C01 was above the ammonia UCL. Therefore, on June 14, additional excavation of soil was conducted at the location of LP-C01. Upon completion of that excavation, a confirmatory sample LP-C09 was collected at the new limit of excavation and the concentration of ammonia was below the UCL.

Figure 2.1-13 shows the final limits of soil excavation activities in the Lake Poly area.

2.1.2.1.1.2 Groundwater Investigations

Consistent with the MADEP's December 12, 2003 Final Conditional Approval for additional investigations in the area of the former Lake Poly, three borings were completed as monitoring

wells (GW-LPB-40, GW-LPB-44, and GW-LPB-47) during the December 2003 soil boring program (MACTEC, 2004a). Figure 2.1-6 shows those monitoring well locations. These monitoring wells were installed to a completion depth of approximately 15 feet bgs and were constructed with ten feet of 0.010 slot well screen and sufficient un-slotted riser to bring the wells to grade. The well screen sand pack extended to approximately one foot above the screen. An approximate two foot bentonite seal was placed above the sand pack, and the rest of the boring was filled with the overlying fill material and/or cement. Each of the wells was finished with a standpipe cemented in place.

On December 18 and 19, 2003, groundwater samples were collected, per USEPA Region I 1996 low stress-low flow guidelines, from eight monitoring wells within and adjacent to the former Lake Poly area. Wells sampled included GW-28S, GW-289D, GW-29S, GW-29D, GW-LPB-11, GW-LPB-40, GW-LPB-44 (upgradient), and GW-LPB-47. These monitoring well locations are shown on Figure 2.1-6 The details of the well purging, sampling, shipping, and laboratory analysis are contained in the February 10, 2004 Field Activity Report (MACTEC, 2004a). All eight samples were analyzed by STL Laboratory for acetaldehyde and formaldehyde (SW846 Method 8315a), and hydrazine via method STL-DEN-WC-0048. These compounds were target analytes because they were considered by MADEP to be potential precursors for NDMA formation in groundwater. In addition, groundwater samples from GW-LPB-40, GW-LPB-44, and GW-LPB-47 were analyzed for NDMA by a modified Method EPA 1625/625. The other five wells had recently been sampled and analyzed for NDMA on August 25 and 26, 2003. Hydrazine, formaldehyde, or acetaldehyde were not detected in any of the groundwater samples. NDMA was detected at concentrations ranging from 7.6 ng/l (parts per trillion) at well GW-LPB-47 to 130 ng/l at well GW-29D.

2.1.2.1.1.3 Opex and Kempore Investigations

Kempore was visually identified as a yellow solid material in the subsurface in the former Lake Poly Area during early investigations. Kempore (also referred to as azodicarbamide or ADA) has been used as a blowing agent in the rubber and plastics industries to expand a wide range of polymers. The expansion results from the release of nitrogen and other gases during heating. Kempore , typically listed in the ingredients list as azodicarbonamide or ADA, is used in the food industry as a flour bleaching agent and improving agent. Kempore is used widely in breads and pastries. Kempore is typically a yellow crystalline powder. A trenching excavation program was

conducted in May 2001 to determine the extent of the Kempore material (GEI, 2001c). During the Lake Poly excavations in 2004, Kempore was also visually identified within the area of excavation (GEI, 2004b). In a letter dated March 29, 2005, MADEP stated that Kempore appears to be present beyond the limits of the excavation, representing an exceedance of the Upper Concentration Limit, and that this condition was a barrier to a permanent solution per the MCP MADEP, 2005a). A letter submitted to MADEP on June 23, 2005 (MACTEC, 2005a) presented the technical documentation that the presence of Kempore material does not represent a significant risk to health, safety, public welfare, and the environment.

2.1.2.1.2 Removal Actions and Confirmatory Investigations

The Interim Status Report – Former Lake Poly Area Assessment, Part 2 Construction-Related Release Abatement Measure Plan (GEI, 2001c) briefly summarizes the November 2000 chromium hot spot (as defined under the MCP) removal from the Lake Poly area. All of the removal actions and confirmatory investigations for soil in the Lake Poly area are summarized in the Part 2 Construction-Related Release Abatement Measure (RAM) Status Report No. 8 dated September 7, 2004 (GEI, 2004b).

Consistent with the Modification No. 3 of the Part 2 RAM Plan (GEI, 2000f) which was conditionally approved by MADEP on November 2, 2000 (MADEP, 2000f), Sevenson excavated the chromium soil hot spot (Lake Poly – 1) on November 17, 2000. The C-RAM Status Report No. 1 (GEI, 2000c) documents the soil removal activities conducted in November 2000. The excavation was 10 feet wide, 10 feet long and 10 feet deep. Four confirmatory sidewall samples (LAKE POLY 1-N, LAKE POLY 1-E, LAKE POLY 1-S, and LAKE POLY 1-W) and one bottom of excavation sample (LAKE POLY 1-B) were collected and submitted for analysis of SVOCs, VOCs, pesticides, cadmium, chromium, and lead. The excavation was backfilled with imported clean granular fill. The excavated soil (approximately 40 cy) was stockpiled pending additional investigation and remediation of Lake Poly soil. The post-excavation confirmatory sample results indicated that additional excavation was required for the Lake Poly–1 chromium hot spot as indicated in the C-RAM Status report No. 2 (GEI, 2001a). Concentrations of chromium were above applicable MCP Method 1 standards and the soil Upper Concentration Limits in two of the confirmatory sidewall samples.

In addition to the Lake Poly excavations, two additional soil hot spots (A8CW-1 (B(a)P) and RSO-6 (cadmium) were excavated as C-RAM activities on November 17, 2000. These locations are shown on Figure 2.1-3. The program that delineated those hot spots is discussed in Section 2.1.6.1.2.8.

The MADEP approved the final scope of work and extent of additional excavations in the Lake Poly area on April 28, 2004 (MADEP, 2004b). That approval concurred that the ammonia hot spot area that had been identified for excavation in the April 2003 Focused Feasibility Study (FFS) (GEI, 2003d) was still appropriate. Consistent with that approved scope of work, between June 7 and June 15, 2004 approximately 600 cubic yards of subsoil was excavated and disposed off-site in order to eliminate soil concentrations of ammonia and chromium above corresponding MCP soil UCLs. Appendix D of Status Report No. 8 of the Construction-Related RAM (GEI, 2004b) presents the detailed documentation of the excavation activities, confirmation sampling and analysis, and site backfilling and restoration. That report concluded that chromium and ammonia concentrations in the soil remaining in the former Lake Poly area are below UCLs and therefore meet the objectives of the RAM. The confirmatory sampling is described in detail above. The limits of the final soil excavation activities are presented on Figure 2.1-13 (from Figure D1 in Appendix D of CRAM Status Report No. 8).

2.1.2.2 Dense Aqueous Phase Liquid (DAPL)

The DAPL is a dense, acidic, chromium-containing, high-dissolved solids waste material that has come to be located in the subsurface at the bedrock surface at locations under the former Facility, and adjoining areas of the Site, between the western Property boundary and just west of Main Street, and immediately to the west of the facility, and at one location within the Maple Meadow Brook Aquifer further to the west. The DAPL is a source material and its chemical, geochemical, and physical characteristics have been investigated and the locations where it is present have been delineated. A laboratory column study (Geomega, 2004a) was conducted to evaluate the feasibility of treatment of the DAPL by pump and treat remedial techniques. A containment structure comprised of a slurry wall and a temporary cap has been constructed to contain the area of DAPL located on-Property. The design of a Pilot Test for DAPL extraction in the off-Property West Ditch Area is in process and is described in the Interim Response Steps Work Plan, submitted to EPA in July 2007 (MACTEC, 2007). The following subsections summarize the investigations and remedial actions conducted with respect to the DAPL.

2.1.2.2.1 Investigations

As reported in the Supplemental Phase II Report (Smith, 1997), downhole specific conductance profiling was performed at selected monitoring wells between 1993 and 1995 to determine the extent of DAPL to the west, east, and southwest of the facility. The specific conductance (conductivity) of a fluid is directly related to total dissolved solids (TDS) and therefore is a good investigation and monitoring tool to define the presence and vertical limit of DAPL, which characteristically has high TDS. Using this physical property, electromagnetic inductance logging was used to characterize the vertical elevation of the top of DAPL and horizontal distribution of the DAPL. Since the DAPL is a dense fluid contained within a series of cascading bedrock depressions, knowledge of each DAPL pool elevation, combined with knowledge of the bedrock topography greatly aids in establishing the horizontal limits of each discrete DAPL pool with certainty. In addition, between February 1 and February 10, 1995, a terrain conductivity survey was conducted as an aid in the identification of the location of DAPL in the bedrock valleys at and around the Site (Smith, 1997).

Between September 19 and September 22, 1995, a cone penetrometer testing (CPT) program was conducted at six locations (CPT-1 through CPT-6) within known DAPL areas to examine the interface between the DAPL and the overlying ground water (Smith, 1997). In particular, the CPT was conducted to determine if the interface is sharp or wide and gradational (thicker dispersive zone). The widespread occurrence of cobbles and boulders made it difficult to collect data from the surface down to the bedrock surface by CPT drilling methods (Smith, 1997).

Electromagnetic inductance logging was conducted on a number of different wells between August 1992 and March 1997 to provide data on the location and depth of the DAPL. The wells where this inductance logging was implemented include: GW-22D, GW-27D, GW-30DR, GW-34D, GW-35D, GW-36, GW-40, GW-42D, GW-43D, GW-44D, GW-45D, GW-58D, GW-59D, GW-61BR, GW-62BR GW67D, GW-68BR, GW-69D, GW-70D, GW-71D, GW-82D, GW-83D, GW-84D, GW-85D, GW-86D, and GW-87D (Smith, 1997).

Following the 1997 logging events, inductance logging was conducted annually through 2005. In addition to the wells previously logged, GW-103BR and GW-103D were included in the logging program. In Geomega's report concerning the 2005 inductance logging event (Geomega, 2005a), it

is reported "the primary aim of the inductance-logging/multilevel piezometer sampling is to track the extent and thickness of the dense aqueous phase liquid (DAPL) that resides on and near the Property, and to monitor other areas within the Western Bedrock Valley for any changes in the distribution of Site-related constituents that may not be apparent from routine water quality sampling and chemical analyses." A report for each of the annual inductance logging events has been prepared and submitted to MADEP (Geomega, 1998a, Geomega, 2000a, Geomega, 2001b, Geomega, 2002a, Geomega, 2002b, Geomega, 2003a, Geomega, 2004b, Geomega, 2005a).

In a report titled Results of the August, 1998 Multilevel Piezometer Sampling Event and DAPL/Diffuse Layer Discrimination Analysis (Geomega, 1999), the physical characteristics and chemical data were used to derive a technical basis for discriminating DAPL from the diffuse layer and overlying groundwater. The term diffuse layer referred to the groundwater immediately above the DAPL, into which DAPL constituents diffuse prior to being transported with groundwater by advective processes, and diminished in concentration by dispersion and reaction with the aquifer matrix (reactive transport). Based on a comprehensive statistical analysis of data collected during the August 1998 MLP sampling event, groundwater samples with specific gravity greater than or equal to 1.025 represented a statistically distinguishable population compared to the groundwater samples from diffuse/ambient groundwater (Geomega, 1999). Therefore, the working definition of DAPL, used throughout the MCP investigations, identifies samples with specific gravity greater than or equal to 1.025 as DAPL material (it is recommended that specific gravity be measured using the ASTM hydrometer test (Method D1298)). A number of DAPL parameters were correlated with specific gravity, and the following cutoff concentrations corresponding to a specific gravity of 1.025 have been identified:

- Ammonia concentration greater than 1,250 mg/l;
- Chloride concentration greater than 2,800 mg/l;
- Magnesium concentration greater than 270 mg/l;
- Sodium concentration greater than 1,700 mg/l;
- Sulfate concentration greater than 16,000 mg/l; and
- Specific conductance greater than 20, 600 µmhos/cm.

Specific conductance has been used frequently in the absence of specific gravity data, to discriminate DAPL samples from diffuse layer groundwater samples.

A predictive equation was developed for calculating specific gravity based on concentration data for multiple chemicals, rather than on a concentration data for a single parameter (Geomega, 1999). The equation is:

$$SG = 2.6 \times 10^{-7} \times SO_4^{2-} + 1.3 \times 10^{-6} \times Na^{+} + 3.7 \times 10^{-6} \times Cl^{-} + 7.4 \times 10^{-7} \times NH_3 + 1.01$$

Concentrations of sulfate, sodium, chloride, and ammonia are in dimensions of mg/l.

Multilevel piezometers have been installed to obtain a vertical characterization of groundwater chemistry above and within the DAPL and (in some cases within the diffuse layer groundwater) to understand potential future transport of DAPL constituents of concern. The Waterloo System multilevel piezometers from Solinst Canada were installed with multiple sampling ports to provide more accurate characterization of vertical profiles of groundwater quality than had been accomplished previously.

A total of five multilevel piezometers (MP-1 through MP-5) have been installed and studied to characterize DAPL and groundwater quality and to monitor DAPL characteristics and groundwater quality over time. MP-1 (within the footprint of the current containment structure and near the historical waste disposal features), MP-2 (between the property boundary and Jewel Drive in the upper Western Bedrock Valley), and MP-3 (on the Koch property north of Eames Street and east of Main Street which is within the Western Bedrock Valley and downgradient of MP-2) were installed in March 1996. The boreholes were drilled with a Barber dual wall air rotary drill rig using a standard air rotary hammer, while simultaneously advancing an 8-inch ID temporary steel casing. The boreholes for MP-1 and MP-2 were advanced to bedrock. The borehole for MP-3 did not encounter bedrock and was terminated at 67 ft bgs (which was at least 10 feet into the DAPL).

MP-4 was installed on the western side of Main Street further downgradient within the Western Bedrock Valley in March and April 2000. The MP-4 boring encountered bedrock at 65 ft bgs and the boring was terminated at 176 feet bgs. The boring was drilled with a rotosonic drill rig, advancing a temporary 6-inch diameter casing to 75 ft bgs. Bedrock was cored from 75 ft bgs to 176 ft bgs using an HQ wire line coring rig.. The HQ borehole was reamed to 6 inch diameter using a mud-rotary rig. MP-5 was installed in the Western Bedrock Valley during September and October 2005 (MACTEC, 2005b). The MP-5 borehole was advanced to competent rock at 98 ft

bgs by rotosonic methods using a temporary 7.5 inch diameter steel casing. The borehole was then terminated at 106.7 ft bgs. MP-5 was installed to the bottom of the boring. DAPL has not been observed in MP-5. A monitoring well triplet (GW-88S, GW-88M, and GW-88D) was also installed in the Southern Bedrock Channel during the MP-5 mobilization as an additional component of the 2005 Pre-Remedial Investigation.

The sampling ports in the multilevel piezometers are located throughout the water column but clustered (spaced closer together) to be able to characterize concentration gradients across the DAPL and "diffuse layer" groundwater interface and the overlying groundwater above it. Sampling ports were located close together (1.5 feet) at depths where a sharp concentration gradient was expected (e.g., across the DAPL/diffuse interface) and further apart (up to 5.5 ft) at depths where lesser gradients were expected (e.g., overlying groundwater). The Waterloo Systems have a sampling port that is emplaced in a sand pack, thus, the smallest discreet screened interval is about 1.5 feet. Sampling ports were number sequentially from deepest to the most shallow (for example, in MP-5, ports 1 through 15).

On an annual basis, simultaneous with the inductance logging program, the multi-level piezometers were typically sampled (multiple ports in each piezometer) and the groundwater samples were submitted to the laboratory for analysis of bicarbonate alkalinity, chloride, nitrate and nitrite as N, ammonia nitrogen, sulfate, pH, and specific gravity. Measured field parameters included temperature, specific conductance, dissolved oxygen, pH and Eh. Analysis for other metals including (filtered samples) for aluminum, calcium, chromium, iron, magnesium, and sodium have also been completed for the multilevel piezometer samples at selected times. In March 2003, all TAL metals (unfiltered) were analyzed in addition to the typical analytical parameter list. The results of the annual multilevel piezometer sampling and analysis have typically been reported with the results of the annual inductance logging events. Therefore, the annual multilevel piezometer sampling and analysis events are documented in the annual Inductance Logging and Multilevel Piezometer Sampling reports that have been submitted to MADEP (Geomega, 1998a, Geomega, 2000a, Geomega, 2001b, Geomega, 2002a, Geomega, 2002b, Geomega, 2003a, Geomega, 2004b, Geomega, 2005a). All of the investigations discussed above as well as the numerous groundwater investigations have been utilized to identify and map the locations of DAPL associated with the Site. The results are discussed in Section 4.0.

An extensive laboratory column study and geochemical study designed to evaluate the efficacy of using pump and treat as a technology for the removal of DAPL from the subsurface has been conducted (Geomega, 2004a). The geochemistry of the DAPL, its potential interaction with aquifer materials, and the potential reaction of DAPL with unimpacted groundwater raised questions concerning the possibility of aquifer clogging and the feasibility of DAPL removal using pump and treat technology. Therefore, the objective of the column study was to evaluate the hypothesis that DAPL extraction via pumping is a viable remedial alternative.

The column study included: the collection of aquifer core samples from the DAPL-impacted subsurface near the multilevel piezometer MP-2; the design of column tests to simulate DAPL extraction in the aquifer; sampling and analysis of DAPL indicator parameters of influent and effluent from the column tests; partitioning studies of DAPL constituents using the actual aquifer materials (from the cores), and extensive analysis of the data and extrapolation of that data to expected real-world conditions.

The column tests evaluated the likely removal requirements (in terms of pore volumes replaced) for a controlled extraction of DAPL material only (very limited mixing with un-impacted groundwater) to remove DAPL (DAPL, as defined previously based on specific gravity of greater than 1.025). The column studies concluded that:

- Pumping at least 1.5 pore volumes could potentially attain a condition where DAPL is no longer present;
- Plugging of the aquifer material by solids such as iron precipitates and metal sulfates could potentially adversely affect DAPL extraction;
- Due to partitioning of DAPL constituents between the DAPL and aquifer materials, and retention of DAPL ganglia, some DAPL material may remain in the aquifer materials in the solid phase after removal of 1.5 pore volumes;
- After removal of 1.5 pore volumes, acid sulfate solid phases could result in elevated dissolved phase concentrations for an unknown period of time;
- Lower pump rates would minimize release of DAPL constituents to the overlying un-impacted groundwater and also minimize the formation of precipitates during pumping;
- Mass removal would become much less efficient after removal of 1.5 pore volumes as reduction in mass remaining becomes asymptotic.

The information generated and the conclusions of the DAPL column tests have been used in the development of the plan to conduct a Pilot Test for DAPL Extraction in the off-Property West Ditch Area, which is a continuation of the DAPL Pool that Olin isolated on-Property portion of with the slurry wall containment structure described in the next section. The DAPL Extraction Pilot Test is intended to determine the feasibility of DAPL extraction in the OPWD Study Area. The Pilot Test was originally proposed as an MCP Release Abatement Measure (RAM) (GEI, 2004d). MADEP, in a letter dated June 22, 2005 (MADEP, 2005b) approved the intent to complete the DAPL Extraction Pilot Test as a RAM. Information developed during the DAPL Extraction Pilot Test will be used in the FS for groundwater. The design of the DAPL Extraction Pilot test is proceeding in accordance with the Draft Interim Response Steps Work Plan prepared by MACTEC on behalf of Olin and submitted to USEPA in July 2007 (MACTEC, 2007).

2.1.2.2.2 Remedial Actions

One component of the C-RAM was the construction of the slurry wall containment structure and temporary cap. The containment structure was installed as a source control measure to contain on-Property DAPL and overlying contaminated groundwater in order to mitigate the discharge of contaminated groundwater to surface water and sediments in South Ditch.

Between October 24 and December 9, 2000, a 3-foot wide soil-clay containment wall (referred to as the slurry wall) was installed from ground surface to the top of bedrock in the southwestern portion of the property (GEI, 2000c). The location of the slurry wall (perimeter of the containment structure) is shown on Figure 1.3-1. The maximum depth of the slurry wall was approximately 35 feet below ground surface. The slurry wall is comprised of a mixture of 65 percent excavated soil, 30 percent imported clayey glacial till, 3 percent processed attapugite clay, and 2 percent bentonite clay. During construction, these materials were mixed to project specifications. This material was placed into the slurry-supported excavation using continuous mud wave techniques. Laboratory tests of backfill material indicate a permeability of 5.0×10^{-8} centimeters per second (cm/sec) using both water and DAPL as permeants.

The temporary cap was completed in April 2001 over the entire containment area using 6-mil reinforced polyethylene sheeting. A gravel roadbed was installed around the eastern and southern perimeter of the temporary cap and slurry wall to allow vehicle access to the southwest area of the Site. The 6-mil sheeting was replaced in 2003 with an 8-mil polyethylene sheeting in which the

seams sewn with ultraviolet resistant thread to reduce potential leakage of precipitation. The new sheeting was ballasted with sandbags on a grid pattern to minimize potential wind uplift and damage. Olin instituted quarterly inspections to monitor the integrity of the temporary cap material, evaluate the need for periodic maintenance and document maintenance activities and repairs.

The containment structure was constructed with an equalization window on its western side to allow movement of shallow groundwater out of the structure, and equalize hydraulic pressure with surrounding groundwater. The equalization window is a gravel backfill section within the slurry wall located at an elevation corresponding to the water table. The equalization window is instrumented with two wells that allow measurement of water levels and collection of water quality samples to assess flux of groundwater and solutes through the window.

In 2000, a Post-Construction Monitoring Plan (PCMP) was prepared and monitoring was initiated to assess the performance of the subsurface containment structure in encompassing the DAPL and the temporary cap in minimizing the influx of precipitation and storm water into the containment structure. Since 2001, on a semi-annual basis, Olin has prepared a PCMP status report which has documented the post-construction performance monitoring for the containment structure. The PCMP monitoring program is discussed in Section 2.2.2.

2.1.2.3 Plant B

The Plant B area, located in the northeast portion of the facility, contains two source areas: the LNAPL area; and the EPH/VPH area. The LNAPL area is located between the current Plant B tanks and building and the East Ditch. The LNAPL is a processing oil that contains bis(2-ethylhexyl)phthalate (BEHP), N-nitrosodiphenylamine (NDPA), and trimethylpentenes. The EPH/VPH area is located immediately to the west of the current Plant B tanks and building (in the immediate area of the former Plant B production area as shown on Figure 1.4-1). This area has been impacted by a historical release of trimethylpentenes to the subsurface. The area has been referred to as the EPH/VPH area because trimethylpentenes are detected by the MADEP's Volatile Petroleum Hydrocarbons analytical method that has usually been conducted simultaneously with the Extractable Petroleum Hydrocarbons analytical method.

Remedial activities in the LNAPL area have included: a groundwater recovery, LNAPL removal, and groundwater treatment; air sparging/multi-phase extraction (AS/MPE); and nutrient injection to enhance biodegradation. In the LNAPL area, the Plant B groundwater recovery/treatment system has been in operation and its performance has been monitored since 1981 with continued operation from 1997 to present as an Immediate Response Action (IRA) under the MCP. The system was installed in response to the seepage of LNAPL into the East Ditch that is located at the eastern perimeter of the former facility property. The AS/MPE system has operated in the LNAPL area from December 2000 to present. From June 2004 through January 2006, Shaw Environmental (Shaw) operated the nutrient Injection system (NIS) on behalf of Olin.

The remedial activity in the EPH/VPH area was the operation of an air sparge/soil vapor extraction (AS/SVE) system from December 2000 through 2005.

The following subsections summarize the investigations and remedial actions conducted for the Plant B Area.

2.1.2.3.1 LNAPL Area

2.1.2.3.1.1 Investigations

In 1980 an investigation was conducted on the area along the eastern boundary of the Site where LNAPL seepage had been observed along the bank of the East Ditch (Wehran, 1986). Eleven soil borings were conducted and five observation wells (GW-13, GW-14, GW-15, GW-16, and GW-2A) were installed. A sample of the LNAPL material was collected for chemical analysis. Groundwater elevation measurements were made to determine groundwater flow direction.

Ecology & Environment, Inc. produced for USEPA the Site Inspection Report for the Facility in December 1980 (Ecology & Environment, 1980) which focused on water pollution control and RCRA compliance. In January 1980 Ecology & Environment, Inc. collected one soil sample (Station 110) from the Plant B area. One groundwater sample (GW-12) was collected from the Plant B area for head space screening. The seep material was also sampled and it was documented that phthalates, diphenylamine, dioctylamine, and other organics were present in that material. The Ecology & Environment report concluded that remediation was required to eliminate the on-going release of LNAPL to the East Ditch. That report further recommended that an impervious base and

confinement structure be provided for the Plant B tank farm to avoid spills to the environment. During the subsurface soil investigations to support the 1993 CSA (CRA, 1993), soil sample BH34 was collected between the current Plant B building and the East Ditch. This sample was submitted for laboratory analysis for the SSPL.

2.1.2.3.1.2 Remedial Actions

Based on the recommendations of the 1980 Ecology & Environment Report, a concrete pad and curb around the storage tank area was installed in 1981 and the Plant B groundwater containment/recovery system was installed in 1982. During construction, impacted soils were encountered and removed from under and around the storage tanks. The excavated soils were disposed at a secure off-site landfill (Smith, 1997) licensed to receive such materials.

The operation and monitoring of the Plant B remedial system has been conducted under an IRA in accordance with the MADEP Conditional Approval dated July 3, 1997. The LNAPL recovery/groundwater recovery and treatment system has been operated by Olin since 1981 as containment to prevent reoccurrence of LNAPL seepage and associated sheen to the East Ditch. The system was designed to create a groundwater cone of depression to prevent migration of the mechanical removal of the LNAPL. The LNAPL recovery system has been modified twice since the initial 1981 installation. In 1984, the initial three recovery wells were replaced by an additional five wells. Those wells were subsequently replaced by the existing three-well recovery system (IW-11, IW-12, and IW-13) in 1988. The Plant B LNAPL recovery/groundwater recovery and treatment system is operated continuously except for maintenance and repair activities.

Currently, three wells (IW-12, IW-11, and IW-13) are used for groundwater extraction (Figure 2.1-6). The Plant B treatment system uses pH adjustment (iron removal) and break point chlorination to treat ammonia in conjunction with liquid phase granular activated carbon for pretreatment and polishing to remove inorganic and organic compounds. Extracted groundwater is stored in a large vertical above ground storage tank (AST) (Tank 7) prior to treatment. Two additional horizontal ASTs (Tanks 1 and 2) are used for pH adjustment. The pH adjusted water is pretreated through a bag filter and two carbon beds in series, prior to break point chlorination with calcium hypochlorite solution. Treated water is polished through three additional carbon beds in series prior to discharge.

Water is treated 24 hours per day during weekdays. Treated water is discharged to the On-Property West Ditch wetland and flows into the South Ditch, immediately downstream of the weir, during standard weekday working hours. Overnight, treated water is stored in two additional horizontal ASTs (Tanks 3 and 4). During weekends, holidays or work dictated occasions, it is collected and stored in Tank 7 for treatment during standard weekday working hours. This water can also be circulated through the other tanks to prevent freezing of lines, pumps and tanks during cold weather months.

Treated groundwater is discharged in accordance with a Remediation General Permit (RGP) to the South Ditch.

LNAPL is recovered from the three extraction wells (IW-11, IW-12, and IW-13) using a floating skimmer in IW-11 and IW-13 with a trap. The skimmer and trap and all wells are checked on a weekly basis. It is also recovered from the water surface in GW-23, PID, 12-IN and P5 using a peristaltic pump when measurable LNAPL is observed. The volume of LNAPL recovered during the weekly check is measured and recorded. The recovered LNAPL is placed in a satellite storage drum. Periodically the material is manifested and shipped as hazardous waste to a licensed treatment/storage/disposal (TSD) facility.

Since June 2000, Olin has been collecting monthly water level, LNAPL thickness, and LNAPL recovery data from wells at the site. Over the last seven years,, the LNAPL recovery rate has declined significantly, and a total of 97.0 gallons of LNAPL have been physically recovered. Only 1.5 gallons of LNAPL was physically recovered in 2006, and 2007 is projecting a similar volume. This trend can be seen in the following table:

Annual LNAPL Recovery from 2000-2007

Year	2000	2001	2002	2003	2004	2005	2006	2007
Number of Months	6	12	12	12	12	12	12	3
LNAPL Recovered (Gallons)	35.2	34.9	13.1	6.4	3.7	1.8	1.5	0.4

Due to this consistent decline in LNAPL recovery, the cumulative LNAPL recovery is approaching an asymptotic limit. The LNAPL recovery rate is low and approaching a practical end point and the LNAPL is approaching an immobile state. The Plant B system has effectively controlled LNAPL migration and has effectively removed LNAPL.

The LNAPL removal has been augmented in-situ through AS/MPE and biostimulation. Implementation of the in-situ remediation system to enhance the cleanup of the Plant B LNAPL area was conditionally approved by MADEP August 4, 2000 and October 31, 2000.

Olin has operated an AS/MPE system to augment the LNAPL recovery system and to remove volatile compounds from the subsurface in the EPH/VPH area of Plant B. The principal contaminants in that area were trimethylpentenes. The in-situ measures were initially implemented as a Pilot Study, consisted of an AS/SVE and MPE (Multiphase Extraction Well Cluster System). The results of the Pilot Testing were submitted to MADEP for review and approval in August 2001 (Envirogen, 2001).

In February 2002, MADEP approved a modification to the remedial system to include a Nutrient Injection System (NIS) implementation. In October 2003, a laboratory study to evaluate the progress of biostimulation of BEHP and NDPA in the Plant B LNAPL area was completed as part of the operation and maintenance program associated with the NIS. The analytical and field results collected during September 2003 revealed the presence of the indigenous bacterial population responsible for biodegradation of BEHP and NDPA at the Site. The bacterial population's ability to degrade BEHP and NDPA was limited in nitrogen and oxygen. Based on these preliminary results, it was proposed to the MADEP that the original nutrient mix (mono- and di-potassium phosphate) be replaced with a solution of di-ammonium phosphate to satisfy both the nitrogen and phosphorous requirements of the BEHP and NDPA degrading bacterial population. In addition, it was proposed that the air sparge rate and frequency be increased to meet the biological oxygen demand. From June 2004 through January 2006, Shaw Environmental (Shaw) operated the NIS on behalf of Olin.

As part of MADEP's December 21, 2004 approval of modifications to the nutrient injection system at Plant B, MADEP requested additional monitoring to ensure that the increased AS does not result in vapor migration into indoor air, at Plant B. Air monitoring in Plant B was completed on September 8, 2005, and showed no indication of vapor migration due to the AS system.

Throughout the operation of the Plant B system as an IRA, Plant B Status Reports have been submitted to MADEP (LAW, 1999a, LAW, 1999b, LAW, 2001a, LAW, 2001b, LAW, 2002a,

LAW, 2002a, MACTEC, 2003b, MACTEC, 2003c, MACTEC, 2004b, MACTEC, 2004c, MACTEC, 2005c, MACTEC, 2005d, MACTEC, 2006c)

The Draft Interim Response Steps Work Plan submitted to USEPA in July 2007 (MACTEC, 2007) proposes an approach for a monitored shut down of the Plant B system.

2.1.2.3.2 EPH/VPH AREA

2.1.2.3.2.1 Investigations

During the subsurface soil investigations to support the 1993 CSA (CRA, 1993), samples BH30 and BH28 were collected in the EPH/VPH area to the west of the current Plant B tanks and building. These samples were submitted for laboratory analysis for the SSPL.

In October 2000 Envirogen installed air sparge/soil vapor extraction (AS/SVE) well clusters 1 through 20 in the VPH/EPH Area to the west of the current Plant B groundwater containment/treatment building. The AS/SVE system was installed to remove VOCs (particularly trimethylpentenes) from the subsurface in the area of monitoring well GW-16. This activity was conducted in accordance with a proposed modification of the on-going IRA for Plant B (Envirogen, 2000a that was approved by MADEP on August 4, 2000. The installation of the AS/SVE system and associated investigation activities are documented in Appendix C (Envirogen, 2000b) of the January 2001 Plant B IRA Status report (LAW, 2001a). Soil samples were collected during installation of air sparge wells to determine impacts to unsaturated zone and saturated zone soils. The soil samples are identified in Table 2.1-2 under the October 2000 Plant B AS/SVE Installation VPH/EPH Area sampling event.

Boring B-10 was installed through the slab of the former building but was abandoned due to elevated headspace readings in the breathing zone around the drill rig. A modification to the IRA Plan (the excavation of additional test pits) was proposed by GEI in a letter to MADEP dated October 31, 2000 (GEI, 2000g). That proposed modification was approved by MADEP verbally on November 1, 2000 and in writing on November 2, 2000. Subsequently, on November 1, 2000 additional test pit investigation was conducted, using Level B respiratory protection, in order to assess the nature and extent of contamination under the slab. One test pit was executed through the slab in the immediate area of boring B-10. The test pit was identified as TP-1, and a soil sample and a duplicate were collected from the bottom of the excavation (9.5 ft bgs) and one sample was

collected from the southwest sidewall of the test pit at 6 – 9 ft bgs. The location of this test pit has been identified as B-10. These samples were submitted for laboratory analysis for VPH, EPH, VOCs (8260), and SVOCs (8270), and urea.

On July 16, 2004 ten direct push soil borings and one temporary groundwater monitoring well were completed within the EPH/VPH Area (MACTEC, 2004d). Borings were advanced to depths ranging from 8 to 14 feet bgs. As the borings were advanced, soils were screened for VOCs using a photo ionization detector (PID). Within each boring, a soil sample was collected from the interval that exhibited the highest PID reading (unless visibly impacted soils were encountered, in which case multiple samples were obtained). Soil samples were carefully collected to minimize mixing of soil to prevent loss of volatiles and the samples were preserved according to USEPA SW-846 methodology and approved MCP laboratory guidance and placed on ice for storage prior to shipping. In some cases, if there were no significant OVA readings, one sample was collected from the interval immediately above the water table.

The soil sample locations were identified as SVESB-1 through SVESB-9. Soil samples were identified by the sample location and the start and end depth (in feet) of the sampled interval (e.g., SVESB-1-8-10). One soil sample was collected from each of the nine boring locations with the exception of SVESB-5 where two samples were collected. SVESB-5 was samples were collected from 6 – 8 feet bgs and also from 8 -11 feet bgs. Sample location SVESB-5 was intended to represent the area of the former soil boring B-10 as well as the samples collected from the previously excavated test pit (TP-1). Samples were analyzed for trimethylpentenes (Method 8260) and Volatile Petroleum Hydrocarbons (MADEP-MCP-VPH-04-1.1) for both fractions and target compounds. Figure 2.1-2 identifies the July 2004 soil sampling locations. The soil boring logs, chains of custody, data validation memoranda, and laboratory analytical reports for these soil samples were presented in Appendix A to Attachment A of Modification No. 3 of the Plant B IRA Plan (MACTEC, 2004d). Soil boring SVESB-9 was converted to a temporary small diameter monitoring well (SVEGW-9). This temporary well was not sampled on the day of installation. On July 22, 2004, MACTEC personnel collected a groundwater sample from SVEGW-9 and GW-303 within the EPH/VPH Area. Analysis of the samples was conducted for trimethylpentenes (Method 8260) and Volatile Petroleum Hydrocarbons (MADEP-MCP-VPH-04-1.1) [both fractions and target compounds]. The laboratory analytical reports for these groundwater samples are presented in Appendix A to Attachment A of Modification No. 3 of the Plant B IRA Plan (MACTEC, 2004d).

The July 2004 soil data show substantial reductions in trimethylpentenes and VPH relative to the October 2000 soil concentrations. These data are representative of remediation progress conditions for TMPs and VPH in soils in this area at the time of sampling. These data should be considered to represent conservative estimates of current conditions. These data were submitted to MADEP in the proposed IRA modification for the discontinuance of the AS/SVE in the EPH/VPH. MADEP approved the discontinuance of the AS/SVE system in that area in a letter dated March 21, 2005 (MADEP, 2005c).

2.1.2.3.2.2 Remedial Actions

From 2000 to 2005 Olin operated an AS/SVE system located west of the groundwater extraction and product recovery system, to treat the EPH/VPH area (in the immediate vicinity of the former Plant B production area as shown on Figure 1.4-1). The principal contaminants in this area were trimethylpentenes. Treatment of the EPH/VPH area was modified in 2002 to include a shut down test for the AS/SVE system in the EPH/VPH area that was conducted in July 2004. In a letter dated March 21, 2005 the MADEP approved the request to discontinue the operation of the AS/SVE system in the EPH/VPH area and the system was subsequently shut down and dismantled in August 2005. The MADEP concurred that the system had significantly reduced concentrations of volatiles in the soil and that the system had achieved or approached background conditions for volatile contaminants in groundwater within the EPH/VPH area. The AS/SVE system components in the LNAPL area were not dismantled.

2.1.2.4 Former Drum Areas and Debris Area

This section summarizes the investigations and remedial actions conducted for Drum Area A, Drum Area B, and the Buried Debris Area.

The former Drum Areas were initially identified in the initial 1991-1993 CSA (CRA, 1993) by a magnetometer survey and follow-up test pit activities. Drum Area A and Drum Area B were evaluated by an MCP IRA from 1994 through 1996 and subsequently, in an MCP Release Abatement Measure (RAM) during 2000 and 2001. The excavation and removals for Drum Area A and Drum Area B were conducted per the MADEP approved January 24, 2000 RAM Plan for Excavation of Buried Drums (LAW, 2000a). The MADEP provided conditional approval of the

RAM Plan in a letter dated February 14, 2000 (MADEP, 2000g). A status report for the D-RAM was submitted in 2000 (GEI, 2000h) and the Completion Statement for the Drum Removal RAM was submitted to MADEP on July 12, 2001 (GEI, 2001k).

The Buried Debris Area was remediated as a component of the C-RAM. The Buried Debris Area is located within the area that was referred to as the West Ditch Wetland during the implementation of the Construction-Related RAM as shown on Figure 1.4-1. Specifically, the excavation of the Buried Debris Area is documented in C-RAM Status Report No. 1 (GEI, 2000c) and in Status Report No. 8 (GEI, 2004b). These remedial actions are discussed in subsection 2.1.2.4.2.

2.1.2.4.1 Investigations

Magnetometer surveys (December 1990 and January 1991), test pit excavations (October 1991), and initial soil investigations (June 1991 through May 1993) were conducted to identify and investigate Drum Areas A and B and the Buried Debris Area. Test pits (TP) TP18, TP19, and TP20 were excavated in the Buried Debris Area, TP6, TP7, and TP8 were excavated in Drum Area A, and TP21 was excavated in Drum Area B. In October 1991, drum content samples were collected from drums located and removed from TP6, TP8, and TP21. Soil samples were also collected from locations TP19 and TP21. These samples were submitted for chemical analysis of VOCs, SVOCs, pesticides, PCBs, TAL metals, chloride, cyanide, ammonia, sulfate, and per cent solids (drum contents only).

On November 2, 1994 Olin notified MADEP that a release of hazardous materials from buried drums at the property posed an Imminent Hazard to public safety due to the potential explosive and flammable characteristics (as reported on Material Safety Data Sheets) of the chemical products azodicarbonamide (Kempore) and dinitrosopentamethylenetetramine (Opex) which had been previously reported to be present in test pits in the Drum Area. Fences were installed around the two drum areas to isolate the drum areas from human activities and possible ignition sources. On November 17, 1994 MADEP issued to Olin an MCP Notice of Responsibility and Interim Deadlines for the Buried Drum Area (MADEP, 1994a). The NOR established a new Release Tracking Number RTN: 3-11816 for the buried drum areas. The NOR required that chromatograms from previously collected soil and drum samples from the drum areas be researched to determine if Opex and Kempore could be identified in the historical samples. Unfortunately, this retrospective approach was not successful – the historical chromatograms did

not contain the information that would be required for such identification.. Subsequently, it became apparent that the weathered material did not present an explosive hazard.

An IRA Plan was submitted to MADEP in December 1994 in response to the NOR. MADEP approved the IRA Plan in a letter dated January 17, 1995 (MADEP, 1995a), with the approval conditional on Olin's commitment to conduct additional sampling and analysis to determine the presence/absence of Opex and Kempore in soil, groundwater, and drums in the area.

Because there were no published MCP groundwater standards for Opex and Kempore that could be used to evaluate potential groundwater risks, MCP GW-1 standards were developed for Opex and Kempore as described in the IRA Completion Report (ABB-ES, 1996a). The GW-1 standards (for actual or potential drinking water in a residential setting) were calculated as a health-protective means of evaluating health risks for the Drum Area where there is no use of groundwater for any purpose. The calculated GW-1 standards were 0.112 mg/l for Opex and 6.81 mg/l for Kempore. These standards were based on chronic Reference Doses that were derived based on the results of a search of the toxicity literature. The derivation of the RfDs is documented in the 1997 Supplemental Phase II Report (Smith, 1997).

A major component of the Drum Area IRA was the development of analytical methods for Opex and Kempore in groundwater. The analytical methods (high pressure liquid chromatography or HPLC) were developed by PACE Laboratories. PACE laboratories reported that the methods meet the criteria of Method 8000 (SW-846, 3rd Edition) for method validation. The analytical method for Kempore was submitted by Olin to MADEP in a letter dated November 20, 1995 (Olin, 1995a) and the analytical method for Opex was submitted by Olin to MADEP in a letter dated April 11, 1996 (Olin, 1996a). During these IRA activities, on November 20, 1995, Olin submitted a letter to MADEP (Olin, 1995b) indicating, consistent with MADEP's November 3, 1995 approval of the Application for a Minor Modification of the Tier 1A Permit, that the Drum Area IRA site (RTN: 3-11816) and the overall Tier 1A Site (RTN: 3-0471) were combined under RTN: 3-0471 with a single LSP of record for the Site (Mr. Jeffrey Bradshaw).

Consistent with the approved IRA Plan, groundwater samples were collected from ten groundwater monitoring wells (GW-17S, GW-17D, GW-22S, GW-27S, GW-27D, GW-34S, GW-34D, GW-35D, GW-36, and GW-37) on May 1-2, 1996. The samples were submitted to Katahdin Analytical Services, Inc. for analysis of Opex and Kempore. Opex was not detected in any of the samples and

Kempore was detected in only one groundwater sample from monitoring well GW-35D at a concentration of 3.8 mg/l. This monitoring well is located within the current slurry wall containment area. The Kempore result was below the calculated GW-1 groundwater standard of 6.81 mg/l. The June 1996 IRA Completion Report (ABB-ES, 1996a) concluded that there is no significant leaching from drums and soil in the buried drum area and therefore, no soil testing for Opex and Kempore is warranted to further assess a potential Imminent Hazard condition in the IRA.

The IRA Completion Report identified that:

- there was no longer an Imminent Hazard to safety (fencing installed to isolate the area and prevent ignition sources in the area),
- appropriate analytical methods had been developed for analysis of Opex and Kempore in groundwater,
- Opex was not detected in groundwater samples from the drum areas, and
- Kempore was detected in only one groundwater sample, but at a concentration below the calculated GW-1 standard.

Therefore is was concluded that a Condition of Substantial Release Migration does not exist for Opex and Kempore, and that no Imminent hazard exists for the buried drum areas, and all Immediate Response Actions have been completed.

As part of the December 1996 Supplemental Phase II Surface Soil Sampling Event, two composite surface soil samples were collected from Drum Area A (DRMA(COMP-A) and DRMA(COMP-B)). The samples were analyzed for TAL metals, pesticides, SVOCs, ammonia, and sulfate (Smith, 1997). The individual samples that comprised these composite samples (GA1-DRMA, GA2-DRMA, GA3-DRMA, GA4-DRMA, GB1-DRMA, GB2-DRMA, and GB3-DRMA) were submitted to the laboratory for VOC analysis. In addition, one composite surface soil sample was collected from Drum Area B (DRMB-(COMP) and analyzed for TAL metals, pesticides, SVOCs, ammonia, and sulfate. The individual samples that comprised this composite sample (G1-DRMB, G2-DRMB, G3-DRMB, and G4-DRMB) were also submitted to the laboratory for VOC analysis.

2.1.2.4.2 Remedial Action

A Release Abatement Measures (RAM) Plan for Excavation of Buried Drums (LAW, 2000a) was submitted to MADEP on January 24, 2000, proposing the excavation and off-site disposal of

drums, debris, and impacted soils at Drum Areas A and B. The RAM was required to eliminate a potential substantial hazard as defined in the MCP and to eliminate exceedances of the MCP Soil UCLs. Figure 1.4-1 shows the locations of these two areas. The RAM Plan was conditionally approved by MADEP on February 14, 2000 (MADEP, 2000g). The Release Abatement Measure Status Report No. 1, Drum Removal (GEI, 2000h) documented that the following activities were completed between August 7 and December 9, 2000: The results of the sampling and analysis associated with the Drum Removal are discussed in Section 4.0.

- Approximately 3,200 cubic yards (cy) of soil, 160 overpacks of old drums, crushed drums, and drum parts, and 34 tons of metal debris were excavated from Drum Area A;
- Thirty four confirmatory soil samples (locations DA-C1 through DA-C34 were collected in September 2000 from the base and sidewalls of the excavation in Drum Area A and were submitted for chemical analysis.
- Drum Area A was backfilled with a mixture of excavated soil, blast rock, and on-property borrow;
- Approximately 1,150 cubic yards (cy) of soil, 3 overpacks of drum parts, and 2 tons of metal debris were excavated from Drum Area B;
- Sixteen confirmatory soil samples (locations DB-C1 through DB-C16) were collected in August 2000 from the base and sidewalls of the excavation in Drum Area B and were submitted for chemical analysis.
- Drum Area B was backfilled with a mixture of excavated soil and on-property borrow;
- Groundwater and surface water associated with Drum Area A was treated;
- All materials generated by the excavation activities were disposed of in off-site facilities approved to receive these waste materials.

Although the Debris Area was included in the C-RAM rather than the Drum Removal RAM, the Buried Debris Area excavations are summarized here because the Debris Area is physically close to the Drum Areas. Specifically, the excavation of the Buried Debris Area is documented in C-RAM Status Report No. 1 (GEI, 2000c) and in the C-RAM Status Report No. 8 (GEI, 2004b). In September and October 2000, 2,065 cubic yards (cy) of impacted peat and sediment were excavated. Thirty-four confirmatory samples (locations BD-C1 through BD-C35) were collected in October 2000 and submitted for laboratory analysis of RCRA 8 metals, pesticides, SVOCs, VOCs, and per cent solids from the bottom and sidewalls of the excavation. Based on the initial confirmatory analysis, 250 cy of additional soil was excavated in May 2001 and six additional confirmatory samples (locations BD-C50 through BD-C55) were collected and submitted for laboratory analysis of chromium, SVOCs, VOCs, and per cent moisture. During a period from

April through July 2001, the excavated sediment and peat was disposed of in off-site facilities approved to receive these materials (GEI, 2004b).

Figures 2.1-3 and 2.1-10 show the soil sample locations in soil excavation areas and sediment sample locations in sediment excavation areas respectively.

2.1.2.5 Warehouses Investigation (Acid Pits)

2.1.2.5.1 Investigations

In February 1992, a soil gas survey was conducted for the warehouse area, including the interior of both warehouses, the area between the two buildings, and the loading dock area at the north end of the buildings. The soil gas survey was conducted in this area (the area of the former East Pit and West Pit) to map the potential lateral extent, if any, of groundwater and/or soil impact by VOCs. The soil gas survey is documented in the report titled Soil Gas Survey at the Olin Facility, Wilmington, Massachusetts, February/March 1992 (LGI, 1992). This report is included as Appendix C to the 1993 CSA (CRA, 1993).

From February 5 - 7, 1992 fifteen sample points were installed through the floor of the West Warehouse, eighteen samples points were installed though the floor of the East Warehouse, 10 sample points were installed between the two buildings, and seven sample points were installed in the loading dock area. A portable percussion hammer was used to install the boreholes for the sampling ports. An air tight sampling ports were installed to a depth of three feet. The sampling ports consisted of 0.5 inch diameter PVC piping perforated and open at the bottom. The sampling end of the port consisted of a triple size-reducing tube assembly terminating in a ribbed double hose connector. A peristaltic pump was attached to the hose connecter to generate negative pressure and to purge the borehole. The purged air flowed to both a HNu model photoionization detector (PID) and an organic vapor analyzer (OVA). LGI recorded OVA Peak readings (initial response to the soil gas immediately after borehole installation), OVA stabilized readings, and HNu readings.

The range of VOC concentrations for the OVA peak, OVA stabilized, and HNu readings were 0 to 300 ppm, 0 to 300 ppm, and 0 to 80 ppm respectively. For all three sets of readings, the highest concentrations were reported between the two warehouses at one area (locations C2, C3), and a

second area (C7). A third "suspect area" at locations B9 and B12, located in the West Warehouse was also identified. The LGI report recommended further investigation of the three suspect areas using a combination of GPR and excavation of the area between the buildings with a backhoe.

As presented in the report titled Interim Report of Additional Phase II Investigation for East and West Warehouses, Subsurface Assessment. DEP RTN 3-0471, (LAW, 1998), in April 1998 a subsurface investigation was conducted to gather information concerning the former acid pits beneath the warehouses. More specifically, the investigation's objectives were to confirm the bottom depths of the pits, to assess soil constituents, and to obtain information concerning the presence/absence of buried drums.

Four trenches were excavated with a backhoe after removal of portions of the concrete floor of the east and west warehouses. The concrete that was removed was sampled and characterized for off-site disposal (TCLP metals). Upon completion of trenching and site restoration, two samples of excess soil (one form each warehouse) were collected and submitted to the laboratory for waste disposal characterization (TCLP metals analysis). Two trenches (E1 and E2) were excavated in the East Warehouse within the footprint of the former east pit. Trench E1 was excavated to a depth of between 7 and 10 feet below the surface of the concrete floor. Trench E2 was excavated to a depth of between 9 and 14 ft below the concrete floor surface. One trench within the West Warehouse (W1) and one trench between the two warehouses (W2) were excavated within the footprint of the former west pit. Trench W-1 was excavated to depths between 7 and 9 feet below the concrete floor surface. Trench W2 was excavated to a depth of approximately 3.5 feet below the concrete floor surface because of instability of the trench and its proximity to the building foundation. A ground penetrating radar (GPR) survey was conducted beneath trench W-2 to investigate the presence/absence of buried drums. Visual observations were recorded both in writing and photographically of subsurface conditions in the trenches. Samples of soil and other materials from the trenches were also collected. The soil samples are identified in Table 2.1-2 with "Area" identified as Warehouse and sampling dates April 15 through April 21, 1998.

Four soil samples were collected from materials brought to the warehouse floor by the backhoe bucket using glass sample jars from trench E-1, four from trench E-2, and two samples from trench W-1. Soil samples were analyzed for the SSPL (VOCs, SVOCs, priority pollutant metals, pesticides, and ammonia, chloride, and sulfate.

The investigation findings were as follows:

- No drums or drum fragments were observed in any of the trenches.
- The bottom depth of the pits was interpreted to coincide with the upper surface of a gray coarse sand with cobbles, encountered at a depth of approximately eight feet below warehouse floor level in all excavations except Trench W-1, which was limited to 3.5 feet due to its proximity to the building foundation..
- Fill material (including thin layers of yellow, white, and gray material)was observed above the coarse sand with cobbles.
- The yellow material was reported to be Kempore. The white and gray material appeared to be calcium sulfate (gypsum).

The 1998 Interim Report contained the summary and documentation of field activities, sample collection logs, chains of custody, laboratory reports, and the GPR report.

MADEP recommended additional subsurface investigations to assess soil at depth and groundwater beneath the warehouses. A proposed Addendum to Scope of Work, Additional Subsurface Investigations, East and West Warehouses was submitted to MADEP in June, 1998 and was subsequently approved by MADEP.

Implementation of the Addendum to the SOW began on August 12 – 15, 1998. Soil borings were drilled using a truck-mounted drill rig with an 8.25 inch outside diameter hollow stem auger. Five soil borings were drilled within Trench W1 in the West Warehouse (B-1, B-1B, B-1C, B-1D and B-2). Borings B-1B (5-foot screen), B-1D (10-foot screen), and B-2 (5-foot screen) were completed as monitoring wells on August 14, 15, and 13 respectively. Two soil borings were drilled within Trench E-1 in the East Warehouse (B-3 and B-3B). Soil borings B-3 (5-foot screen) and B-3B (10-foot screen) were completed as monitoring wells on August 14 and 15 respectively. Wells were installed at the top of bedrock with 5-foot or 10-foot long well screens set at the bottom of the boring. The depth to bedrock in the five wells ranged from 18.6 feet to 23.56 feet. After field screening of water samples from the wells, two wells were selected as permanent monitoring wells (the well at B-1D was identified as monitoring well W-10 and the well at B-3B was identified as monitoring well E-10). The remaining temporary wells were abandoned by pulling the casings and backfilling the hole with verbal agreement from MADEP.

Soil samples were collected using split spoon samplers and submitted to STL for laboratory analysis for alkalinity, chloride, pH, sulfate, ammonia-N, percent solids, aluminum, chromium, iron, and sodium. As shown in Table 2.1-2, seven soil samples were submitted to for analyses (B-1 8-10, B-1 16-17.3, B-1B 19-19.5, B-2 16-18, B-2 22-24, B-3 12-14, and B-3 18-20).

Monitoring wells E-10 and W-10 were developed and sampled on August 26 to 27, 1998. These samples were analyzed for bicarbonate alkalinity (method 310.1), carbonate alkalinity (method 310.1), chloride (method 325.3), pH (method 150.1), sulfate (method 300.0A), specific conductance (method 2510B), ammonia-N (method 4500F), calcium, chromium, iron, magnesium, manganese, potassium, and sodium (all by method 6010A). The activities associated with and the data generated during the additional investigation of deep soils and groundwater in the area of the warehouses (former pits) are discussed in the report titled Report of Phase II Subsurface Investigation for East and West Warehouses, Olin Corporation, Wilmington, Massachusetts, DEP RTN 3-0471, (LAW, 1999a). The report for this investigation concluded that no remedial action was necessary.

2.1.2.6 Potential On- Property Sources of NDMA and Potential Precursors (Including the Sewer System and Septic System)

Part 2 of the Supplemental investigations related to NDMA included the advancement of borings and installation of monitoring wells on-Property to assess the presence/absence of NDMA, hydrazine and formaldehyde. This investigation assessed the CSL, the sewer lines and septic system, and the former Plant D as potential sources of NDMA and the other compounds identified above to soil and groundwater. The investigation was conducted in accordance with the December 12, 2003 scope of work submitted to MADEP (MACTEC, 2003d) and the Update to the Part 2 scope of work (MACTEC, 2004e).

2.1.2.6.1 Investigation

In March 2004 twelve (12) soil borings (WSS-1, WSS-2, WSS-3 (septic system), WSL-1, WSL-2, WSL-3 (sewer line), PLD-1, PLD-1A, PLD-2, PLD-2A, PLD-3 (area of former Plant D), and CSL-1 (CSL)) were advanced and seven (7) groundwater monitoring wells (GW-301 through GW307) were installed. Tables 2.2-2 and 2.1-3 identify the details of the surface soil samples collected. Fourteen soil samples were collected from the borings (samples were designated by the boring identifier and depth interval (e.g., WSS-1-2-4). Soil samples were submitted for laboratory

analysis of NDMA, hydrazine, and formaldehyde. Borings WSS-1 and WSS-3 were finished as monitoring wells GW-301 and GW-302, borings WSL-1, WSL-2, and WSL-3 were finished as monitoring wells GW-303, GW-304, and GW-305, borings PLD-1A and PLD-2A were finished as monitoring wells GW-306 and GW-307 respectively. Location identifiers GW-301 through GW-307 are used to identify locations of the monitoring wells and soil borings at those locations. Location identifiers PLD-1, PLD-2, PLD-3, WSS-2, and CSL-1 represent locations of those soil borings that were not finished as monitoring wells. Surface soil samples were collected from locations GW-306, GW-307, and PLD-3. Subsurface soil samples were collected from all twelve borings. Surface soil sample locations are shown on Figures 2.1-1 And 2.1-4 and subsurface soil sample locations are shown on Figures 2.1-2 And 2.1-5. Monitoring well locations are shown on Figure 2.1-6. In a letter dated August 5, 2005, a summary of the groundwater data collected from the newly installed monitoring wells at areas at or near the known sewer and septic systems at the Site was provided to MADEP(MACTEC, 2005e). The analytical data for the surface and subsurface soil samples collected during this investigation were included in the NDMA Supplemental Phase 2, Part 2 report related to the distribution of NDMA in environmental media that was submitted to MADEP on December 15, 2004f (MACTEC, 2004). No NDMA was detected in any of the soil samples collected during the investigation described above and no NDMA source area was identified.

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2.1.2.7 Calcium Sulfate Landfill

The Calcium Sulfate Landfill (CSL) was first used by Stepan from 1975 - 1980 to receive calcium sulfate (gypsum) sludge with approval from MADEQE (now MADEP). Olin continued to use the CSL between 1980 and 1986 when operations at the facility ceased. The landfill contains approximately 35,000 cy of calcium sulfate. After the 1986 cessation of operations, the lined lagoons were dismantled. The calcium sulfate in the lagoons as well as the lagoon liners were placed in the CSL. In March 2004, one subsurface soil sample was collected at location CSL-1 during the investigation of potential NDMA and potential precursor sources. In October 2006, a surficial soil investigation was conducted to confirm the physical characteristics of the cap at the CSL as a component of the formal closure of the landfill per the Massachusetts Solid Waste Regulations. Soil characteristics and cap thickness were observed at locations CS-GPS-1 through CS-GPS-29 (odd numbers only). No samples from these locations were submitted for chemical analysis. Olin began a perimeter groundwater monitoring program in 1986. The final low permeability cap at the CSL was completed in 1988. Two submittals to MADEQE to close the

landfill in 1986 and 1987 were approved. However, based on some revisions to the Solid Waste Regulations, the CSL was not formally closed under those regulations at that time (Smith, 1997).

The CSL Closure process per the Massachusetts Solid Waste Regulations was re-initiated in 2006. An additional field study was conducted in 2006 to verify the thickness and organic carbon content of the vegetative cover soil at the verbal request of MADEP. A closure certification letter and post closure monitoring plan was submitted to MADEP in 2006 (MACTEC, 2006a, 2006b) and a copy of these submittals was provided to EPA. The CSL is regulated under the Massachusetts Solid Waste Regulations and the requirements for closure of this landfill have been completed. The results of investigations and groundwater monitoring conducted with respect to the CSL have been summarized and the associated analytical data presented to MADEP in past submittals, and copied to EPA. Because the CSL is in the process of formal closure per the Massachusetts Solid Waste Regulations, the investigation activities and closure activities are not repeated here.

2.1.2.8 Source Area Removals - Soil Stockpiles

During completion of the various remedial actions described in the preceding subsections, soil stockpiles were created, sampled and analyzed prior to re-use or off-site disposal. The soil samples that were collected from stockpiles that were subsequently removed from the site are obviously not representative of current Site conditions. Those stockpiled soils that were sampled and determined appropriate for reuse on-site were used as backfill in excavations or during the construction of the containment structure. Some stockpiles of potentially minimally impacted soils were created, sampled and analyzed, and determined to be appropriate for potential future re-use as grading or landscape material and other uses in the upland areas at the Site. Most of the soil stockpiles have been removed from the Site and soils have been disposed under the applicable regulations. Table 2.1-10 identifies samples that were collected from stockpiled soils. This table identifies the current status of stockpiled soils represented by these samples. The locations of soil stockpiles were reported through July 2001 by GEI in the C-RAM Status Report No. 2 (GEI, 2001a[373]) and those stockpile locations are included on Figure 2.1-14. That figure does not necessarily portray all soil stockpiles created throughout remedial activities to date. The C-RAM and D-RAM Status Reports and Completion Reports provide details concerning the off-site disposal of stockpiled material. The discussions below are focused on stockpiled soil that remains on the Property.

The C-RAM Status Report No. 1 (GEI, 2000c) refers to 3 soil stockpiles for on-site re-use: SP7A and SP13A from near the Buried Debris Area (combined 250 cy) and SP17A from the Delta (50 cy). Analytical results for composite samples of each pile (SVOCs, VOCs including TMPs, pesticides, chromium, and lead) were presented in Appendix K of that report. VOC analysis was performed on a grab sample from each pile. Samples were collected in September 22, October 9, and October 27, 2000 for stockpiles SP7A, SP13A, and SP17A respectively. All of the material from those 3 stockpiles was re-used within the containment area.

C-RAM Status Report No. 2 (GEI, 2001a) states that C-RAM Modification No. 4 requested approval on April 18, 2001 to reuse approximately 2,700 cy of topsoil excavated during the RAM activities to restore aquatic and non-aquatic areas of the property. The request included a risk assessment of the proposed reuse. The stockpiled soil was sampled and analyzed for VOCs, SVOCs, pesticides, aluminum, arsenic, barium, cadmium, chromium, iron, lead, and mercury. The stockpile samples include all samples designated as 1130-SP10-A through 1130-SP10-F, 1130-SP11-A through 1130-SP11-D, and 1130-SP12-A. Each of these samples was collected on October 7, 2000 or December 12, 2000. MADEP indicated that this request would need to be reviewed by the Office of Research and Standards and that would require several months. Because the wetlands needed to be restored in spring and early summer, soil was imported to the site for the restoration of the wetlands. The topsoil was stockpiled pending a determination from MADEP concerning the suitability of the soil for reuse in upland areas of the property.

C-RAM Status Report No. 8 (GEI, 2004b) indicates that an Addendum to C-RAM Modification No. 4 was submitted to MADEP on November 9, 2001. The Addendum included additional evaluation of potential ecological risks associated with the stockpiled topsoil. On February 2, 2002, MADEP approved reuse of the stockpiled topsoil on upland areas of the property. The topsoil remains stockpiled for future re-use. The topsoil stockpile is located to the east of the warehouses as shown in Figure 2.1-14.

2.1.3 Meteorological Investigations

No specific meteorological investigations were conducted for the Site. Olin personnel employed at the Site have recorded site-specific daily rainfall amounts for several years to complement evaluation assessment of other data including surface water and groundwater conditions on-Property.

2.1.4 Surface Water and Sediment Investigations

Numerous investigations and remedial actions involving surface water and/or sediment have been conducted at the Site. Table 2.1-11 lists chronologically the surface water and sediment investigations that have been conducted at the Site. Some of the investigations involve multiple areas which include several ditch system components. These components are discussed separately in the subsections below. As a complement to the following discussions, several tables and figures have been prepared with respect to sediment and surface water sample locations.

Table 2.1-4 lists by area the sediment samples that have been collected to date. Table 2.1-5 lists chronologically the sediment samples that have been collected to date. Figure 2.1-8 shows the OU1 (on-Property) sediment sample locations associated with investigations and remedial activities (including post-remedial confirmatory sediment samples [not soil confirmatory samples below the excavated sediments]). Figure 2.1-9 shows OU2 (off-Property) sediment sample locations. Figure 2.1-10 identifies sediment sample locations in areas where sediment excavation has occurred. The samples associated with those sample locations are no longer representative of Site conditions. Figure 2.1-15 identifies the locations of sediment (and surface water) background sampling locations.

Table 2.1-6 lists by area the surface water samples that have been collected to date. Table 2.1-7 lists chronologically the surface water samples that have been collected to date. Figure 2.1-7 identifies surface water sampling locations. Figure 2.1-15 identifies the locations of surface water and sediment background sample locations.

The remainder of this section summarizes surface water and sediment investigations and remedial activities, related to: the Ditch System (on-Property West Ditch, on-Property West Ditch, the South Ditch, the off-Property West Ditch, the East Ditch, Central Pond), and North Pond (not part of the

Ditch System); and the Maple Meadow Brook Wetland (including Sawmill Brook and Maple Meadow Brook).

Surface water investigations of the ditches at the Facility were initiated in 1977 and 1978 as described in the Report titled Groundwater and Surface Water Study, Stepan Chemical Company, Wilmington, Massachusetts (GEI, 1978). A total of 57 surface water samples were collected from 12 surface water sampling locations identified as SS-1 through SS-17. Surface water sampling and analysis was conducted for the East Ditch in January 1980 (Ecology & Environment, 1980). Additional surface water sampling was conducted in 1981 and is described in the document titled Special Study Report, Hydrogeologic Investigation For Olin Chemicals Group, Wilmington, Massachusetts (Malcolm Pirnie, 1982). Malcolm-Pirnie's 14 surface water sampling locations included SS-1, SS-1A, SS-2, SS-5, SS-11, SS-12, SS-16 and SS-N-A through SS-N-G. These surface water investigations were conducted more than twenty five years ago. While they provide historical perspective, these surface water data are not representative of current Site conditions.

Some surface water and sediment investigations have assessed multiple areas within the surface water/sediment system associated with the Site. In addition, the investigation of background surface water and sediment conditions is not related to any one specific area within the Site. Rather than discuss those investigations for each of the areas of the system in the subsections below, these multiple-area investigations and the background investigation are summarized here prior to the discussion on investigations within the specific areas (e.g. South Ditch, East Ditch). The multiple-area surface water/sediment investigations and the background investigation include:

- 1992-1993 Phase II Surface Water/Sediment Investigations reported in the 1993 Comprehensive Site Assessment (CRA, 1993);
- 1995 Supplemental Phase II Surface Water/Floc Investigations briefly referred to in the 1997 Supplemental Phase II Report (Smith, 1997);
- 1996 Surface Water and Sediment Background Investigation(Smith, 1997);
- 1996/1997 Sediment Sampling to Support the Ecological Risk Assessment activities (samples collected in conjunction with toxicity testing samples and tissue analysis); (Smith, 1997)
- 2000 Focused Site Characterization Sediment Investigation (RSD samples) (LAW, 2000b)
- May 2000 West Ditch Wetland, Central Pond, and South Ditch Pre-Remediation Sediment Characterization and

- 2001 Groundwater and Surface Water Elevation and Stream Flow Investigation (LAW, 2001c)

1992-1993 Phase II Surface Water/Sediment Investigations (CRA, 1993)

During the 1992 – 1993 Phase II Surface Water/Sediment Investigation surface water and sediment sampling and analysis was conducted to determine nature and distribution of contamination (CRA, 1993). Two rounds of surface water sampling were completed in 1992. In the first round, conducted in August/September 1992/1993, surface water samples were collected from surface water sampling locations SW-1 through SW-18. Although the sampling plan included locations SW-19 through SW-22, samples were not collected at those locations because the locations were dry. All samples were submitted for SSPL analysis (TCL VOCs and trimethylpentenes, SVOCs, Pesticides, TAL metals, ammonia, chloride, and sulfate). In addition, the sample from SW-17 was analyzed for hexavalent chromium. In the second round, conducted in November 1992 through January 1993, surface water samples were collected from locations SW-1 through SW-30. All surface water samples from the second round were analyzed for SSPL. The samples from SW-6, SW-16, SW-17, and SW-23 were also analyzed for hexavalent chromium.

Surface water and sediment sample locations SW-1 through SW-5, SW-23 through SW-30 are in the East Ditch, locations SW-6 through SW-11 and SW-14 are in the South Ditch, locations SW-12 and SW-13 are in the on-Property West Ditch, locations SW-15 through SW-18 are in the Off-Property West Ditch, location SW-19 is located in the wetland north of the South Ditch and immediately to the west of the East Ditch, locations SW-20 through SW-22 are in the Ephemeral Drainage, and location SW-23. Figure 2.1-8 displays the surface water sample locations for the on-Property West Ditch, South Ditch, the Ephemeral Drainage, and the wetland adjacent to the East Ditch. Figure 2.1-9 displays the surface water sample locations for the off-Property West Ditch and the East Ditch.

Sediment samples were co-located with the surface water samples in the two sampling rounds of 1992/1993. Therefore, the sediment sample location identifiers are identical to the surface water sample locations – SW-1 through SW-30. In the first round, although surface water samples were not collected at locations SW-19 through SW-23, sediment samples were collected. The sediment samples from the two sampling rounds were analyzed for SSPL and hexavalent chromium (selected samples) as were the surface water samples.

In 1996-1997 sediment and plant tissue sampling was conducted to support Ecological Risk Assessment Activities. Four sediment samples were collected at locations BS001, BS002, BS003, , and BS004 These sediment samples were co-located with the four plant tissue samples so that the relationship between soil and tissue chemical concentrations could be evaluated and be considered in the ecological risk assessment. The plant tissue samples, included Typha latifolia (2 samples), Carex sp., and Scirpus cyperinus.. The sediment and plant samples were collected and submitted for analysis of TAL metals, pesticides, and PCBs. The data generated from the sampling activities were used to support the ecological risk assessment that was included in the 1997 Supplemental Phase II Report (Smith, 1997). Figure 2.1-8 presents the locations of these sediment samples.

On January 20 and January 21, 1997, eight sediment samples were collected for toxicity testing (Frog Embryo Toxicity Assay, (FETAX) and for corresponding chemical analysis. The samples included BS005WDXXX (on-Property West Ditch), BS006WDXXX (on-Property West Ditch), BS007WDOXX (off-Property West Ditch), BS008SDXXX (South Ditch), BS009PNDXX (Central Pond), BS010PNDXX (Central Pond), and BS011WMDXX (Wet Meadow) from the site and BS012REFXX that was collected from an off-property reference (background) location. Samples were submitted to IEA for laboratory analysis of TAL metals, SVOCs, and pesticides. The chemical analysis of the sediment samples was intended to provide information concerning possible chemical contributions to any toxicity that might be observed during the toxicity testing. Figure 2.1-8 presents the locations of the sediment samples from the Wet Meadow, on-Property West Ditch, South Ditch, and Central Pond. Figure 2.1-9 8 presents the locations of the sediment samples from the off-Property West Ditch and the reference location.

2000 Focused Site Characterization Sediment Investigation: In January 2000, investigations were conducted to support a Focused Site Characterization which was included as a component of the C-RAM Plan. The C-RAM Plan was completed in anticipation of contemplated Site redevelopment. The C-RAM Plan was prepared in accordance with MADEP's Policy No. WSC-00-425, Construction of Buildings in Contaminated Areas (MADEP, 2000b). A Focused Site Characterization, Focused Risk Assessment, and Focused Feasibility Study were completed for projects involving the construction of buildings, as required by this policy. The C-RAM Plan (GEI, 2000a), including the Focused Site Characterization Report was submitted to MADEP in April, 2000. The Focused Site Characterization investigations were intended to: obtain the necessary data for determining that the extent of contamination in groundwater, soil, and sediment

had been determined; to obtain the necessary data for a Focused Risk Assessment; and to collect the necessary data to support the Focused Feasibility Study .

On January 18 and 19, 2000 surficial sediment samples were collected, by hand auger, from 15 locations at the Site. (LAW, 2000b). The sediment sample locations were identified as RSD-01 through RSD-15. Locations of samples are presented in Figure 2.1-8 and the details of the samples are summarized in Table 2.1-5. Locations of samples were as follows: RSD-01 through RSD-04 were in the on-Property West Ditch Wetland; RSD-05 was in the On-Property West Ditch; RSD-06 and RSD07 were in the South Ditch; RSD-08 was in the Central Pond; and RSD-09 through RSD-15 were in the Ephemeral Drainage. All samples were submitted for laboratory analysis for VOCs, SVOCs, TAL metals, and pesticides. Five of the samples were also analyzed for PCBs (Aroclors). The analytical results for this sampling and analysis program were reported in the 2000 Site Characterization Report (LAW, 2000b) that was submitted to MADEP within the C-RAM Plan in April 2000.

May 2000 West Ditch Wetland, Central Pond, and South Ditch Pre-Remediation Sediment Characterization: In May 2000, surficial sediment samples were collected from the on-property ditch system and two samples from two off-property locations in the West Ditch Wetland. The sample locations were identified as RSD-16 through RSD-39. The sample locations were as follows: RSD-16 through RSD23 were located in the on-Property West Ditch Wetland; RSD-24 through RSD-28 were located in the Central Pond; RSD-29 through RSD-35 were located in the South Ditch, RSD-36 and RSD-37 were located in the off-Property West Ditch Wetland, and RSD-38 and RSD-39 were located in the on-Property West Ditch Wetland. Table 2.1-5 summarizes the details of these samples. Figure 2.1-8 shows the locations of the on-property sediment samples. Figure 2.1-9 identifies the locations of the two off-Property samples (RSD-36 and RSD-37). These samples were submitted for chromium analysis to assist in delineating the excavation area for the ditch system.

2001 Groundwater and Surface Water Elevation and Stream Flow Investigation. In April/May 2001, LAW conducted a comprehensive field program at 189 measurement locations in the vicinity of the Site (LAW, 2001c). The purpose of the Site-wide measurement event was to provide groundwater and surface water elevation data and stream flow measurement data for the periodic calibration of the project's groundwater/surface water model. Water level measurements were

collected from monitoring wells, piezometers, staff gauges, and surface streams during the program. Stream flow measurements were collected at ten locations.

1996 Surface Water and Sediment Background Investigation. Olin submitted to MADEP a January 23, 1996 letter proposing a sampling and analysis program for establishing background conditions in soil, surface water, and sediment (Olin, 1996b), ABB-ES, 1996b). MADEP approved the additional sampling and analysis Scope of Work to establish background conditions in a letter dated March 26, 1996 (MADEP, 1996a). Consequently, in a letter dated May 16, 1996 (MADEP, 1996b), the MADEP conditionally approved the Human Health Risk Assessment Scope of Work that had been submitted to MADEP in April 1996 (ABB-ES, 1996c). The Conditional Approval required that background levels be established in accordance with the definition of background in the MCP.

In April 1996, ABB-ES collected surface water and surficial sediment samples at fourteen background locations (SDBK-001 through SDBK-014) consistent with the approved scope of work. All of the surface water and sediment samples (except sediment sample SDBK-002) were analyzed for pesticides. The surface water and sediment samples from locations SDBK-001, SDBK-002, SDBK-003, SDBK-004, and SDBK-014 were analyzed for VOCs, SVOCs, metals and inorganics in addition to pesticides. The locations of the surface water and sediment samples are presented on Figure 2.1-15. The data from these samples were collected to establish background conditions for sediment. Background surface water and sediment conditions were summarized in Attachment 3 of the Environmental Risk Characterization contained in Volume VIII of the 1997 Supplemental Phase II Report (Smith, 1997).

2.1.4.1 Ditch System

2.1.4.1.1 On-Property West Ditch

2.1.4.1.1.1 Investigations

Table 2.1-4 and Table 2.1-6 list sediment samples and surface water samples collected at the Site by “area” (e.g. on-Property West Ditch or West Ditch Wetland listed in the in the “area” column). All samples associated within a given “area” are listed in chronological order. The following

subsection identifies additional surface water and sediment investigations for on-Property West Ditch that were not identified in the broader investigations that were discussed above.

August 2000 Pre-Remediation Sediment Characterization (West Ditch Wetland)

During the clearing of the densely wooded portions of the West Ditch Wetland in August 2000, in preparation for the C-RAM excavation activity, it was observed that the extent of surface water and the likely extent of Site-related impacts in that area had been overestimated previously. Olin received verbal approval from MADEP on August 22, 2000 to conduct additional pre-remedial investigation of the West Ditch Wetland area. This information is documented in Modification No. 2 of Part 2 Construction-Related Release Abatement Measure (GEI, 2000e which is Appendix F of C-RAM Status Report No. 1 (GEI, 2000c). GEI collected 66 sediment samples on August 25, 30, and 31, 2000 within the on-Property West Ditch Wetland. Consistent with MADEP-approved sampling strategy samples were collected from two intervals (0 – 0.5 ft and 0.5 – 3 ft) at 33 locations that were selected based on a 25-foot grid pattern placed on the areas of the West Ditch Wetland that were expected to be minimally impacted. The sample locations were WDW-1 through WDW-19, WDWD-21A, WDW-21B, WDW-21C, and WDW-22 through WDW-32. At each location, a shallow and deep sediment sample was collected. These samples were submitted for analysis of SVOCs and chromium. The samples from location WDW-21C were analyzed for SVOCs and eight metals. The analytical data for these August 2000 sediment samples were summarized in Modification No. 2 of the C-RAM, which was included as Appendix F of the C-RAM Status Report No. 1 (GEI, 2000c).

Portions of the on-Property West Ditch Wetland were excavated in 2000 during the C-RAM. Unlike the narrow, well defined ditches where all of the sediments were completely removed (both vertically and horizontally), in the on-Property West Ditch Wetland, after excavation, sediments remained in the broader bottom and on the sidewalls of the excavations. Therefore, the confirmatory samples from the on-Property West Ditch Wetland were sediment samples. Table 2.1-4 presents the confirmatory sediment samples (Area "on-Property West Ditch Wetland, locations WDW-C1 through WDW-C24 Confirmatory Samples). The samples were submitted for SVOCs and chromium, and selected samples were analyzed for pesticides and volatiles. Figure 2.1-11 shows the locations of the confirmatory samples. Figure 2.1-10 shows the locations of sediment samples from areas where sediment was excavated.

2.1.4.1.2 Pilot Test Sampling and Analysis

A RAM Plan for bioremediation of soil/sediment near and in the on-Property West Ditch was submitted to MADEP on February 17, 1999. The RAM Plan was conditionally approved by MADEP in a letter dated July 12, 1999. The RAM Plan called for the testing of bioremediation techniques for sediments and soil impacted by VOCs and SVOCs (particularly phthalates and NDPA). The test area was approximately 500 square feet and it was located in the northern portion of the on-Property West Ditch. The Sediment Bioremediation RAM was intended to evaluate the feasibility of bioremediation of excavated sediments (phthalates, NDPA) from the ditch system. The intent was to treat excavated sediments via bioremediation in the Biocell that had been constructed at the Calcium Sulfate Landfill.

Sediment samples RAM-1 through RAM-9 were collected in August, 1999 and all of these samples were submitted for SVOC analysis and six of them were submitted for VOC analysis. The locations of these samples are shown on Figure 2.1-8. RAM Status Report No. 1 was submitted to MADEP on November 10, 1999 (GEI, 1999). To monitor progress of the bioremediation activities, these locations were sampled again in May 2000. These samples were analyzed for SVOCs and chromium. A second status report for the sediment bioremediation test was submitted to MADEP (LAW, 2000c. Off-site disposal of excavated sediments was proposed in the C-RAM Modification No. 6 (GEI, 2001g). The Sediment Bio-Remediation RAM was terminated and a RAM Completion Report was submitted to MADEP on January 10, 2001 since off-site disposal was selected for the sediments excavated from the ditch system (GEI, 2001l). The sediments of the on-Property West Ditch were excavated in 2000, placed in the Biocell, and subsequently the sediments were disposed off-site. None of these Sediment Bioremediation RAM samples are representative of current site conditions (Refer to Figure 2.1-10).

2.1.4.1.1.3 Remedial Actions

The on-Property West Ditch was excavated in 2000 during C-RAM activities. Sediment excavation involved excavation vertically to remove the organic sediment layer and expose the granular soil material beneath the sediments. The banks of the ditch were over excavated to remove all sediment. Confirmatory samples were collected on a 25-foot grid from soils (not sediment) at the bottom and edges of the excavation. The on-Property West Ditch was backfilled and was replaced with a 30-inch concrete culvert that now connects the West Ditch Wetland and

the South Ditch (at the weir). The confirmatory soil samples are summarized in Table 2.1-4 (see Area "on-Property West Ditch", locations WD-C1 through WD-C16). These samples were analyzed for metals and SVOCs and for selected samples (one of four samples) pesticides and VOCs. The locations of these confirmatory subsurface soil samples for the on-Property West Ditch are shown in Figure 2.1-5. The locations of sediment samples in excavated areas of the on-Property West Ditch (sediment samples no longer representative of site conditions) are shown on Figure 2.1-10. Figure 2.1-11 shows the locations of sediment samples that are representative of current site conditions.

2.1.4.1.2 South Ditch

The South Ditch flows west to east across the southern portion of the Site. The South Ditch has historically received surface water flow from the off-Property West Ditch and from the on-Property West Ditch (including the Plant B NPDES discharge [historically] and the Plant B Remediation General Permit [recently]). Although the NPDES discharge has been located at the on-Property West Ditch, the Plant B IRA Status Report dated January 11, 2002a, indicates the NPDES discharge was moved to a temporary location at the lower end of the South Ditch during two time periods: August 2000 through December 4, 2001; and April 17, 2001 through September 24, 2001. The upstream end of the South Ditch (Upper South Ditch) also receives groundwater discharge.

The history of investigation and remedial activities of the South Ditch and the off-Property West Ditch are closely connected. In the early 1990s, a flocculent material (floc) was observed in the in the off-Property West Ditch. The floc contained metals (including chromium) and inorganics. Since the surface water flows from the off-Property West Ditch to the South Ditch, there was a potential for migration of the floc from the off-Property West Ditch to the South Ditch. Olin has conducted several investigations and has implemented several measures to control migration of the floc and to prevent human exposure to the floc in the off-Property West Ditch and South Ditch. Olin installed an eight-foot chain link fence around the perimeter of the off-Property West Ditch to prevent human access to the area. The floc has subsequently been determined to be stable and not bioavailable to aquatic organisms under typical stream conditions.

Historically, the floc in the off-Property West Ditch formed via precipitation reactions when the acidic, metal containing groundwater discharged into the more-neutral pH surface water in the off-Property West Ditch. Olin has conducted a series of actions over a period of more than ten years to

reduce the floc formation in the off-Property West Ditch and to prevent migration of floc that has formed. Because several actions that were taken in the 1990s to address the floc have involved both the off-Property West Ditch and the South Ditch, the actions from that time period are summarized here prior to the discussions of the separate surface water and sediment investigations for the South Ditch and off-Property West Ditch.

In February 1992, MADEP indicated verbally to Olin that the floc material in the off-Property West Ditch contained chromium and aluminum and requested that Olin take actions to stop the floc from migrating off-Site. In April 1992 MADEP approved the deployment of hay bales as a sedimentation control measure to mitigate floc migration in the short-term and requested that when plans for a retention pond were developed that the plans be forwarded to MADEP. Hay bales were installed in April 1992. In response to a request by the Wilmington Board of Health, Olin installed an 8-foot fence around the off-Property West Ditch area to prevent human contact with floc. On May 28, 1992, MADEP issued to Olin a Notice of Responsibility under the MCP for the floc material. In May and July 1992 Olin conducted and submitted two human health risk assessments for floc, surface water, and sediments within the ditch system.

In September 1992, the report titled Interim Action Plan, West Ditch Precipitate, Olin Corporation, Wilmington Facility (CRA, 1992) was prepared and submitted to MADEP. The plan included the construction of a weir in the upstream portion of the South Ditch that would raise the surface water level in the off-Property West Ditch and the upper portion of the South Ditch. This ponding of water in the off-Property West Ditch and upper portion of the South Ditch would suppress groundwater discharge to the off-Property West Ditch and reduce the formation of floc. The MADEP commented on the plan in a letter dated December 11, 1992 (MADEP, 1992). Subsequently, in April 1993 the Addendum I to the plan (CRA, 1993b) and in July 1993 the Addendum II to the plan (CRA, 1993c) were submitted for MADEP review.

Between July 1993 and June 1993 the refinement of the Interim Action Plan was accomplished through discussions with MADEP and the Wilmington Conservation Commission. On June 21, 1994, Olin notified MADEP that the installation of the weir in the South Ditch had been completed. In a June 30, 1994 letter MADEP required that status reports be submitted every six months for the duration of the weir project (MADEP, 1994b). Olin submitted the first IRA status report for the weir on September 6, 1994 (Olin, 1994). The Status Report indicated that a vacuum truck was used on June 9 and 10, 1994 to remove the precipitate from the off-Property West Ditch.

Approximately 18,000 gallons of sediment/water were collected from the ditch and were stored on-Site in a FRAC tank pending waste characterization results and off-site disposal. Additional Weir Status Reports were subsequently submitted (Smith, 1995, Smith, 1996), GEI, 1998a, and GEI, 1998b[597]). The September 21, 1998 IRA Status Report (GEI, 1998b) concluded that the MCP requirements for an IRA had been met and that the IRA should be terminated.

2.1.4.1.2.1 Investigations

2.1.4.1.2.1.1 Surface Water and Sediment

While the South Ditch was being dewatered to facilitate the construction of the concrete box culvert that would replace the weir, impacted groundwater was released overnight to the Delta area of the South Ditch (GEI, 2000c). Groundwater that was being pumped from the excavation in the area of the weir was released to the South Ditch on October 5, 2000. MADEP was notified immediately. An IRA Assessment and Plan were submitted to MADEP on December 22, 2000 (GEI, 2000i). MADEP provided Conditional Approval of the Assessment and Plan in a letter on June 8, 2001 (MADEP, 2001d). The conditional approval required weekly surface water sampling and an Imminent Hazard Evaluation. Further, beyond the proposed activities, additional sampling of sediments and bank soil in the downgradient portions of the South Ditch to evaluate the impacts of the discharge to the ditch as well as to further characterize the non-remediated sediments located in the lower South Ditch was required. GEI prepared and submitted a scope of work for the additional sediment sampling and analysis on July 9, 2001 (GEI, 2000j). MADEP provided Conditional Approval of the SOW on August 10, 2001 (MADEP, 2001e).

The implementation of the IRA included weekly sampling of surface water in the upper and lower portions of the South Ditch and monthly sampling of the East Ditch from January 2001 through April 2001 (GEI, 2001m). Surface water samples were analyzed for chromium, dissolved chromium, ammonia, ph, and specific conductivity. In March 2001, the analysis program was modified to include laboratory analysis of total nitrate/nitrites, dissolved aluminum, sulfate and chloride. Also in March 2001, field measurement of dissolved oxygen and stream temperature were added to the program. Table 2.1-7 presents a summary of surface water samples collected from January 2001 through April 2001 for this IRA program. South Ditch samples were collected at ISCO-1 and OPWD-SWD (upstream of the weir), SD-SWD (upstream of the Delta), NP-1 (downstream of the Delta), and ISCO-2 (most downstream area of the South Ditch). The East

Ditch samples were collected at location ISCO-3. These surface water sampling locations are presented on Figure 2.1-7.

Sediment samples SDC-1 through SDC-8 shallow (S) and deep (D) in South Ditch were collected and submitted to STL for VOCs, SVOCs, nine metals including hexavalent chromium), ORP, pH, percent solids, and EPH. The bank samples were soil samples (locations SDF-1 through SDF-8) and were analyzed for the same parameters as the sediment samples.

The locations of the sediment samples are shown in Figures 2.1-8 and 2.1-11 and Table 2.1-5 provides the details of the samples. The locations of the bank soil samples that were collected are shown in Figures 2.1-1 and 2.1-4 and Table 2.1-3 provides a summary of the bank soil samples.

GEI submitted IRA Status Report No. 1 on June 1, 2001 (GEI, 2001m) and an IRA Status Report No. 2 and Completion Statement on December 5, 2001 (GEI, 2001n). MADEP approved the Completion Statement in a letter dated February 4, 2002 (MADEP, 2002b). The February 4, 2002 letter indicated that it approved the Completion of the IRA for discharges to the ditch on October 5, 2000 as well as on May 5, 2001 as described below.

On May 5, 2001 approximately 5,000 to 15,000 gallons of impacted groundwater was captured by a dewatering sump and then released to a portion of the South Ditch that was previously remediated. This release was reported immediately to MADEP and GEI took actions to contain and treat the impacted surface water. Based on analytical data collected during and after the release, GEI indicated they were successful in containing and treating the impacted surface water. The MADEP's February 4, 2002 IRA Approval letter stated that the IRA's for both the October 5, 2000 and the May 5, 2001 releases were successfully completed.

2005-2006 Supplemental South Ditch Investigation of South Ditch Surface Water Quality and Adjacent Groundwater Quality. In a letter to MADEP dated April 14, 2005, Olin presented and discussed surface water quality data that appeared to indicate a change in conditions in the South Ditch (Olin, 2005). The data had been collected as a component of the PCMP Monitoring Program (associated with the C-RAM, Part 2). Increased concentrations of ammonia, chloride, sulfate, and chromium in surface water of the South Ditch were observed during a brief period of time. Olin proposed to update the human health and ecological risk assessments for the South Ditch and to evaluate the need for additional data collection to evaluate what appeared to be a changed

condition. In a letter dated April 25, 2005, the MADEP approved of Olin's proposed course of action and required submittal of an updated human health and ecological risk assessment for the South Ditch (MADEP, 2005d).

Olin submitted a proposed scope of work on May 16, 2005 (MACTEC, 2005f) for collection of additional data for a one year period to support analysis of South Ditch conditions. The scope of work included four quarterly surface water, piezometer, and shallow groundwater testing events as well as monthly field measurements, including pH, specific conductance, groundwater level, surface water level, and ammonia. Ammonia was analyzed in Olin's on-site field laboratory. In August 2005 MACTEC advanced two direct push borings and installed two piezometers (PZ-24 immediately inside the containment structure slurry wall and PZ-25 immediately outside the containment structure slurry wall). Six hand-driven stainless steel drive point piezometers with iron riser pipes (PZ-16RR, PZ-17RR, PZ-20, PZ-21, PZ-22, and PZ-23) were installed within the streambed of the South Ditch (MACTEC, 2005). MACTEC also established three hydrologic stream transects (SDCS-1 through SDCS-3) within the South Ditch to monitor surface water elevation and stream flow.

Consistent with the scope of work, MACTEC and Olin began to implement the quarterly surface water sampling and analysis on May 9, 2005. Surface water sampling locations identified as SDSW-A through SDSW-I plus locations ISCO-1, ISCO-2, and ISCO-3 were sampled and analyzed at an off-Site laboratory for total chromium, dissolved aluminum and chromium, chloride, nitrate/nitrite, ammonia nitrogen, sulfate, and specific conductance. These surface water sample locations were sampled on the quarterly schedule again on August 2, 2005 and November 21, 2005. Surface water samples were collected adjacent to the South Ditch piezometers on a monthly basis from September 2005 through September 2006. Field measurements were made for these samples (pH, specific conductivity, water level) and ammonia. Table 2.1-7 lists the details of these surface water samples and their locations are shown on Figure 2.1-7.

Lower South Ditch Area Surface Soil and Sediment Sampling.

A scope of work was submitted to MADEP for additional soil and sediment testing in support of risk assessment activities for the Lower South Ditch on May 5, 2005 (Sleeman, Hanley & DiNitto, 2005). More specifically, the scope of work proposed a characterization of soil and sediments, toxicity testing of amphibians and invertebrates, and delineation of the extent of an area of elevated chromium concentrations in floodplain soil. Information collected from the sampling and analysis

was intended for use in a future Environmental Risk Characterization for the Lower South Ditch. The term Lower South Ditch in this context refers to the portion of the South Ditch downstream of the Delta, which is the downstream limit of the C-RAM remedial activities. The Lower South Ditch extends beyond the eastern facility property boundary to the East Ditch. Figure 1.3-1 identifies the Lower South Ditch and Delta areas. MADEP provided approval of the scope of work in a letter dated July 5, 2005 (MADEP, 2005e).

The additional sediment and surface soil samples were collected in August 2005 to better characterize the chemical composition of soils and sediments in the Lower South Ditch and to identify potential toxicity of Lower South Ditch soils and sediments to invertebrates and amphibians.

On August 22 and 23, 2005, MACTEC collected three sediment samples (BS030LSD-02 through BS032LSD-02) from three locations in the lower South Ditch and seven floodplain soil samples (BS040LSD through BS045LSD and BS041LSD-DUP) from six locations in wetland areas north and south of the lower South Ditch (MACTEC, 2005g). Two of the samples (BS040LSD and BS030LSD) were collected from an adjacent property (Parcel 37-1, New England Resins & Pigments). In addition, three reference floodplain soil samples (BS021REF-02 through BS021REF-04) were collected from three locations in Wilmington south of Maple Meadow Brook (on Parcel 25-2B).

Samples were analyzed for semi-volatile organic compounds (SVOCs), polycyclic aromatic compounds (PAHs), pesticides, metals, and general chemistry. In addition, sediment samples BS030LSD-02 through BS032LSD-02 were submitted for a screening-level Frog Embryological Teratogenesis Xenopus (FETAX) assay to be performed on one elutriate sample (prepared from BS030LSD-02). The elutriate samples were analyzed for the same chemical parameters as the sediment/soil samples. Soil samples BS040LSD through BS045LSD and BS021REF-02 through BS021REF-04 were also submitted for earthworm toxicity testing. The sediment sample locations are shown on Figure 2.1-8. The locations of the reference sediment samples are shown 2.1-15. Tables 2.1-8 and 2.1-9 summarize the collected sediment samples and analytical parameters. The soil sample locations are shown on Figures 2.1-1 and 2.1-4. Tables 2.1-2 and 2.1-3 summarize the collected soil samples and analytical parameters.

All surface water samples collected from the South Ditch are summarized in Table 2.1-6 (see "South Ditch" in the "Area" column of the table). The samples are too numerous to discuss individually. However, most of the surface water samples collected from the South Ditch have been collected as part of the major site investigations, during implementation of the C-RAM, during the IRAs related to the October 5, 2000 and July 5, 2001 discharge of impacted groundwater to the South Ditch, the PCMP program, and the 2005-2006 supplemental investigations of surface water quality in the South Ditch.

Surface water and sediment sampling and analytical programs associated with the C-RAM PCMP (monitoring program) are discussed in Section 2.2.2.

2.1.4.1.2.1.2 Flocculent

The floc that has been observed within the ditch system has been characterized and investigated in order to evaluate the fate and transport of the material, to assess potential bioavailablity and potential risks of the material to aquatic receptors, if any, and to evaluate remedial requirements, if any.

2.1.4.1.2.1.2.1 Floc Investigations

Three investigations were conducted concerning the chemical, physical, and mineral composition of the floc material collected form the ditch system. It was observed that the physical appearance and chemical composition of floc was not consistent throughout the ditch system.

In May 1995, as a Supplemental Phase II activity, samples of floc were collected to assist in determining mechanisms of formation (Geomega, 1996). Samples of a "red floc" in the off-Property West Ditch and a "white floc" in the South Ditch downstream of the former Central Pond location were collected. The floc material samples were prepared for analysis by filtering the water/floc mixture and air drying the material that collected on the filter paper at room temperature. The samples were analyzed by Electron Micrograph Analysis (EMPA) at the University of Colorado at Boulder. Additionally, the samples were submitted to the laboratory for total metals analysis. The EMPA concluded the "white floc" consisted of pure aluminum hydroxide (gibbsite) and trivalent chromium was present with a composition of between 0.8% and 2%. The "red floc" (also referred to as "iron floc") characterization suggested the material was similar to the mineral

redingtonite (containing iron, chromium, aluminum, and sulfate) with a chromium content of 5% - 10%. The laboratory analysis indicated that the "white floc" sample contained 2,500 mg/kg (0.25% by weight) total chromium while aluminum was the metal with the highest concentration (77,000 mg/kg) and the "red floc" sample contained 35,000 mg/kg (3.5% by weight) while iron was the predominant metal (180,000 mg/kg). The aluminum concentration in the "white floc" sample and the "red floc" sample were very similar. The "white floc" sample contained no detectable sulfate while the "red floc" sample contained 740 mg/kg sulfate.

In April 1996 five additional floc samples (Floc-1 through Floc-5) were collected for chromium analysis. The samples were filtered, placed on ice, and submitted to the laboratory for analysis. The total chromium concentrations in the samples Floc-1 through Floc-5 were 19,000 mg/kg, 7,400 mg/kg, 18,000 mg/kg, 930 mg/kg, and 5,200 mg/kg respectively. One additional sample (Floc-6) was collected for EMPA. Floc sample locations are shown on Figure 2.1-8 (Floc-1 through Floc-6) and Figure 2.1-9 ("red floc"). Sample Floc-1 was collected from the upper South Ditch, Floc-2 from between the weir and the Central Pond location, Floc-3 from the South Ditch near the eastern property boundary, and Floc-4, Floc-5, and Floc-6 from the wet area between the eastern property boundary and the East Ditch. Several chromium-containing phases were identified in the floc samples by EMPA. It was concluded that "the existence of these precipitates in the floc samples indicates that these phases are thermodynamically stable under neutral, oxidizing conditions of the surface water environment" (Geomega, 1996)

A study was conducted on the floc material (surface water/floc mixture) in the East Ditch in January 1998 (Geomega, 1998b). Three floc samples were obtained: ED-B (East Ditch – Background); ED-C (East Ditch a botryoidal growth in the sediment); and ED-S (a flocculent material visibly comparable to the "white floc" observed in the South Ditch in 1996). Sample ED-B was collected on the East Ditch upstream of the Facility and upstream of the Eames Street Bridge. Sample ED-C was collected from the East Ditch, centrally located along the eastern property boundary). Sample ED-S was collected from the East Ditch, upstream of the confluence of the South Ditch and the East Ditch. These samples were filtered and submitted for laboratory analysis in a manner consistent with the 1996 floc samples. In this instance, however, the filtered water samples were also submitted for chemical analysis. Chromium concentrations in the three East Ditch floc samples were lower than in the samples collected from the off-Property West Ditch and South Ditch. The concentrations were: ED-B (not detected); ED-C (34 mg/kg); and ED-S (230

mg/kg). The report concluded that the floc is unlikely to represent an ecological risk to aquatic organisms due to the low solubility and bioavailability in surface water.

2.1.4.1.2.1.2.2 Floc Stability Study

An investigation of the stability of floc material was conducted beginning in June 2003 (Geomega, 2004c). The investigation was conducted to further characterize the floc composition and describe its morphology and to evaluate the solubility of floc over a range of pH conditions that are likely to be present in the ditch system (particularly the East Ditch). The investigation is based on the scope of work submitted to MADEP on October 12, 2001(GEI, 2001o). MADEP conditionally approved the scope of work on February 1, 2002 (MADEP, 2002c).

Floc samples (floc/surface water mixture) were collected in June and September 2003. Portions of the samples were submitted for analysis and for the laboratory solubility studies. Floc samples included "red floc" (off-Property West Ditch), "white floc" (South Ditch), and "background floc" (East Ditch upstream). The study determined the chemical composition of each of the floc types and also determined the solubility of the floc constituents over a range of pH conditions. All of the floc types were "observed to have low metal solubility for iron, aluminum, manganese, and chromium over the range of pH conditions likely to occur at the site." The report also concluded that none of the flocs are reported to contain any significant hexavalent chromium concentrations and no hexavalent chromium was detected in any of the water samples associated with the study (Geomega, 2004c). These findings indicate the floc is expected to be stable within the ditch system surface water and its bioavailability to aquatic organisms would be low.

2.1.4.1.2.2 Remedial Action and Confirmatory Sampling

South ditch sediment excavations and restoration are documented in the C-RAM Status Reports. As reported in those Status Reports, the confirmatory samples from the South Ditch were mineral soil samples collected after the organic sediments of the ditch were completely removed from the bottom and sides of the defined ditch. Those confirmatory soil samples are identified at locations SD-C1 through SD-C54S and they were collected in October/November 2000 and in May 2001. Table 2.1-2 summarizes those soil sample locations and identifies their current status (remaining, excavated, etc.). These sample locations are shown on Figure 2.1-1 and 2.1-2.

Upon completion of the C-RAM, the excavated portion of the South Ditch was restored with erosion control netting and imported organic soil materials. The C-RAM activities included the construction of the permanent box culvert/weir in the upper portion of the South Ditch. The monitoring program known as the PCMP was initiated upon completion of the C-RAM activities. The PCMP activities are discussed in detail in section 2.2.2.

The PCMP included the collection of annual sediment samples to assess potential recontamination of the remediated portion of the South Ditch. These samples were collected at locations SD-SD2, SD-SD3, SD-SD4, and SD-SD5. The first three annual sampling events were conducted in June 2003, August 2004, and May 2005. Sample SD-SD1 was collected from the on-Property West Ditch.

The locations of sediment samples that are representative of current conditions are shown in Figure 2.1-11.

2.1.4.1.3 Off-Property West Ditch

2.1.4.1.3.1 Investigations

Table 2.1-4 summarizes all sediment samples collected in the off-Property West Ditch and Table 2.1-6 summarizes all surface water samples collected in the off-Property West Ditch (see "Off-Property West Ditch" in the "Area" column of the tables).

In addition to the major investigations that have been summarized previously in section 2.1.4, a Supplemental Phase II off-Property West Ditch sediment (and soil) sampling event was conducted in June 2003. Table 2.1-4 summarizes all of the sediment samples collected in the off-Property West Ditch. Sampling was conducted in 1992 during the Phase II CSA and in June 2003. The June 2003 samples were collected at locations OPWD-SD/SO/SW-N (northern end), OPWD-SD/SO/SW-S (southern end), and OPWD-SD/SO/SW-WS (western spur). These samples were analyzed for VOCs, SVOCs, NDMA, and target analyte list (TAL) metals as shown in Table 2.1-4. These sediment sample locations are shown on Figure 2.1-9. During this sampling event, soil samples were also collected at the same locations (typically six-inch intervals down to three feet below the sediment/water interface. These soil samples were collected to evaluate the extent of contamination in soils below the very thin veneer of organic sediment observed in the off-Property

West Ditch. These samples were collected in June 2003 at locations OPWD-SD/SO/SW-S (southern end), OPWD-SD/SO/SW-WS (western spur). These soil samples are summarized in Table 2.1-2 (see "off-Property West Ditch" in the "Area" column of the table).

As discussed in section 2.1.4.1.2, floc and sediment were removed from the off-Property West Ditch via vacuum truck in 1994. That activity altered the surface conditions of sediment where the CSA sediment samples had been collected previously.

All surface water samples collected from the off-Property West Ditch are summarized in Table 2.1-6 ("Off-property West Ditch" in the "Area" column of the table). The surface water sampling events are primarily from a 1995 Supplemental Phase II surface water and groundwater investigation (Geomega, 1996) and storm water runoff and storm water runoff baseline sampling conducted in 2002 and 2003.

2.1.4.1.4 East Ditch (and New Boston Street Drainway)

The East Ditch is a man-made, maintained, railroad ditch that runs from north to south along the eastern boundary of the Property. The ditch is maintained and periodically "cleaned out" or dredged by the railroad. The East Ditch flows south and eventually becomes the New Boston Street Drainway that flows further south to Hall's Brook Holding Area (HBHA).

2.1.4.1.4.1 Investigations

Table 2.1-4 summarizes all sediment samples collected in the East Ditch and Table 2.1-6 summarizes all surface water samples collected in the East Ditch ("East Ditch" in the "Area" column of the tables). The sediment and surface water programs for the East Ditch are summarized below. Figure 2.1-9 shows the East Ditch sediment sampling locations.

Sediment sampling was conducted in the East Ditch in 1992 and 1993 during the CSA investigation (CRA, 1993). Sample locations included SW-1 through SW-5 and SW-23, SW-24, SW-25, SW-26, SW-27, SW-29, and SW-30. These samples were analyzed for the SSPL. A second sediment sampling program was conducted in June 2003 and April 2004. This sampling program was conducted as a Supplemental Phase II activity to support and updated Ecological Risk

Assessment for the East Ditch. Sample locations included EDSD/SW0 through EDSD/SW8. These samples were analyzed for the SSPL plus NDMA.

Surface water sampling was conducted in the East Ditch in 1978 (GEI, 1978). During the years 1982 through 1987, surface water samples were collected twice yearly from East Ditch locations SS-1, SS-16, SS-2 (beginning in 1985), SS-B (beginning in 1986), and SS-E (only in 1987).

During the CSA Investigation, surface water samples were collected at locations SW-1, SW-2, SW-3, and SW-23 in 1992 and from locations SW-24 through SW30 in 1993. These samples were analyzed for the SSPL. The sample location ISCO-3 was included in the PCMP program beginning in February 2001 through February 2006. As a Supplemental Phase II activity to support an updated Ecological Risk Assessment, comprehensive surface water sampling rounds of the East Ditch were conducted in June 2003, September 2003, April 2004, and October 2004. These samples were analyzed for the SSPL plus NDMA, herbicides, Opex and Kempore. In addition acetaldehyde and formaldehyde were analyzed in two sampling rounds.

The investigations of sediment and surface water conducted in 2003 and 2004 were conducted in accordance with the scope of work for additional investigation of the East Ditch that was submitted to MADEP on October 12, 2001 (GEI, 2001p) as modified by the requirements of the MADEP Conditional Approval letter dated February 1, 2002 (MADEP, 2002c).

2.1.4.1.5 Central Pond

2.1.4.1.5.1 Investigations

Table 2.1-4 summarizes all sediment samples collected in the Central Pond and Table 2.1-6 summarizes all surface water samples collected in the Central Pond (see “Central Pond” in the “Area” column of the tables). Figure 2.1-8 shows the locations of the sediment samples.

Two sediment samples were collected from location SW-8 in Central Pond during the 1992 CSA investigations (CRA, 1993). In January 2000, two sediment samples were collected at locations BS009 and BS010 as part of the Focused Site Characterization that supported the focused Risk Assessment for the proposed Property redevelopment. These samples were analyzed for SVOCs, pesticides, and TAL metals. Sediment samples were collected from location RSD-8 in January

2000 and analyzed for VOCs, SVOCs, PCBs, and metals. As part of the Pre-Remedial Characterization, in May 2000, sediment samples RSD-24 through RSD-28 were collected and analyzed for chromium.

After the completion of the Central Pond remedial excavation during the C-RAM, confirmatory sediment samples CP-C1 through CP-C8 were collected and submitted for analysis SVOCs and chromium. In addition two of the samples were analyzed for VOCs and RCRA 8 metals. Figure 2.1-10 shows excavated sample locations, and Figure 2.1-11 shows the locations of sediment samples that are representative of current Site conditions.

Surface water sampling in Central Pond is limited to the samples collected in 2000 and 2001. These samples were collected during C-RAM activities and have little potential to represent current Site conditions.

2.1.4.1.6 North Pond

2.1.4.1.6.1 Investigations

Table 2.1-4 identifies the sediment sample and duplicate collected from the North Pond (see "North Pond" in the "Area" column of the table). No surface water samples were collected from North Pond. The sample was collected from location NPSED1 which is shown on Figure 2.1-9. The sample was collected per the scope of work for the investigation of the North Pond area that was submitted to MADEP on April 4, 2002 (GEI, 2002e). Two reports (Part 1 and Part 2 Investigations) containing analytical data for the North Pond investigations were submitted to MADEP (GEI, 2002f, GEI, 2003e).

2.1.4.2 Maple Meadow Brook Wetland

2.1.4.2.1 Investigations

Investigations and monitoring of Maple Meadow Brook Wetland sediment and surface water have been conducted to evaluate potential migration of Site-impacted groundwater to surface water and sediments within the Maple Meadow Brook Wetland. MADEP suggested that with the cessation of pumping of the Town of Wilmington municipal waster supply wells (MWSWs) that the flow

regime of the groundwater beneath the wetland may change. MADEP required a monitoring program to identify and assess any changes in Site-related solute concentrations in groundwater and/or surface water within the Maple Meadow Brook Wetland.

Table 2.1-4 summarizes all sediment samples collected in the Maple Meadow Brook Wetland and Table 2.1-6 summarizes all surface water samples collected in the Maple Meadow Brook Wetland (see "Maple Meadow Brook Wetland" in the "Area" column of the tables).

Two rounds of sediment sampling were conducted in the Maple Meadow Brook Wetland (October 2001 and June 2002). The samples were collected from Maple Meadow Brook and Sawmill Brook. The two brooks flow in a general southwest to northeast direction through the Maple Meadow Brook Wetland. Samples were analyzed for three inorganic parameters: ammonia, percent solids, and total organic carbon.

Surface water sampling was conducted in the Maple Meadow Brook Wetland on the following schedule:

- October 2001
- June 2002
- June 2003
- November 2003
- February 2004
- May 2004
- August 2004
- November 2004
- May 2005
- July 2005
- November 2005
- May 2006

Surface water sediment sample locations include MMB-SW/SD-1 through MMB-SW/SD-7, MMB-SW/SD-8A, MMB-SW/SD-9 through MMB-SW/SD-11. Sample location MMB-SW/SD-9 was added to the program in June 2003 and MMB-SW/SD-10 and MMB-SW/SD-11 were added in

November 2003. Location MMB-SW/SD-1 is slightly downstream of the confluence of Maple Meadow Brook and Sawmill Brook. Several sample locations were selected to be upstream of any Site-related groundwater and include MMB-SW/SD-6 and MMB-SW/SD-11. Figure 2.1-7 shows these surface water sample locations.

In this Maple Meadow Brook Wetland surface water program, samples were originally analyzed for five total and dissolved metals and three inorganic/physical parameters. NDMA was added to the analytical suite in June 2003. Also in November 2003, the number of metals analyzed was increased to nineteen, the number of inorganic/physical parameters was increased to ten, and only for this one round, were acetaldehyde and formaldehyde added to the parameter list. Total metals analysis was removed from the parameter list after the November 2003 sampling event.

This surface water monitoring program was conducted simultaneously with a complementary groundwater monitoring program. In 1996/1997 a Town and Sentinel Well Monitoring Program was established to monitor possible changes in groundwater conditions within the Maple Meadow Brook Aquifer over time and to provide an "early warning" system for the Town of Wilmington's MWSWs. In December 2002, a Stage I Environmental Screening for Maple Meadow Brook and Sawmill Brook was submitted to MADEP. This Environmental Screening evaluated surface water data collected in 2001 and 2002 from the two brooks to assess potential impacts on aquatic life.

In March 2003, pumping of the MWSWs was suspended in response to the detection of NDMA in raw (untreated) water samples collected from four of the five wells associated with the Maple Meadow Brook Aquifer. The Town Well; monitoring program was suspended as well. In August 2003 Olin proposed a surface water monitoring program (and statistical data analysis component) to assess potential changes in surface water quality that might occur after the cessation of pumping of the MWSWs and also proposed to assess the need to update the Stage I Screening. It was determined it was premature to update the environmental screening at that time. The program was initiated in November 2003 and the program was conditionally approved by MADEP on February 5, 2004. The groundwater component of the former Town and Sentinel Well program and the surface water monitoring program have been know in recent years as the Western Bedrock Valley Monitoring Program for the Maple Meadow Brook Aquifer Study Area. The monitoring program activities and the monitoring data have been documented in Western Bedrock Valley Monitoring Reports and the analysis of data has been submitted in the Western Bedrock Valley Statistical Reports.

2.1.5 Geological Investigations

The shape of the bedrock surface at the Property and in the Maple Meadow Brook Aquifer was an important control over gravity driven DAPL migration paths, locations where the migration of DAPL was arrested and where DAPL-like material has accumulated. Information collected from installation of monitoring wells, seismic investigations, and boring programs has been used to characterize the shape of the bedrock surface over the Site. The monitoring well installation logs have provided extensive information concerning the depth to bedrock. In addition, several seismic investigations have been conducted, and those investigations have been augmented with boring programs designed specifically to determine the depth to bedrock in specific areas that are of special interest due to distinct bedrock features such as the Western Bedrock Valley and protrusions that cut across the bridge the bedrock valley forming dams or saddles.

2.1.5.1 Seismic Investigations

Section 3.0 discusses the locations of seismic lines, both reflection and refraction, that have been completed during several seismic investigations conducted to characterize the shape of the bedrock surface at the Site. Section 3.0 provides the most current interpretation of the bedrock surface from seismic studies and bedrock depths determined from borings.

Seismic work conducted prior to 1997 was summarized in the 1997 Supplemental Phase II Report (Smith, 1997). From November 1994, through November 1996, four seismic reflection studies completed a total 16,750 linear feet of seismic line. Fifteen lines were located in the Western Bedrock Valley, four lines within the Eastern Bedrock Valley east of the Property, and two lines were shot southwest of the Property. Section 3.0 presents the seismic work and discusses it in greater detail.

In response approved work plans discussed in the next section, since 1997, four additional seismic studies were conducted. Two studies focused on the delineation of the Western Bedrock Valley, one study was conducted as part of the Maine Street Saddle Investigation, and the most recent was completed in the vicinity of Jewel Drive in 2006. Since 1997, eight long seismic refraction lines have been completed within the MMB wetland, (Geomega, 2001c, Geomega, 2004d), three seismic reflection and three seismic refraction lines completed in vicinity of the Maine Street Saddle

(LAW, 2001), (Geomega 2001), and two seismic reflection and four seismic refraction lines were conducted in vicinity of Jewel Drive (LAW, 2001d., and MACTEC, 2006d).

2.1.5.1.1 Main Street Bedrock Saddle Investigations

The Main Street Bedrock Saddle investigations were initiated to investigate the suspected presence of a bedrock saddle that formed a dam within the Western Bedrock Valley, arresting westward migration of DAPL. Subsequent investigations were designed to refine the geometry and hydraulic characteristics of that structure. In October through November 1996, three borings (MB-1, MB-2, and MB-3) were advanced to at least five feet into bedrock (except at MB-2) on properties to the west of Main Street. In November 1996 three additional borings (CB-1, CB-2, and CB-3) were advanced to at least five feet into bedrock along the access road to the Chestnut Street pumping station. Groundwater samples were collected from the top of bedrock upon completion of the boring. Boring locations shown on Figure 2-1 of the 1997 Supplemental Phase II Report. These borings were advanced using a rotosonic drill rig. During the advancement of the borings, aquifer materials and conditions were recorded and were documented in Appendix A of the 1997 Supplemental Phase II Report (Smith, 1997). Groundwater analytical results for the Main Street borings indicate that DAPL is not present at any of those locations. This information is the basis for the inferred presence of a subsurface geologic barrier to DAPL flow immediately west of Main Street (at the western boundary of the Main Street DAPL pool).

On February 28, 1998, MADEP conditionally approved (MADEP, 1998a) the 1997 Supplemental Phase II Report with the requirement that the existence of the subsurface barrier west of Main Street be confirmed by geophysical techniques and subsurface borings. On March 13, 1998 GEI submitted a Work Plan for conducting a seismic survey west of Main Street to collect additional information concerning the depth and orientation of bedrock or other geologic features which may affect the lateral extent and migration of DAPL (GEI, 1998c). On April 3, 1998 MADEP conditionally approved the Seismic Survey work plan requiring additional seismic lines beyond those proposed in the Work Plan. In its October 2, 1998 Conditional Approval of the Town Well and Sentinel Well Groundwater Program Recommendations, MADEP required that a soil boring program be conducted north of the intersection of Main Street and Eames Street to further define the Western Bedrock Valley and to define the downgradient extent of the DAPL (MADEP, 1998b) in this area.

Three seismic lines (1,2,5) were shot in the area of the inferred saddle and six borings (SB-1 through SB-6) were drilled between August 24, 1998 and September 4, 1998 (LAW, 2001d). The location of these borings was based on the seismic investigation. The borings confirmed the existence of the bedrock saddle, which is roughly parallel to Main Street, and with a low elevation of approximately elevation 40 ft MSL. Groundwater samples were collected from top of bedrock from these borings. The groundwater sample from the deep boring east of the saddle (SB-4) had DAPL characteristics. Groundwater samples from locations nearer to the crest of the saddle (SB-2 and SB-3) had diluted concentrations of DAPL constituents, and the samples (SB-5 and SB-6) from outside the saddle-controlled reservoir exhibited ambient groundwater conditions (Geomega, 2001d).

Subsequently, three additional borings (SB-7, SB-8, and SB-9) were drilled in the saddle area to determine the lowest point within the bedrock saddle and to identify the location of an additional multilevel piezometer at that low point. The low point, at SB-8 had elevation of approximately 32 ft amsl. SB-8 was cored from the top of bedrock at depth of approximately 65 ft bgs to approximately 176 ft bgs. Additional downhole investigations of the bedrock portion of SB-8 included hydraulic packer tests, Borehole Image Processing System (BIPS) Logging, and hydrophysical logging. For comparison purposes, the same tests were conducted in monitoring wells GW-62BR and GW-62BRD (Geomega, 2001d).

Multilevel piezometer MP-4 was installed in the SB-8 boring to a depth of approximately 173 ft bgs (approximately 108 feet into bedrock). The soil boring investigation (SB-7 through SB-9) and installation of MP-4 (in SB-8) is documented in the January 8, 2001 report titled Summary Report – Investigation Leading to the Installation of Multilevel Piezometer MP-4, Olin Corporation, Wilmington, Massachusetts (LAW, 2001d).

2.1.6 Soil and Vadose Zone Investigations

Several soil and vadose zone investigations, independent of specific source-area investigations have been conducted. The investigations are summarized in the following subsections.

2.1.6.1.1 Initial CRA Soil Investigation

Surface and subsurface soil investigations were conducted prior to the 1993 CSA and were focused on the SWMUs identified in the 1993 CSA. A standard set of analytical parameters was adopted for samples submitted for laboratory analysis. This set of parameters was identified with the acronym SSPL. The analytical suite included TCL-VOCs including the trimethylpentne compounds 2,4,4-trimethyl-1-pentene and 2,4,4-trimetyhly-2-pentene, TCL-BNAs or SVOCs, TCL-Pesticides/PCBs , TAL-metals, cyanide, and general chemistry parameters sulfate, chloride and ammonia. The ammonia method is from Methods for Chemical Analysis of Water and Waste", EPA-600/04-79-020, Revised, March 1983. All other methods cited above are listed in Test Methods for Evaluating Solid Waste, USEPA SW-846, 3rd Edition, November, 1986.

2.1.6.1.2 Supplemental Phase II Soil Investigations

2.1.6.1.2.1 1996 Soil Background Investigation

During the CSA soil investigations, two background soil samples were collected during the installation of monitoring well GW-67 on November 2, 1992, (CRA, 1993). Monitoring well GW-67 is located approximately 1,400 feet west of the facility. The surface soil sample location was identified as BGS-01 and the subsurface soil sample location was identified as BH41. These samples were analyzed for SVOCs and TAL metals. The locations of these samples are shown on Figure 2.1-16 and the samples summaries are provided in Table 2.1-3 (see "22-Apr-96" in the "Date sampled" column of the table).

Olin submitted letter to MADEP dated January 23, 1996 proposing a sampling and analysis program for establishing background conditions in soil, surface water and sediment (Olin, 1996b), ABB-ES, 1996b). MADEP approved the additional sampling and analysis Scope of Work to establish background conditions in a letter dated March 26, 1996 (MADEP, 1996a). Consequently, in a letter dated May 16, 1996 (MADEP, 1996b), the MADEP conditionally approved the Human Health Risk Assessment Scope of Work that had been submitted to MADEP in April 1996 (ABB-ES, 1996c). The Conditional Approval required that background levels be established in accordance with the definition of background in the MCP.

In April 1996, surface soil samples at six background locations (SSBK-015 through SSBK-019) were collected consistent with the approved scope of work. Table 2.1-3 summarizes the samples

and associated analytical parameter list (see "22-Apr-96" in the "Date Sampled" column of the table). All of the surface soil background samples were submitted for analysis of SVOCs, calcium, potassium, sodium, ammonia nitrogen, and sulfate. These parameters were selected because they had not been included in the list of background values for Massachusetts soils that had been published by the MADEP's Bureau of Waste Site Cleanup (BWSC). The locations of the surface soil background samples are presented on Figure 2.1-16. The data from these samples were collected to establish background conditions for soil for the Site for those analytical parameters. Background soil conditions were summarized in Attachment 3 of the Environmental Risk Characterization contained in Volume VIII of the 1997 Supplemental Phase II Report (Smith, 1997).

2.1.6.1.2.2 December 1996 Surface Soil Sampling Program

During the Supplemental Phase II Investigation, the Surface Soil Investigation Work Plan was submitted (Smith, 1996b). The objective of the proposed investigation was to provide supplemental surface soil data to support the human health and environmental risk assessments that would be included in the 1997 Supplemental Phase II Report. A second objective was to collect groundwater quality data to assist in the determination of extent of impact.

Consistent with the scope of work, 54 surface soil samples were collected on December 15 and 16, 1996. The sample summaries (including analytical parameters and current status are provided in Table 2.1-3 (see"15-Dec-96" or "16-Dec-96" in the "Date Sampled" column of the table). The locations of these soil samples are shown on Figure 2.1-1. Five samples were collected from SWMU-26 (where surface soil had been removed), five samples for VOC analysis and one composite sample for the remainder of the analytical suite were collected from Area 1 (identified in the CRA Report (CRA, 1993), eight samples for VOC analysis and one composite sample for Drum Area A, four samples for VOC analysis and one composite sample for Drum Area B, four samples from Lake Poly, several samples from the Central Pond Drainage Area, several samples from Area 8 and Area 9 were collected to provide representative data for surface soils. Samples were analyzed for VOCs (discrete grab samples), SVOCs, Pesticides, TAL metals (several samples were analyzed for only chromium), ammonia nitrogen, and sulfate. The results of this investigation were included in the 1997 Supplemental Phase II Report (CRA, 1993), particularly in the human health and ecological risk assessments.

2.1.6.1.2.3 Surface Soil Program to Support Biological Sampling- January 1997

In January 1997, nine surface soil samples were collected from the undeveloped portion of the Property for earthworm toxicity and bioaccumulation testing. Splits of those samples were submitted to IEA for laboratory analysis of TAL metals, pesticides, and SVOCs. Samples BS013WDXXX, BS014WDXXX, BS015SDXXX, BS016SMDXX, BS017PNDX, BS018PNDX, BS019WMDX, and S020WMDX were collected from the Facility and sample BS021REFX was collected from a reference location. The chemical analysis of the sediment samples was intended to provide information concerning possible chemical contributions to any toxicity that might be observed during the toxicity testing and to assess the bioaccumulation test for earthworms (for use in food chain modeling). The locations of these samples are shown on Figure 2.1-1 and Figure 2.1-16 (BS021REFX only). Summaries of the samples, including analytical parameters and current status can be viewed in Table 2.1-3 (see"21-Jan-97" listed in the "Date Sampled" column of the table).

2.1.6.1.2.4 1998 Background Soil Sampling for Arsenic

In response to the February 27, 1998 Supplemental Phase II Conditional Approval (MADEP, 1998a) and a meeting at MADEP on June 23, 1998, five surface soil samples (0' – 2') were collected and submitted for analysis of arsenic. These samples were collected on November 23, 1998 to establish site-specific arsenic soil background concentrations, since arsenic had not previously been a target analyte for the soil background samples. These data would be used to determine if OU1 arsenic soil concentrations were consistent with site-specific background concentrations. These samples were collected from the previously sampled soil background locations and were identified as SS101XXBKX through SS105XXBKX. The locations of these samples are shown on Figure 2.1-16. The sample summaries can be viewed in Table 2.1-3 (see"23-Nov-98" listed in the "Date Sampled" column of the table).

2.1.6.1.2.5 Soil Sampling -November 1998

In response to the February 27, 1998 Supplemental Phase II Conditional Approval (MADEP, 1998a) and a meeting at MADEP on June 23, 1998, additional soil samples were collected in 1998 to further investigate potential hot spot analytes in soils at SWMU-27 (Lake Poly area) and SWMU-33 (oily soil to the south of the South Ditch), to determine if hexavalent chromium was

present in soils and to determine if additional risk assessment was warranted to address potential allergic contact dermatitis. The SWMU-related soil sample collection discussion is followed by a discussion of the chromium speciation sample collection.

The analytical data from original composite surface soil samples collected from SWMU-27 and SWMU-33 during the CSA indicated potential hot spot analytes were present. HLA collected three additional surface soil samples on November 30, 1998 at each of the SWMUs in order to identify the specific soil locations that contributed to the high concentrations of various analytical parameters in the original composite samples. Three surface soil samples (0 – 2 ft bgs) from each of the two areas were submitted for analyses. The analytical suite for samples from SWMU-27 included PCE, di-n-butylphthalate, di-n-octyl phthalate, NDPA, BEHP, chromium, mercury, and ammonia nitrogen. The analytical suite for samples from SWMU-33 included BEHP, chromium, and chloride. These samples were collected at locations SWMU-27-101 through SWMU-237-103 and SWMU-33-101 through SWMU-33-103 as shown in Figure 2.1-1 and as summarized (including current status and list of analytical parameters) in Table 2.1-3 (see"30-Nov-98" listed in the "Date Sampled" column of the table).

In response to MADEP comments, on November 24, 1998 six surface soil samples (0 – 2 ft bgs) including one duplicate and five subsurface soil samples (6 – 8 ft bgs) were collected from within the former Lake Poly area to determine if hexavalent chromium was present in soil from this area where chromium concentrations were indicative of releases of chromium. Samples were designated as SS101XXLPX through SS105XXLPX (plus the duplicate SS103XXLPD) and SB101XXLPX through SB105XXLPX (corresponding sample locations were identified as LP-101 through LP-105). Samples were submitted for analysis of total chromium (Method ICP 6010A), hexavalent chromium (Methods 3060A/7196A), total organic carbon (Method IR 9060), soil pH (Method 9045), and oxidation-reduction potential (via electrode). On November 30, 1998, three additional surface soil samples (101A, 102A, and 104A) and three additional subsurface soil samples (101B, 102B, and 104B) were collected and submitted for analysis as described above (at locations LP-101, LP-102, and LP-104). Locations of these samples are shown on Figure 2.1-1 and are summarized (including current status and list of analytical parameters) in Table 2.1-3 (see "24-Nov-98" listed in the "Date Sampled" column of the table). The results of the sampling and analysis indicated that trivalent chromium is the predominant chromium species in the soil samples and there was no indication that concerns about potential contact dermatitis should be pursued further.

2.1.6.1.2.6 P esticide Soil Program-1999

On November 4, 1999 eight surface soil samples were collected from the Central Pond area (locations CP-1 and CP-2), the warehouse area (NW-WAREHOUSE and SE-WAREHOUSE), the area of the West Ditch (locations WD-1 and WD-2), the Lake Poly area (LP-1 and LP-2) and submitted the samples for laboratory analysis of the pesticide Fenazaflor. This sampling and analysis program addressed a concern that this pesticide may have been stored at the Facility. Locations of these samples can be viewed on Figure 2.1-1 and are summarized (including current status and list of analytical parameters) in Table 2.1-3 (see "4-Nov-99" listed in the "Date Sampled" column of the table). Fenazaflor was not detected in any of the samples.

2.1.6.1.2.7 Soil Investigation to Support Nature and Extent and Risk Assessment-2000

In January 2000, an investigation was conducted to support a Focused Site Characterization. The Focused Site Characterization Report was included as a component of the C-RAM Plan in anticipation of remedial activities in advance of Site redevelopment. The C-RAM Plan was prepared in accordance with MADEP's Policy No. WSC-00-425, Construction of Buildings in Contaminated Areas (MADEP, 2000b). That policy requires the preparation of a Focused Site Characterization, Focused Risk Assessment, and Focused feasibility Study for projects involving the construction of buildings. The C-RAM Plan (GEI, 2000a) including the Focused Site Characterization Report was submitted to MADEP in April, 2000. The Focused Site Characterization investigations obtained the necessary data for determining that the extent of contamination in groundwater, soil, and sediment had been determined; obtained the necessary data for a Focused Risk Assessment to be included in the C-RAM Plan; and collected the necessary data to support the Focused Feasibility Study to be submitted as a component of the C-RAM Plan.

Consistent with the scope of work, on January 24 through 26, 2000 seventeen direct push borings to depths ranging from 3 feet bgs to 6 feet bgs were advanced. Soil boring locations were identified as RSO-1 through RSO-15, CPDA-1-A, and BH-20A (HLA, 2000 and LAW, 2000b). At each boring, samples representative of two depth intervals (0-3 feet bgs and 3-6 feet bgs) were collected and submitted for laboratory analysis. Locations of the samples are shown on Figure 2.1-4 (0 – 3 feet bgs samples) and Figure 2.1-5 (3 – 6 feet bgs samples). Table 2.1-3 provides sample summary information, including analytical parameters and current status (see "24-Jan-00", "25-

Jan-00", or "26-Jan-00" listed in the "Date Sampled" column of the table). All of these soil samples were analyzed for VOCs, SVOCs, and TAL metals. A hexavalent chromium analysis was conducted on samples with total chromium concentration greater than 200 mg/kg (the MADEP allergic contact dermatitis threshold value). The analytical results for this sampling and analysis program were reported in the 2000 Site Characterization Report (LAW, 2000b) that was submitted to MADEP within the C-RAM Plan in April 2000.

2.1.6.1.2.8 November 2000 Surface Soil Hot Spot Delineation (Area 8 Location CW-1 and RSO-06)

As part of the C-RAM, Part 2 activities, on November 17, 2000, the A8CW-1 soil hot spot (PAHs and dibenzofuran) and the RSO-6 (cadmium) soil hot spot (as "hot spot" is defined by the MCP) were excavated. These areas had been identified as hot spots because they met the definition of hot spot per the MCP. The C-RAM Status Report No. 1 (GEI, 2000c) documents the soil removal activities conducted in November 2000. The A8CW-1 excavation was 10 feet wide, 10 feet long and 3 feet deep. The RSO-6 excavation was 12 feet wide, 14 feet long and 8 feet deep. Four confirmatory sidewall samples (A8CW-1-N, A8CW-1-E, A8CW-1-S, A8CW-1-W and RSO-06-N, RSO-06-E, RSO-06-S, RSO-06-W) and one bottom of excavation sample (A8CW-1-B and RSO-06-B) were collected and submitted for analysis of SVOCs, pesticides, cadmium, chromium, and lead. These samples are listed as "C-RAM Hotspot" in the "Area" column of Tables 2.1-2 and 2.1-3. The excavations were backfilled with imported clean granular fill. The excavated soil was stockpiled and tested for off-site disposal. The stockpiled soil from both excavations was subsequently shipped off-site for disposal at approved facilities.

The confirmatory sample results for the two excavations indicated that additional excavation was not required for the A8CW-1 and RSO-6 soil hot spots as indicated in the C-RAM Status report No. 2 (GEI, 2001a). The confirmatory sample results indicated that the concentrations of PAHs and dibenzofuran at A8CW-1 and cadmium at RSO-6 had been reduced to below applicable MCP Method 1 soil standards. Therefore, these excavations had met their objectives.

2.1.6.1.2.9 Lower South Ditch Bank Soil Investigation- September 2001

In response to a release of impacted groundwater to the South Ditch/Delta during dewatering of an excavation on October 5, 2000, An IRA Assessment and Plan was submitted to MADEP on

December 22, 2000 (GEI, 2000i). MADEP provided Conditional Approval of the Assessment and Plan in a letter on June 8, 2001 (MADEP, 2001d). The conditional approval required weekly surface water sampling and an Imminent Hazard Evaluation. Further, beyond the proposed activities, the approval required additional sampling of sediments and bank soil in the downgradient portions of the South Ditch to evaluate the impacts of the October 5, 2000 release as well as to further characterize the lower South Ditch sediments that had not been remediated. GEI prepared and submitted a scope of work for the additional sediment sampling and analysis on July 9, 2001 (GEI, 2000j). MADEP provided Conditional Approval of the SOW on August 10, 2001 (MADEP, 2001e).

Consistent with the approved scope, sediment samples were collected at locations SDC-1 through SDC-8 shallow (S) and deep (D) in South Ditch on September 17, 2001 and submitted to STL for VOCs, SVOCs, nine metals including hexavalent chromium), ORP, pH, solids, and EPH. The bank samples were soil samples (locations SDF-1 through SDF-8) and were analyzed for the same parameters as the sediment samples.

Figures 2.1-8 and 2.1-11 show the locations of the sediment samples and Tables 2.1-4 and 2.1-5 shows the details of the samples. Figures 2.1-1 and 2.1-4 show the locations of the bank soil samples that were collected and Table 2.1-3 provides a summary of the bank soil samples.

2.1.6.1.2.10 June 2003 off-Property West Ditch Sediment and Subsurface Soil Investigation

In addition to the major investigations that have been summarized previously in section 2.1.4, a Supplemental Phase II off-Property West Ditch sediment and soil sampling event was conducted in June 2003. Table 2.1-4 summarizes all of the sediment samples collected in the off-Property West Ditch. Sampling was conducted in 1992 during the phase II CSA and in June 2003. The June 2003 samples were collected at locations including OPWD-SD/SO/SW-N (northern end), OPWD-SD/SO/SW-S (southern end), and OPWD-SD/SO/SW-WS (western spur). These samples were analyzed for VOCs, SVOCs, NDMA, and TAL metals as indicated in Table 2.1-4. These sediment sample locations are shown on Figure 2.1-9.

During this sampling event, soil samples were also collected at the same locations (typically six-inch intervals down to three feet below the sediment/water interface). These soil samples were collected to evaluate the extent of contamination in soils below the veneer of organic sediment

observed in the off-Property West Ditch. These samples were collected in June 2003 at locations OPWD-SD/SO/SW-S (southern end), OPWD-SD/SO/SW-WS (western spur). These soil samples are summarized in Table 2.1-2 (see "Off-Property West Ditch" in the "Area" column of the table). Figures 2.1-1 and 2.1-2 show the locations of the surface soil samples (top two feet) and subsurface soil samples (greater than 2 feet below the sediment/water interface. These soils are beneath a water body's sediment layer. Therefore, they do not have the same accessibility as do typical surface and subsurface soils.

2.1.6.1.2.11 August 2005 Lower South Ditch Sediment and Floodplain Surface Soil Investigation

The background, objectives, and regulatory context of the August 2005 Lower South Ditch sediment and floodplain soil investigation were described in section 2.1.4.1.2.1.1. On August 22 and 23, 2005, three sediment samples (BS030LSD-02 through BS032LSD-02) were collected from three locations in the lower South Ditch and seven floodplain soil samples (BS040LSD through BS045LSD and BS041LSD-DUP) from six locations in wetland areas north and south of the lower South Ditch (MACTEC, 2005). Two of the samples (BS040LSD and BS030LSD) were collected from property owned by New England Resins & Pigments (Parcel 37-1). In addition, three reference floodplain soil samples (BS021REF-02 through BS021REF-04) were collected from three locations in Wilmington south of Maple Meadow Brook (on Parcel 25-2B).

All samples were submitted for analysis for semi-volatile organic compounds (SVOCs), polycyclic aromatic compounds (PAHs), pesticides, metals, and general chemistry. In addition, sediment samples BS030LSD-02 through BS032LSD-02 were submitted for elutriate preparation, with a screening-level Frog Embryological Teratogenesis Xenopus (FETAX) assay to be performed on one elutriate sample (prepared from BS030LSD-02). Once prepared, the elutriate samples were submitted for analysis for the same chemical parameters as the sediment/soil samples. Soil samples BS040LSD through BS045LSD and BS021REF-02 through BS021REF-04 were also submitted for earthworm toxicity testing. Tables 2.1-8 and 2.1-9 summarize the collected sediment samples and analytical parameters. The soil sample locations are shown on Figures 2.1-1 and 2.1-4. The reference soil sample locations are shown on Figure 2.1-16. Tables 2.1-2 and 2.1-3 summarize the collected soil samples and analytical parameters.

2.1.6.1.2.12 Lower South Ditch Floodplain Surface Soil Investigation- September 2005

The background, objectives, and regulatory context of the September 2005 Lower South Ditch investigation of the chromium-impacted surface soil area in the Lower South Ditch were described in section 2.1.4.1.2.1.1. On September 20 and 21, 2005, soil samples were collected from 23 locations (SOLSD-1 through SOLSD-23) north and south of the lower South Ditch on property owned by New England Resins & Pigments (Parcel 37-1) (MACTEC, 2005i). At each location, samples were collected from three depths (0 to 6 inches, 6 to 12 inches, and 12 to 18 inches) using a hand auger. A total of 72 samples were collected, including duplicate samples SOLSD-11-6-12 (6 to 12 inch depth), SOLSD-12-0-6 (0 to 6 inch depth), and SOLSD-14-12-18 (12 to 18 inch depth).

Sampling was conducted to delineate the vertical and horizontal extent of soils exceeding the soil UCL for chromium under the Massachusetts Contingency Plan. The samples were collected along a grid that includes the area where soil samples SDF-1 and SDF-2 were collected in 2001 and had chromium concentrations exceeding the UCL.

All samples collected at the 0 to 6 inch depth were submitted for total chromium analysis. One sample (SOLSD-14-0-6) was collected for analysis for total chromium and hexavalent chromium. The remaining samples were stored for later analysis, as necessary. Based on the results of the surficial samples, samples from the second depth interval at locations of chromium-impact were submitted for chemical analysis (and third depth as needed) to delineate the vertical extent of UCL exceedances. The soil sample locations are shown on Figures 2.1-1 and 2.1-4. Tables 2.1-2 and 2.1-3 summarize the collected soil samples and analytical parameters.

2.1.6.1.3 Other Soil Investigations

In 2004, additional subsurface soil sampling and analysis was conducted to support the Focused Site Characterization and Focused Risk Assessments that were being prepared for a Construction-Related RAM Plan for Site redevelopment. On January 30, 2004 seven discrete subsurface grab samples (ECS-1 through ECS-8 (excluding ECS-7) were collected and submitted for VPH analysis. Additionally, two composite subsurface soil samples (ECS-C-1 and ECS-C-2) were submitted for laboratory analysis for SVOCs, NDMA, PCBs, 8 RCRA metals, EPH, cyanide, and

reactivity. The soil sample locations are shown on Figure 2.1-2. Tables 2.1-2 and 2.1-3 summarize the collected soil samples and analytical parameters.

2.1.6.1.4 North Pond Investigations

The North Pond investigations were conducted to determine if a historical migration pathway may have existed between the Site and the area that historically constituted North Pond. Subsurface soil samples were collected to assess the strata that might represent the historical sediments of the now partially filled North Pond as well as the soil beneath and above (fill) those sediments.

Total and hexavalent chromium analyses was required for one surface soil sample and four subsurface soil samples collected on November 20, 2003 (NPSB1-SED1, NPSB2-Fill1, NPSB3-Fill1, and NPSB3-SED1 were the subsurface soil samples and NPSB1-Fill1 was the surface soil sample). Samples NPSB1-Fill1, NPSB2-Fill1, and NPSB3-Fill1were analyzed for RCRA metals. Samples NPSB1-SED1and NPSB3-SED1were submitted for laboratory analysis of VOCs, SVOCs, NDMA, Pesticides and herbicides, metals, ammonia, chloride, and sulfate.

Soil samples NPSB4-Sed, NPSB4-Soil (subsurface soil samples) and NPSB4-Fill (surface soil sample) were collected on September 8, 2004 and submitted for VOCs, SVOCs, NDMA, pesticides, herbicides, metals (total and hexavalent), and ammonia, chloride, and sulfate.

Sample locations are identified as NPSB1 through NPSB4 and are shown on Figures 2.1-1 and 2.1-2. Table 2.1-3 provides a summary of the samples, including analytical parameters.

2.1.6.2 Groundwater Investigations

Groundwater investigations began at the Site with the installation of monitoring wells GW-1 through GW-12 at the Facility in November 1977. Since that time, more than one hundred monitoring wells, have been installed and sampled on-Property and off-Property. Five multi-level piezometers have been installed and sampled to characterize the vertical distribution of DAPL impacts on groundwater. In addition, wells located at private residences and at industrial/commercial facilities have been sampled as part of off-Property groundwater assessments. Shallow groundwater piezometers have been installed and sampled to investigate groundwater/surface water interaction. A variety of techniques have been used to characterize the

shape of the bedrock surface underlying the Site. As discussed previously, surface water hydrology has also been studied extensively to understand the interaction of groundwater and surface water at the Site. The most recently installed monitoring wells are the GW-88 well triplet and the multi-level piezometer MP-5, installed in September 2005 and October 2005 respectively. These monitoring wells are located in the MMBA to the west of the Facility and were installed to better characterize the nature and extent of impacted groundwater.

2.1.6.2.1 Initial Facility Investigations

A chronological list of all monitoring well locations at the Site is shown in Table 2.1-12 which lists the earliest groundwater sampling date for each monitoring well. All monitoring well locations as well as the locations of the Town of Wilmington MWSWs are shown on Figure 2.1-6. The gradual expansion of the groundwater investigations and of the monitoring well network has evolved along a process that included:

- an initial assessment of facility conditions, identification of on-Property impacts from source areas,
- identification of groundwater migration pathways and of potential receptors,
- step-wise determination of the nature and horizontal and vertical extent of impact on groundwater quality,
- assessment of risks to human and environmental receptors both on-Property and off-Property,
- mitigation actions as precautionary measures,
- temporary replacement of drinking water resources,
- the execution of source-control measures,
- implementation of monitoring programs to address potential human health and environmental risks and to demonstrate the effectiveness of mitigation and remedial measures that have been implemented, and
- identification and assessment of remedial alternatives

There is no use of groundwater at the Facility. Several human health risk assessments have evaluated the potential for vapor migration from groundwater into buildings on the facility for current and planned site conditions. Those assessments have concluded the vapor migration pathway is not of concern for current land use or for specific planned uses of the property. The extensive information available indicates that there is not VOC-impacted groundwater in areas with

occupied buildings to the east, north, west or south of the Facility. There are occupied buildings in areas of impacted groundwater to the west of the facility, but the impacts are primarily associated with non-volatile constituents (inorganics and metals) that are not of concern from a vapor migration perspective.

2.1.6.2.2 Industrial/commercial Properties West of the Facility

Olin actively identified the properties within areas of groundwater impact by Site-related constituents and initiated inquiries and investigations to determine if groundwater wells existed, if groundwater was being used for any purpose, and to determine if there were any potential exposure pathways for Site-related constituents other than by active use of groundwater. In the area immediately to the west of the facility and within the area of impacted groundwater, are several industrial/commercial facilities. One of those facilities (Sanmina, formerly Altron located at One Jewel Drive) historically used groundwater withdrawn from two wells for manufacture of printed circuit boards. The water quality from those wells was monitored closely for several years while the wells were being used for industrial process water. Human health risk assessments were conducted to insure that the groundwater use was health protective.

The One Jewel Drive property is currently vacant and the industrial wells are not in use. As a precautionary measure, the industrial/commercial properties to the west of the Facility and within the area of impacted groundwater have been provided Downgradient Property Status (DPS) per the MCP and water management plans are in place for each of those properties. The DPS for the One Jewel Drive property includes a water management plan that prescribes operating procedures and limits that are protective of human health and the environment and also includes a monitoring program for the industrial wells when they are in operation. The potential for vapor migration from groundwater into buildings to the west of the facility and within the area of impacted groundwater has been evaluated and it has been determined to be minimal.

2.1.6.2.3 Calcium Sulfate Landfill

A monitoring well network around the perimeter of the former Calcium Sulfate Landfill (CSL) has been monitored to evaluate groundwater quality surrounding the landfill. Monitoring wells SL-1 through SL-8 were installed in 1987. The locations of these wells are shown in Figure 2.1-6. The monitoring data indicate calcium and sulfate impacts in groundwater in some wells located at the

immediate perimeter of the fill which is consistent with the use of the facility as monofill for calcium sulfate. The final formal closure documents for the CSL are currently under review by MADEP per the Massachusetts Solid Waste Regulations (MACTEC, 2006a, 2006b). Additional monitoring wells have been used to characterize groundwater quality in the area of the CSL (GW-40S, GW-040D, GW-81D, GW-81BR, and MW-5). The CSL groundwater quality conditions are discussed further in Section 4.3 of this report.

2.1.6.2.4 Residential Properties

Olin actively and voluntarily identified private residences within the Site-impacted groundwater areas and tested residential well water quality on an annual basis periodically over a period of years. Since 1990, Olin conducted sampling and analysis of private residential wells that are in impacted groundwater areas or that are immediately downgradient of impacted areas as part of environmental investigations.

2.1.6.2.4.1 Investigations

Table 2.1-13 identifies the private well samples that have been collected during investigations of the Site. The table identifies the sample locations (using map/lot designations), sample dates, and the analytical parameters associated with each sample. In the 1990s, private well samples were analyzed for the SSPL (VOCs, SVOCs, pesticides, PCBs, metals (unfiltered samples), and inorganics. Residential well sampling was conducted along Main Street and on Cook Avenue and Border Avenue during the 1990s since those locations were the residential properties in closest proximity to the Site. The well sampling results indicated that VOCs, SVOCs, pesticides, and PCBs were either not detected or not detected frequently or at concentrations of concern. Based on those results, the analytical list for private well sampling in 1992 through 1995 included only site indicator parameters chromium, ammonia nitrogen, sulfate, and chloride. In 1996 and 1997, the analytical suite was expanded to again include the SSPL (VOCs, SVOCs, pesticides, PCBs, metals (unfiltered samples), and inorganics. Residential well sampling and analytical results were presented in the 1993 CSA (CRA, 1993) and in the 1997 Supplemental Phase II Report (Smith, 1997). The Supplemental Phase II Report concluded that the risks associated with use of the private wells that had been tested met MCP requirements.

In 1998 through early 2003 the analytical suite again included metals and inorganics. In 2003, a sampling program with SSPL analysis (excluding pesticides) was conducted. Private well sampling with NDMA analysis was conducted in December 2003 and in January 2004 private wells were sampled and analyzed for NDMA, acetaldehyde, and formaldehyde as well as for metals and inorganics. In May 2004, one residential well (at M-25/L-05) was sampled and analyzed for NDMA, acetaldehyde, formaldehyde, hydrazine, metals, and inorganics. The results indicated this well was not within the groundwater impacted by the Site. In February 2005, a residential well (at location M-24/L-94) was analyzed for SSPL analysis plus NDMA Opex, and Kempore with similar conclusions.

Well Decommissioning and Public Supply Connections: Since the initial sampling, several residential wells at properties along Main Street have been taken out of service and the corresponding homes have been connected to the Wilmington municipal water supply system. The locations where residential wells have been taken out of service include M-26/L-3, M-26/L-4, M-26/L-5, M-26/L-6, M-25/L-6, M-25/L-7, M-25/L-8, M-25/L-9, M-25/L-10, M-25/L-11, M-25/L-12, and M-25/L-13. These properties have a Notice of Limitation that is a legal agreement that prohibits the use of groundwater for any purpose.

2.1.6.2.5 Multi-level Piezometers

The installation of multi-level piezometers and their use in assessing the impacts of DAPL on groundwater quality was discussed previously in section 2.1.2.2.1.

2.1.6.2.6 Town Municipal Water Supply Wells

There has been a long history of monitoring of water quality in the raw (untreated) water entering the Butters Row Treatment Plant (BRTP). Table 2.1-14 lists all of the groundwater samples that have been collected from the five MMB Aquifer MWSWs and from the raw water intake at the Butters Row Treatment Plant. The locations of the MWSWs and the BRTP are shown on Figure 2.1-6. Section 2.2.1 discusses the details of the Town and Sentinel Well Monitoring Program (Western Bedrock Valley Monitoring Program) that was initiated in 1996. That discussion is not repeated here. The Town Well Testing Program was suspended in May 2003 after the pumping of the MWSWs was suspended in 2003 (GEI, 2003f, MADEP, 2003d).

2.1.6.2.7 October 25, 2000 Comprehensive Sampling Round for Maple Meadow Brook Aquifer

In October 2000, samples of groundwater and finished drinking water were collected from four locations in the MMBA (GEI, 2001q). MADEP was directly involved in the sampling of these locations. The samples were analyzed for a broad spectrum of potentially present compounds, regardless of source. The list of analytical parameters was extensive and included all regulated drinking water contaminants. This sampling event was conducted with the understanding that not all analytical parameters included in the analytical program are associated with the Site.

During this event, water samples were collected from the following locations:

- Potable water from the finished water spigot labeled "potable tap" from the Butters Row Treatment Plant (a field duplicate was also collected from this location);
- Raw groundwater from the water supply well Chestnut Street No. 1 (collected from a sampling tap on the influent pipe inside the well building);
- Raw groundwater from the water supply well Butters Row No. 1 (collected from a sampling tap on the influent pipe inside the well building);
- Groundwater collected from monitoring well MW-87D located in the MMB wetland.

A representative of the Wilmington Water Department confirmed that the two water supply wells, which were not normally pumping at that time, had been activated and pumped off-line at near maximum rate (approximately 400 gallons per minute) for two days prior to sampling. The water samples from the treatment plant and the water supply wells were collected directly from the tap to sampling glassware. The sample from monitoring well MW-87D was collected using minimal drawdown (low stress/low-flow) sampling protocol.

Samples were analyzed for a comprehensive list of parameters because the intent of the investigation was to analyze for all regulated substances in drinking water. Olin, MADEP, and the Town of Wilmington collaborated in the identification of all of those regulated substances. All samples were submitted under chain of custody for analysis of VOCs, EDB, 1,4-dioxane, and wet chemistry (except fluoride), SVOCs, PAHs, VPH, EPH, Opex and Kempore, chlorinated herbicides, and metals, ethylene glycol, chlorinated herbicides, organophosphate pesticides, and haloacetic acids, endothall, glyphosate, carbamate pesticides, and Diquat/Paraquat Herbicides, radiologicals, and fluoride. As a follow-up to this sampling event, a raw water sample (and a duplicate) and a finished tap water sample were collected from the Butters Row Treatment Plant on

December 27, 2000 and the samples were submitted for analysis of Kempore. These samples confirmed Kempore was not detected in the potable tap at Butters Row Treatment Plant.

All analytical results were compared to applicable Massachusetts Primary Drinking Water Standards, Massachusetts Drinking Water Guidance Levels, and Massachusetts Secondary Drinking Water Standards. (GEI, 2000k). For the potable tap water samples, only chloroform (in one of six samples tested by two laboratories) and sodium had any concentrations above Secondary Drinking Water Standards respectively. No Primary Drinking Water Standards were exceeded in the tap water samples.

The untreated water samples from the two water supply wells had no analytes with concentrations above Primary Drinking Water Standards. Concentrations of iron, manganese, sodium and apparent color were above their respective Secondary Drinking Water Standards (based on aesthetics).

The groundwater sample collected from monitoring well MW-87D, contained concentrations of chlorinated organics above corresponding Primary Drinking Water Standards (cis-1, 2-dichloroethene, methylene chloride, and vinyl chloride). Methylene chloride may be due to laboratory contamination as indicated in the data validation report. This monitoring well also had gross alpha radiation reported above the corresponding standard, but the data validation report indicates the result is a false positive. Inorganic parameters that had concentrations above corresponding Secondary Drinking Water Standards were iron, manganese, sodium, chloride, apparent color, total dissolved solids, sulfate, and turbidity.

The Butters Row Treatment Plant continuously operates an air stripper for removal of volatile organic compounds (not Site-related) and an iron and manganese removal system.

2.1.6.2.8 Supplemental Phase II for NDMA

On July 25, 2002, samples of Dense Aqueous Phase Liquid (DAPL), and samples of the layer of groundwater immediately above DAPL (e.g., the “diffuse layer”) were collected from the multiport piezometer MP-2, located near the western boundary of the Olin Property. The diffuse layer sample was collected from Port #7, screened at a depth of about 25.5 feet below the ground surface, which is just above the estimated elevation of the top of the DAPL. The DAPL sample

was collected from Port #1. The samples were collected using EPA Region 1 low stress/low flow sampling procedures. The samples were placed into laboratory supplied glassware containing sodium thiosulfate as a preservative, stored on ice, and transported to MWH Laboratories (MWH) of Monrovia, California for analysis for n-nitrosodimethylamine (NDMA) via USEPA Method 1625/625M. However, at that time the laboratory was unable to analyze the DAPL for NDMA due to matrix interferences. The results of the analysis of the diffuse layer indicated a detectable concentration of 1.4 micrograms per liter (ug/L).

Olin's Licensed Site Professional (LSP) verbally notified the Massachusetts Department of Environmental Protection (MADEP) of the detection of NDMA at MP-2 on September 10, 2002. At that time a further sampling plan to confirm the detection of NDMA in the diffuse layer at MP-2 was discussed with the MADEP. It was agreed that an additional sampling round should be performed that would include the re-sampling of multiport piezometer MP-2, at an elevation just above the DAPL, and at an elevation close to the top of the water column. Additionally, samples would be collected from downgradient pumping wells Altron B-1 and Altron B-3 located on property currently owned and operated by the Sanmina Corporation. Wells B-1 and B-3 are used by Sanmina to supply non-potable water for their manufacturing process lines. Sanmina also receives potable water from the Town of Wilmington water supply. The re-sampling of MP-2 and the Sanmina production wells was performed in September 2002, and the results were submitted to MADEP. Olin has also completed three additional rounds of sampling at Sanmina wells B-1 and B-3. The samples were collected in December 2002, January 2003 and February 2003. The preliminary, un-validated results of the December 2002 and January 2003 sampling event reported NDMA at concentrations of 17 ng/L in B-1 and 40 ng/L in B-3, and 16 ng/L in B-1 and 40 ng/L in B-3, respectively. The final validated results of this 3 month sampling event were submitted to the MADEP under separate cover following the completion of data validation on the final set of samples collected in February 2003.

Based on the initially reported NDMA concentration of 1.4 ug/L, the MADEP issued a letter dated October 18, 2002, to Olin, in which the MADEP required that a comprehensive sampling and analysis quality assurance project plan be prepared to scope out the approach and methods for testing for NDMA in the Maple Meadow Brook Aquifer and in the Town of Wilmington's drinking water supply. MADEP requested that sample locations include one monitoring well in the Maple Meadow Brook Aquifer, the Town of Wilmington Water Supply Wells, raw water entering the

Butters Row Treatment Plant (BRTP), three locations within the treatment train at BRTP, finished water leaving the BRTP, and locations within the distribution system.

In response to the MADEP's requirement, Olin submitted a Comprehensive Sampling Round Scope of Work to the MADEP on November 18, 2002 (MACTEC, 2002). The proposed Scope of Work included the collection of samples from the Town of Wilmington's MWSWs identified as Butters Row Well #1, Butters Row Well #2, Chestnut Street Well #1, Chestnut Street Well #1A/2 and Town Park, and from sentinel well MW-87D located in the MMB Aquifer. Water samples from the BRTP included raw water, water that has been through the aeration process, water that has been through the coagulation/sedimentation process, water that has been through the carbon filtration beds, and finished water leaving the treatment plant.

Furthermore, the NDMA sampling program included the collection of samples from thirteen (13) locations in the water distribution system. These locations are identified as follows:

- Hillside Way Storage Tank
- No. 27 Hillside Way
- Nassau Avenue Storage Tank
- West Intermediate School
- Deming Way Housing Project
- No. 900 Main Street (Hampshire Press)
- No. 634 Main Street (Wilmington Pet Shop)
- No. 21 Oxbow Drive
- No. 14 Fairmont Avenue
- No. 5 Rhode Island Road
- No. 333 Burlington Avenue (Hair Salon)
- 25 Mill Road
- 91 Merriam Street

No detectable concentrations of NDMA were reported in the samples collected from the BRTP, the 13 locations within the distribution system, and within the sample collected from the Town Park water supply well. However, NDMA was detected in the samples collected from monitoring well MW-87D at 5,200 ng/L, and in the samples collected from water supply wells Butters Row #1,

Butters Row #2, Chestnut Street Well #1 and Chestnut Street Well #1A/2, at concentrations of 100 ng/L, 32 ng/L, 166 ng/L, and 38 ng/L, respectively. At the time of the sampling, these wells were not in use by the Town.

2.1.6.2.6.9 Immediate Response Action Investigation for NDMA

In a letter dated March 19, 2003, MADEP required that an Immediate Response Action (IRA) per the MCP be conducted for NDMA in several media at and in the area of the Site (MADEP, 2003e). Consistent with MADEP's March 19, 2003 request, a phased approach was proposed in the IRA Plan (MACTEC, 2003e) to first address exposure pathways located on and off the Property that could potentially pose an Imminent Hazard if NDMA were present at certain concentrations. MADEP provided conditional approval of the IRA Plan in a letter dated April 22, 2003 (MADEP, 2003f). This initial phase of the IRA was performed as an IH Evaluation. The IH Evaluation utilized all available data and was not limited to data collected during the NDMA IRA activities.

The potential exposure pathways that could pose an IH if NDMA is present at certain concentrations and that were evaluated in the IRA included:

- Air at the Olin Property that could be affected by remedial emissions from the Plant B soil vapor extraction/air sparge (SVE/AS) system.
- Treated effluent from the Plant B Groundwater Treatment System
- Potential vapor migration to indoor air at the Property or at properties downgradient of the Olin Property where groundwater is less then fifteen feet below the ground surface.
- Groundwater from wells at residential or industrial properties, within the estimated boundary of the Site, that are used for industrial or landscaping purposes, that may be consumed as drinking water, or that may contribute to indoor air exposures.
- Surface water from streams located within the MMB wetland.
- Surface water from the off-Property West Ditch, the South Ditch and the East Ditch.

Additionally, MADEP requested that the extent of NDMA in the Maple Meadow Brook Aquifer be determined as part of this IRA assessment.

To assess these potential exposure pathways, samples were collected and submitted for NDMA analysis from groundwater and surface water at locations within the boundaries of the Site,

including areas within the MMBA, aqueous effluent from the Plant B groundwater treatment system, and air emissions from the Plant B air sparge/soil vapor extraction system.

The following proposed locations were to be sampled as part of the IRA Activities: Multi-level piezometers MP-4 (from shallow groundwater and from the diffuse layer), MP-3 (from shallow groundwater and from the diffuse layer), MP-2 (from shallow groundwater, from the diffuse layer and from DAPL), and MP-1 (from shallow groundwater and from the diffuse layer), monitoring wells GW-43D, GW-43S, GW-42S, GW-16, GW-42D (potentially DAPL), GW-83D, GW-83M, MW-203S, GW-57D, GW-70S, GW-54S, GW-54D, GW-68D, GW-69S, GW-69D, GW-77S, GW-58S, GW-59S, GW-62S, GW-62M, GW-62D, GW-63S, GW-63D, GW-64D, GW-65S, GW-65D, GW-73D, GW-83S, GW-84M, GW-84D, GW-85M, GW-85D, GW-86S, GW-86M, GW-86D, GW-87D, GW-103D, GW-103BR, MW-203D, MW-204M, MW-206S, and MW-206D, and an influent and effluent sample from the Plant B groundwater treatment System.

Air emissions from the Plant B SVE/AS system were proposed to be tested as part of the IRA activities. The sampling included the collection of one treated off-gas sample, one duplicate of the treated off-gas, one sample of the influent stream to the treatment system, and one "background" sample collected upwind of the treated off-gas discharge.

Olin received a Conditional Approval letter, dated April 22, 2003 from the MADEP. In general, the MADEP approved the Scope of Work for the IRA Plan subject to the following conditions:

- Air samples must be tested for NDMA using the analytical procedure that can achieve the lowest detection limit.
- Olin must contact all businesses and residences within the area of the Olin plume to document the presence or absence of groundwater wells.
- Surface water samples must be collected from streams located within the Maple Meadow Brook wetland and analyzed for NDMA. If NDMA is identified in the surface water, an Imminent Hazard evaluation must be completed for human and ecological receptors, and to determine if further evaluation downstream is deemed necessary. Surface water samples must be collected in Maple Meadow and Sawmill Brooks upstream of the Site, within the Site (near GW-84 and GW-86 well triplets), and after these water bodies merge (downstream of the Town Park pumping station).
- Surface water samples must be collected from the off-Property West Ditch, the South Ditch and the East Ditch and analyzed for NDMA. If NDMA is identified in the surface water, an Imminent Hazard evaluation must be completed for human and ecological receptors, and to determine if further evaluation downstream is deemed necessary.

- Monitoring wells GW-67S, GW-64S and GW-73S must be added to the list of sampling locations.

The sampling and analytical activities for NDMA referenced above were completed. The details of the sampling and analysis are documented in the NDMA IRA Status Reports (MACTEC, 2003g, GEI, 2004e, MACTEC, 2004, MACTEC, 2004g) and the IRA Completion Report (GEI, 2004f).

The presence of groundwater wells at industrial and residential properties located west of the Olin Property that are within the estimated boundaries of the Site and in the area proximate to the Site boundary were assessed. This assessment included a review of records maintained by the Wilmington Assessors Office and the Wilmington Board of Health. Any wells that were identified and had not been previously sampled for NDMA were sampled and the samples submitted for laboratory analysis. In November 2003, MADEP required that properties on Cook Avenue be included in the private well inventory, and that any wells at those properties be tested for Site constituents, including NDMA (MADEP, 2003g). An extensive assessment of the presence of wells was conducted attempts were made to contact owners via certified mail on two occasions to request permission for sampling.

Table 2.1-13 contains a listing of private well samples and analytical parameters for the NDMA IRA (shown in the time period from October 2003 through February 2005). Private wells (M14/L-2B, M-24/L-33A, M-38/L-1, M-15/L-2C) were sampled and submitted for analysis for VOCs, SVOCs, metals, inorganics, Opex and Kempore, VPH, and acetaldehyde and formaldehyde on October 29 and 30, 2003. Those private wells were also sampled and submitted for analysis for NDMA on December 2, 2003. The private well at 56/58 Butters Row was sampled on November 18, 2003 and the sample was submitted for analysis of VOCs, SVOCs, metals, inorganics, Opex and Kempore, VPH, and acetaldehyde and formaldehyde and NDMA. Additional private wells were sampled and submitted for analysis for NDMA, acetaldehyde and formaldehyde on January 20, 2004 and those wells were sampled and submitted for analysis for metals and inorganics on January 29, 2004. In March 2004, the well at M-24/L-117 was sampled and submitted for analysis for metals, inorganics, and NDMA. In May 2004, the well at M-25/L-05 was sampled and submitted for analysis NDMA, hydrazine, MMH, UDMH, metals, and inorganics. In April, 2004, a summary of the assessment of private wells was submitted to MADEP as an Interim Submittal for the NDMA IRA (MACTEC, 2004h). In February 2005 the well at M-24/L-94 was sampled and

submitted for analysis for VOCs, SVOCs, metals, inorganics, VPH, PAHs, acetaldehyde and formaldehyde, and NDMA.

The NDMA IRA Completion Report presented the following conclusions:

No Imminent Hazard to health or the environment was identified. Specifically, the following were the conclusions:

- The estimated lifetime cancer risks and noncancer hazard index valued for the IHEs for employees at the 51 Eames Street facility, neighborhood residents, and employees and visitors of down-gradient commercial/industrial properties are all below the Imminent Hazard cancer risk limit of one in one-hundred thousand and are below the Imminent Hazard noncancer risk (hazard index) of ten.
- The concentrations of NDMA in surface water from the off-Property West Ditch and in the Plant B effluent reported to date are well below the lowest documented aquatic life threshold effect concentration for NDMA.
- No conditions associated with the detection of NDMA that represents a threat of physical harm or bodily injury to people has been identified.
- NDMA was not detected in the groundwater collected from MW-204S and MW-204D, located in the Maple Meadow Brook wetland. Because NDMA was not detected, no ongoing exposure exists and no imminent hazard to human health exists.
- The analytical results of NDMA concentrations from groundwater and surface water samples collected in the South Ditch, indicate estimated lifetime cancer risks and noncancer hazard index values for the Imminent Hazard Evaluation for employees of the 51 Eames Street Site facility that are all below the Imminent Hazard cancer risk limit of one in one-hundred thousand and are below the Imminent Hazard noncancer risk limit (hazard index) of ten.
- The analytical results of NDMA concentrations from groundwater and surface water samples collected in the East Ditch at the 51 Eames Street facility, indicate estimated lifetime cancer risks and noncancer hazard index values for the Imminent Hazard Evaluation for the surrounding neighborhood are all below the Imminent Hazard cancer risk limit of one in one-hundred thousand and are below the Imminent Hazard noncancer risk limit (hazard index) of ten.
- NDMA was not detected in the groundwater collected from the private wells and therefore does not pose an imminent hazard to human health.
- The concentrations of NDMA from surface water samples collected from the East Ditch and South Ditch are well below the lowest documented aquatic life threshold effect concentration for NDMA. Therefore, the surface water does not pose an imminent hazard to aquatic life.

2.1.6.2.10 Supplemental Phase II for Western Bedrock Valley and Southern Bedrock Channel

As a pre-remedial Supplemental Phase II activity, the multi-level piezometer MP-5 and the monitoring well triplet GW-88 were installed in the Maple meadow Brook Aquifer in 2005. The installation of those wells is documented in the report titled Maple Meadow Brook Pre-Remedial Investigation, Multi-Level Piezometer and Monitoring Well Installation, Field Activity Report, 51 Eames Street Site, Wilmington, MA (MACTEC, 2005h).

2.1.6.3 Biota

Biological tissue samples have been collected on four separate occasions to support ecological risk assessment activities. These samples are identified in Table 2.1-15. In October 1996, MACTEC collected eight crayfish, seven frog, fifteen small mammal, and four plant samples and submitted the biological tissue samples for analysis of TAL metals, pesticides, and SVOCs. This information was collected to support the Stage 2 Ecological Risk Assessment that was included in the 1997 Supplemental Phase II report (Smith, 1997). More specifically, the tissue data were used in food chain modeling to assess potential exposures and risks via the food chain.

In March 1997 earthworms from a bioaccumulation test were analyzed by IEA for TAL metals, pesticides, and SVOCs. These samples were identified with the same sample ID as the soil samples that were collected for earthworm toxicity testing and bioaccumulation testing. Earthworm samples BS013WDXX, BS015SDXX, and BS018PNDX were collected after a bioaccumulation period in surface soil that was collected from the site in January 1997 (BS013WDX, BS015SDX, and BS018PND and SSREF-021). Earthworm samples BS021WMDX, BS021EWREF-02, BS021EWREF-03, and BS021EWREF-04 were collected from soil that was collected from reference locations to support the earthworm toxicity testing and bioaccumulation testing. The tissue data were used in food chain modeling to assess potential exposures and risks via the food chain in the ERA included in the 1997 Supplemental phase II report (Smith, 1997).

In August 2005 soil samples were collected from the areas to the north of the Lower South Ditch and a reference sample for toxicity testing and bioaccumulation testing. In November 2005, five earthworm tissue samples were analyzed by the laboratory for TAL metals, pesticides, and SVOCs. These samples corresponded to a subset of the August 2005 soil samples (BS040EWLSD, BS040EWLSD DUP, BS043EWLSD, BS045EWLSD, and BASELINEEWLSD). These data were

collected to support an additional future ecological risk assessment (including food chain modeling) for the Lower South Ditch and the immediately surrounding area.

2.2 GROUNDWATER MONITORING PROGRAMS

2.2.1 Town & Sentinel/Western Bedrock Valley Monitoring Program

2.2.1.1 Regulatory History

Olin has conducted investigations of groundwater quality beneath MMB wetlands since 1992. In August 1993 a Field Investigation Work Plan was submitted for the Wilmington Facility (Smith, 1993). In a July 1, 1994 letter the MADEP (MADEP, 1994c) required that the Wilmington's MWSWs (Butters Row, Chestnut Street and Town Park) must be "monitored on a regular schedule to ensure that the contaminated groundwater plume associated with the Olin Chemical site is not impacting human health." Quarterly monitoring was conducted from 1994 to 1996 for the indicator parameters chloride, sodium, sulfate, chromium, and ammonia as well as some other water quality parameters (Smith, 1997). In June 1996, the proposed Western Bedrock Valley Groundwater Monitoring Program was submitted to MADEP (Olin, 1996c). MADEP approved the proposed Work Plan for Groundwater Monitoring Program Western Bedrock Valley in a letter dated July 16, 1996.. The Work Plan was intended to determine the extent of the deep groundwater plume and the actual depth to bedrock and to determine the relationship between the plume and the MWSWs. The approved Work Plan included a provision for monthly sampling and analysis of the MWSWs.

The WBV Monitoring Program was established in 1996-97, and was intended to monitor for possible changes in groundwater quality in the Maple Meadow Brook Aquifer (MMBA) over time, and to act as a possible "early warning" system for possible future impacts on the Wilmington MWSWs in the aquifer. The monitoring program initially included monthly sampling of the MWSWs, and quarterly monitoring of selected "sentinel" wells in the MMBA. A revised WBV monitoring program was approved by MADEP on October 2, 1998 (MADEP, 1998b).

In addition to the WBV Monitoring Program, Olin performed a Stage I Environmental Screening of the Maple Meadow and Sawmill Brooks, which are located within the MMBA, in 2003. The Stage I Environmental Screening was based on surface water, sediment, and groundwater data collected

in the study are in 2001 and 2002, and was summarized in a report which was submitted to MADEP on December 2, 2002.

In early 2003, the use of the MWSWs was suspended, due to the detection of NDMA in the MMBA aquifer, and in May 2003, DEP agreed to suspend the requirement for monthly monitoring of the MWSWs.

The remaining components of the WBV groundwater monitoring program continued from May 2003, consistent with MADEP's Conditional Approval dated January 12, 1999. On August 25, 2003, Olin submitted a letter to MADEP, which formally proposed surface water monitoring program, to assess changes to surface water quality in the Maple Meadow and Saw Mill Brooks, if any occurred following the cessation of pumping from the wells, and to assess the need to update the Stage I Environmental Screening of Maple Meadow and Sawmill Brook (thereafter referred to as the "Stage I Environmental Screening Scope of Work" (SOW)). Olin proactively initiated the proposed SOW, prior to MADEP approval, in November 2003.

In a letter to Olin dated February 5, 2004, MADEP requested further analysis of the hydrologic changes that could occur in the MMBA aquifer study area following the shut down of the wells, and reconsideration of the proposed SOW. Specifically, MADEP requested that Olin submit documentation demonstrating that the groundwater flow and transport model was updated to evaluate contaminant transport form the Olin plume to the surface water streams under non-pumping conditions, and any other pertinent documentation necessary to justify the adequacy of the proposed SOW. In its February 5, 2004 letter, MADEP also requested that the SOW as initially proposed, be implemented.

Olin responded to MADEP's February 5, 2004 letter, in submittals, dated April 5, and May 19, 2004. In the April 5 submittal, a memorandum prepared by Geomega, presented technical information supporting the WBV SOW, including documentation of the use of the Site groundwater flow and transport model to assess potential changes in the groundwater flow system of the MMBA following the shutdown of the MWSWs, and a re-evaluation of the WBV Monitoring Program. This submittal demonstrated that the then current surface water-monitoring program was sufficient to monitor surface water quality in the Maple Meadow and Sawmill Brooks, and to support a determination as to the need to update the Stage I Screening. In the May 19, 2004 submittal, a revised SOW was presented, which included modifications of the WBV

monitoring program to further document shallow groundwater quality, and the stability of DAPL and DAPL- like material at depth. These modifications included:

- Modify sampling schedule for all existing Sentinel wells as follows: shallow (S) and intermediate (M) depth wells quarterly, deep (D) wells annually;
- Add well GW-84S to the monitoring program;
- Add the new multilevel piezometer and monitoring well cluster scheduled for installation in the WBV diffuse channel and SBC to the monitoring program(s). (Up to 4 quarterly sampling rounds at these new wells may be required to support a technical justification to reduce or eliminate further monitoring at these locations).
- Continue to measure stream stage at staff gauges and water levels in wells at times of sampling (along with the standard field parameters); and
- Continue annual inductance logging, and update that program to include new wells installed in the MMBA.

Olin and MADEP were involved in a dialog concerning the necessary modifications to the program when MADEP suspended review of most MCP previous submittals concerning the Site on December 6, 2005 (MADEP, 2005f). Subsequent to the MADEP submittal suspension, monitoring programs were suspended by Olin.

2.2.1.2 Monitoring Program Elements

The groundwater monitoring component of the monitoring program as of the fourth quarter of 2005 included:

- Sampling of all MMB surface water locations quarterly;
- Sampling of wells on the following schedule: shallow (S) and Intermediate (M) wells quarterly (GW-62S, GW-62M, GW-63S, GW-65S, GW-83S, GW-83M, GW-84S, GW-84M, GW-85M, GW-86S, GW-86M, GW-103BR) and deep wells (GW-62D, GW-62BR, GW-63D, GW-64D, GW-65D, GW-65BR,GW-73D, GW-83D, GW-84D, GW-85D, GW-86D, GW-87D, GW-103D) annually;
- Measuring stream state at staff gauges and water levels in wells at time of sampling.

Field measurements are obtained for the following parameters during groundwater sampling: pH, Specific Conductance, temperature, and Dissolved Oxygen.

Groundwater samples are submitted for laboratory analysis of the following parameters: bicarbonate alkalinity, carbonate alkalinity, chloride, sulfate, specific conductance, ammonia-nitrogen, dissolved calcium, chromium, iron, magnesium, manganese, potassium, and sodium.

The MMB Wetland surface water monitoring component has been discussed previously in section 2.1.4.2. That section describes the program that has been conducted and identifies all of the samples collected and the analytical parameters associated with those samples. The following surface water sample locations are included in the quarterly program:

MMB-SW-1
MMB-SW-2
MMB-SW-3
MMB-SW-4
MMB-SW-5
MMB-SW-6
MMB-SW-8
MMB-SW-8A
MMB-SW-9M
MB-SW-10
MMB-SW-11

In this MMB Wetland surface water program, samples were originally analyzed for five total and dissolved metals (aluminum, calcium, iron, potassium, and sodium) and three inorganic/physical parameters (ammonia, nitrite, and sulfate). NDMA was added to the analytical suite in June 2003. Also in November 2003, the number of metals analyzed was increased to nineteen (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc), the number of inorganic/physical parameters was increased to ten (bicarbonate alkalinity as CaCO3, carbonate alkalinity as CaCO3, chloride, nitrate as N, nitrite as N, nitrogen, ammonia, pH, Specific Conductance, sulfate as SO4, and total alkalinity as CaCO3), and only for this one round, acetaldehyde and formaldehyde were added to the parameter list.

2.2.1.3 Reporting

The Western Bedrock Valley Monitoring program activities have been documented in Western Bedrock Valley Monitoring Reports and the data collected from the program is regularly evaluated and reported upon in the Annual Western Bedrock Valley Statistical Reports.

2.2.2 PCMP

2.2.2.1 Post Closure Monitoring Plan and Semi-Annual Status Reports

In 2000, a PCMP was prepared to assess the performance of the subsurface containment structure in encompassing the DAPL and the temporary cap in minimizing the influx of precipitation and storm water into the containment structure. Since 2001, on a semi-annual basis, Olin has prepared a PCMP status report which has documented the post-construction performance monitoring for the containment structure. The most recent semi-annual report submitted to the MADEP covered the period of June 2005 through December 2005 (MACTEC, 2006e).

The PCMP includes two primary monitoring components. First, water level elevation data is collected from areas within, upgradient and down gradient of the containment structure, including vertical gradient data from monitoring well couplets. This information is used to compare the hydraulic conditions within and outside of the containment structure as a measure of groundwater containment. Second, water quality data are collected from groundwater wells and surface water to evaluate long-term changes in groundwater conditions outside of the containment structure, and in changes in surface water quality. Sediment samples have also been collected annually since 2003 from five locations to monitor chromium concentrations in sediment.

In addition to an introduction and summary and conclusions, the semi-annual PCMP status report, has historically included discussion of the following four topics:

- Groundwater elevations and hydraulic gradients;
- Groundwater and surface water quality data;
- Groundwater and solute mass flux through the equalization window; and
- Presentation of data logger measurements to compare groundwater elevations to precipitation.

The groundwater and solute flux out of the equalization window has been calculated from Darcy's Law using local horizontal hydraulic gradients, the known cross-sectional area of the window and an estimated hydraulic conductivity (GEI, 2001a).

The PCMP Status Report has also provided appendices documenting the results of the temporary cap quarterly inspections, and presenting the laboratory analytical data reports including chemical data validation memorandums. On an annual basis, the data have been more fully evaluated to provide recommendations for modification to the PCMP plan, if applicable.

The previous cap inspections were conducted on a quarterly basis and included a walkover to observe and document the condition of the polyethylene sheeting and to report deficiencies or damage requiring repair. The inspection included observation of the cap surface noting:

- Integrity of sewn seams;
- Condition of ballast sand bags;
- Evidence of animal activity;
- Condition of previous repairs;
- Location(s) of areas of pooled or ponded water; and
- Locations of rips or tears in the cover.

The inspector documented their observations, and to the extent necessary, provided digital photographic documentation of conditions requiring maintenance. Repairs that were determined to be appropriate, if any, were completed by on-site personnel.

The quarterly inspections were followed by a letter report transmitting inspection findings and recommendations to MADEP. These letter reports were appended to the PCMP Semi-Annual Status Report which was also distributed to MADEP.

2.2.2.2 Post Closure Monitoring Plan General Conclusions

Since construction of the Slurry Wall/Cap in 2001, monitoring of water levels in wells within the containment structure have indicated that the horizontal hydraulic gradient within the structure is essentially flat (<0.002 ft/ft). Vertical gradients within the containment area have also remained

essentially neutral since 2001. Although there is some water level response within the containment area to precipitation events, due to a limited amount of leakage through the temporary cap, that response is muted compared to wells outside the structure. Though small, the hydraulic gradient through the equalization window is typically positive indicating outward flow from the containment area. Based on these results, the equalization window is functioning as designed to relieve build up of any hydraulic pressure inside the slurry wall resulting from minor leakage through the temporary cap. The relatively flat internal gradients and lack of vertical gradients with the structure indicates that the slurry wall is effectively isolating groundwater above the DAPL from groundwater outside of the containment structure. Thus the containment structure is performing per design as a source control measure.

Construction of the Slurry Wall / Cap was completed to isolate the on-Property DAPL material currently located within the structure. The construction has isolated the identified zone of DAPL and groundwater. Monitoring of groundwater outside the containment structure has shown declining concentration patterns in some wells for some constituents. The completion of the structure has resulted in groundwater flow around the structure generally from the north-northwest to the south-southeast. Additional monitoring is required for a more complete assessment of long term groundwater quality trends since the containment structure was not intended to control migration of impacted groundwater that was outside the Slurry Wall / Cap at the time of construction.

A weir was installed in the Upper South Ditch to increase and control surface water head in the upstream off-Property West Ditch. The increased head has reduced groundwater discharge to the off-Property West Ditch. Piezometric and stream elevation data collected upstream of the weir within the Upper South Ditch indicate recharging conditions (downward gradients) predominate while data immediately downstream of the weir generally indicate discharging groundwater conditions (upward gradients). The section of the Upper South Ditch immediately down stream of the weir is typically associated with higher solute concentrations in surface water than the area upstream of the weir. The area immediately downstream of the weir is where a chemically stable floc is observed in the water column. The surface water immediately downstream of the weir is also impacted by discharging groundwater. Solute concentrations in Upper South Ditch surface water tend to be highly variable and additional monitoring is necessary to evaluate longer term trends.

2.2.2.3 Historical PCMP Monitoring Activities and Modifications

Over the course of monitoring under the PCMP from 2001 to 2005, several modifications to the PCMP have been proposed by Olin and approved by the MADEP. For example, historically over this time period shallow groundwater elevations have been recorded at least quarterly from up to a total of 47 different locations. The most recent program monitors fewer locations as a result of monitoring information gained over the past six years. Since 2001, the sampling program has evolved through recommendations to optimize the sampling strategy, based on prior results. A statistical evaluation of water quality trends in PCMP data was requested by MADEP in a letter to Olin dated June 8, 2004. That statistical evaluation was performed and presented in "Olin Wilmington Technical Series XXXV. Semi-Annual Analysis of PCMP Data, July 2003 – May 2004" (Geomega, 2004e). The proposed reduction in sampling frequency (from quarterly to semiannually) was recommended in the Part 2 Construction-Related Release Abatement Measure Status Report No. 7 (GEI, 2004a). In a letter dated March 29, 2005, MADEP approved the changes to the PCMP program as proposed. These approved changes included reducing the monitoring frequency for 15 wells from quarterly to semi-annually.

2.2.2.3.1 Groundwater Level Measurements

Groundwater level measurements have been taken from all PCMP monitoring wells at the time of and prior to groundwater sampling. Data loggers were installed to record daily groundwater elevations along the northern, western, southern exterior areas of the Slurry/Wall, within the equalization window and interior of the containment system. The following locations were instrumented with data loggers: GW-10S, GW-35S, GW-76S, GW-78S and GW-CA1.

Specific well couplets were used to monitor vertical gradients in the area including: GW-6D/6S, GW-29D/29S, GW-34D/34SR, GW-35D/35S, GW-55D/55S, GW-202D/202S and GW-CA3D/CA3S.

2.2.2.3.2 Groundwater Quality Monitoring

The PCMP groundwater monitoring program required analysis of groundwater for several DAPL-related indicator parameters including ammonia, chloride, sulfate, aluminum, chromium, and specific conductivity. Groundwater samples were collected using low stress/ low flow procedures.

Groundwater samples analyzed for metals were filtered and reported as dissolved metals. The most recent groundwater sampling locations are presented in Figure 2-2. Quarterly groundwater sampling has included monitoring well locations west (GW-25) and south (GW-202S and GW-79S) of the containment structure and three piezometer locations in the Upper South Ditch (PZ-16RR, PZ-17RR, and PZ-18RR). Semi-annual groundwater sampling included additional monitoring wells located north (GW-34D, GW-34SR), west (GW-10S, GW-24, GW-26, GW-42S and GW-43S), south (GW-39, GW-55S, GW-76S, GW-78S, and GW-202D) and east (GW-201S) of the containment structure. Two groundwater wells located within the containment area (GW-35S and GW-CA1) were also sampled semi-annually.

2.2.2.3.3 Surface Water Quality Monitoring

Surface water was sampled in accordance with the PCMP at six locations within the South Ditch (ISCO1, ISCO2, PZ-16RR/PZ-16RSW, PZ-17RR, PZ-18R and SD-17) and one location in the East Ditch (ISCO3). Surface water samples have historically been analyzed for aluminum, chromium, sulfate, chloride, sodium, ammonia, nitrate, nitrite, and specific conductance. Both unfiltered and filtered surface water samples were collected and analyzed for metals.

2.2.2.3.4 Sediment Sampling

The sediment of the Upper South Ditch was excavated and replaced with clean loam in 2000 as part of the C-RAM. Sediment sampling began in 2003 to monitor for possible recontamination of the imported clean loam from solutes contained in discharging groundwater and floc. Annual sediment sampling was conducted under the PCMP in 2003, 2004 and 2005 at the following five locations: SD-SD1, SD-SD2, SD-SD3, SD-SD4 and SD-SD5. Sediment samples were analyzed for aluminum, chromium, iron and percent solids.

In July 2007, Olin submitted an Interim Response Step Work Plan to EPA (MACTEC, 2007) that provides additional detail on the most recently approved PCMP monitoring program and proposed modifications, pending approval of the Work Plan, to optimize the sampling approach. This additional detail is not provided here.

2.2.3 Plant B

The history of investigation and remedial actions taken at Plant B has been previously described. Plant B is currently monitored in accordance with the requirements of the RGP. The current monitoring program consists of collection of groundwater level measurements, LNAPL thickness measurements and physical removal of LNAPL, collection of groundwater samples and influent and effluent monitoring. These activities are presented in detail in the Draft Interim Response Step Work Plan submitted to EPA by Olin in July, 2007 (MACTEC, 2007), and are described briefly below.

Groundwater levels are measured on a monthly frequency in 26 monitoring wells and the three groundwater extraction wells. The groundwater levels are then computed to groundwater elevation and that data, along with interpreted groundwater surfaces, are presented in a semi-annual IRA Status Report.

LNAPL thickness is measured on a monthly basis. The number of wells with measurable LNAPL thickness during each sampling event varies as the LNAPL layer is very thin and is sporadically detected in certain individual wells from month to month. The lateral extent of measurable LNAPL is limited, and generally restricted to seven wells, including the three extraction wells (IW-11, IW-12, IW-13) and four monitoring wells(PID, GW-23, 12-IN, and P5). Typical LNAPL thicknesses measured in monitoring and extraction wells over the last year typically ranged from 0.01 to 0.04 feet (0.12 to 0.48 inches).

Groundwater samples are collected and analyzed on a quarterly frequency from one well (GW-16), and an annual frequency from five additional wells (B-03, GW-101, GW-13, IW-10 and IW-6). The monitoring well groundwater samples are analyzed for trimethylpentenes, NDPA, BEHP, VPH, ammonia, iron, and pH.

Samples are collected from the treatment plant influent and effluent and analyzed in accordance with the requirements of the RGP. This analysis includes VOCs, SVOCs, total metals (iron), ammonia, total phenols, SGT-HEM and residual chorine.

2.3 GROUNDWATER MODELING

This section presents a summary of the development, evolution, and application of groundwater models at the Olin Chemical Superfund Site and a description of the most recent model update, completed in 2005 (Appendix A). Several groundwater models have been developed for the Site over time to address different objectives, to incorporate new data and field observations, and to reflect changed hydrogeologic conditions. Model development has followed an evolutionary progression, and each model revision or update has built upon and refined previous efforts.

2.3.1 Groundwater Model Development

The first numerical groundwater model specifically for the Site was developed as part of the Supplemental Phase II Investigation (Smith 1997), and was based on the United States Geological Survey's (USGS) finite-difference code MODFLOW (McDonald and Harbaugh 1988). As expected, certain challenges were identified during model development related to the complex hydrogeologic conditions and the variable-density ground waters present at the Site. These challenges have been addressed, to varying degrees, in subsequent modeling efforts, and have spurred further investigations and more advanced analyses. The Smith (1997) MODFLOW model was subsequently modified to incorporate additional data and to refine the model's resolution and calibration (Law (1999).

The MODFLOW model was translated into a finite-element model based on the numerical code FEFLOW (WASY, 2005, Geomega, 2001a) The FEFLOW code was selected because it has additional capabilities that make it more appropriate for representing and evaluating Site-specific conditions, most notably the ability to simulate density-dependent effects and a seamless integration of flow with transport calculations. The FEFLOW model encompasses essentially the same model domain as the MODFLOW model (Figure 2.3-1).

The FEFLOW groundwater flow model was designed to simulate aquifer-scale groundwater flow patterns and velocities, interactions between surface water and groundwater, the effects of pumping at water supply wells and the movement of diffuse solutes in groundwater to key discharge points (e.g., ditch systems and pumping wells). The flow model was first calibrated under steady-state conditions, then subsequently calibrated to transient conditions simulating historical-average, cyclic, seasonal fluctuations in the groundwater system. Finally, the transient flow model was

adapted for solute transport simulations. This initial model development and calibration were documented. Geomega (2001a).

With the concurrence of MADEP, this model was subsequently updated and recalibrated to include new data, and was then used to evaluate various on-Property and off-Property remedial alternatives and different operational pumping strategies for the Town of Wilmington's municipal water supply wells (MWSWs) in the MMBA (Geomega 2000, 2001e, 2002c). The model was again updated in 2003 to incorporate additional field observations, an updated bedrock surface, to reflect recent redevelopment work on the Olin Property, and to assess Remedial Action Alternatives (RAAs) in the vicinity of the off-Property West Ditch (OPWD) Study Area (Geomega 2003b).

Due to substantial changes in the local hydrologic system, the model was updated in 2005. These changes included the cessation of pumping from the five MWSWs within the MMBA and also from the two industrial supply wells at the Sanmina (formerly Altron) facility near the Olin Property. New field observation data were also incorporated into this update. The 2005 model update reflects all of the changes that have been made to the FEFLOW model since it was originally developed. A detailed description of the model and results of the latest update are included in Appendix A.

2.3.2 Groundwater Model Applications

2.3.2.1 MODFLOW Model

The MODFLOW model developed for the Supplemental Phase II Investigation (Smith 1997) had the following objectives and uses:

- Constant-density groundwater flow modeling (MODFLOW) of the aquifer system surrounding MMB and inclusive of the Olin Property. The model was designed to simulate the interaction between surface water and groundwater, determine groundwater flow directions and velocities, and to simulate pumping at the Town of Wilmington's MWSWs.
- Determine the capture zone of pumping wells by use of particle tracking based on groundwater flow model results.

- Dual-density groundwater flow modeling at a scale encompassing the Site waste disposal areas and extending beyond the center of the buried bedrock valley beneath MMB. The dual-density flow model utilized the USGS finite-difference code SHARP (Essaid 1990).

The objective of this model was to aid in understanding potential movement of the DAPL and to predict if and where the DAPL might move to in the future.

The development and application of the MODFLOW and SHARP groundwater models resulted in the following general findings:

- Hydrogeologic aspects of the Site that make groundwater modeling very complex include: the subsurface geometry of the buried bedrock valleys; interactions with surface water, both on-Property and within the MMB wetland; and the effects of pumping at the Town's MWSWs and the Sanmina industrial supply wells. The existence of a dense layer of groundwater adds significant complexity that cannot be modeled by constant-density methods.
- The groundwater flow system within the model domain is dominated by the hydrologic effects of the MMB wetlands. The wetlands act as temporally and spatially variable sources and sinks to the groundwater in the MMBA and surface waters within the MMB wetlands.
- Particle tracking results indicated that the most of the groundwater captured by the Town wells is likely to originate from areas outside the deep zones of contaminated groundwater, with much of the contributing groundwater originating at shallow depths within the MMB wetlands.
- The location of a groundwater divide in the vicinity of Main Street is heavily influenced by groundwater pumping from the nearby industrial wells.
- Results of the SHARP modeling suggest that the dense layer reached its present position in the mid-1980s, and that there is little potential for future movement under modeled scenarios. The modeling also supported the existence of a subsurface barrier to flow, in the form of a bedrock saddle, located west of Main Street.

The MODFLOW model as developed by Smith (1997) was modified by Law (1999) to incorporate additional data acquired since the Supplemental Phase II investigation and to refine the model's resolution and calibration. No further application or updates of the MODLFOW-based model occurred following the Law (1999) revision.

2.3.2.2 FEFLOW Model

Subsequent to development of the initial FEFLOW model (Geomega 2001a), new data became available and use of the model evolved to address additional investigative objectives. These factors required frequent updates of the model to sustain the desired level of model performance. There have been four Site-related investigations involving use of the FEFLOW groundwater model to address groundwater-related objectives and concerns. These investigations included:

- An evaluation of the effects of capping and on-Property DAPL containment on groundwater flow & solute transport (Geomega 2000).

- An evaluation of a preliminary pumping strategy for the Butter's Row Treatment Plant water-supply wells in the MMBA (Geomega 2001e, 2002c).

- An evaluation of groundwater extraction RAAs for the Maple Meadow Brook study area (Geomega 2002b).

- An evaluation of potential RAAs for the off-Property West Ditch Study Area (Geomega 2003b).

The objectives and significant findings of these investigations are summarized below.

Evaluation of the Effects of Capping and on-Property DAPL Containment on Groundwater Flow and Solute Transport.

A Focused Feasibility Study (FFS) was conducted for the Olin Property to evaluate potential remedial alternatives for areas of environmental concern combined with redevelopment within the property boundary (GEI, 2000l). As part of the FFS, Geomega used the groundwater model to simulate various capping and hydraulic containment scenarios in conjunction with redevelopment, which were based on the potential remedial alternatives identified in the FFS. Groundwater flow model results were then used as inputs for geochemical modeling of the expected changes in groundwater chemistry at key discharge points related to the Olin Property.

Pumping Strategy for the Butter's Row Treatment Plant Water-Supply Wells

At the direction of MADEP, Geomega conducted a numerical modeling study to develop a pumping strategy for the Butter's Row Treatment Plant MWSWs, in response to concerns over ammonia entering the distribution system from the MMBA supply wells (Geomega 2001e). The study provided direction for a Water Management Plan, which was being developed by Olin Corporation in coordination with the Town of Wilmington. The model was used to evaluate various operational pumping strategies for the MWSWs, which would minimize their intake of ammonia while maximizing pumping volume under different aquifer stress conditions, and to evaluate various potential RAAs.

The study involved both statistical analyses of pumping and water-quality data from the MWSWs and groundwater modeling of ammonia transport within the MMBA. The model simulations were used to quantify responses of the MMBA to different pumping configurations and climatic conditions, and to illustrate the effects of proposed optimal-pumping configurations under historical precipitation conditions. A total of 70 model simulations were performed during this study.

Based on the findings of this investigation, specific recommendations were developed to support the implementation of the Water Management Plan, which included: avoiding the on/off cycling of wells, minimizing the duration and frequency of well shutdowns, reducing pumping rates during drought conditions, and distributing groundwater withdrawal rates between wells based upon their location.

Following a review of these results and recommendations, MADEP requested an evaluation of additional modeling scenarios. The results of this additional modeling were presented in Geomega (2002a), as an addendum to Geomega (2001e), and included a particle track depiction of groundwater flow paths during dry season conditions.

Results of the simulations performed under this addendum did not suggest that any of the other previous conclusions and recommendations, including the proposed pumping configurations, should be modified. This work did however suggest potential for revising the previous recommendation against cycling wells on and off for limited periods of time. Most of the previous conclusions and recommendations were further supported by the results of these additional model simulations.

Evaluation of Remedial Action Alternatives for MMB Study Area

As authorized and approved by MADEP), a Phase III Detailed Evaluation was conducted for the MMB Study Area to assess the viability of potential RAAs. As part of the Detailed Evaluation, Geomega investigated the capture areas of the Town of Wilmington's MWSWs and the effects of potential RAAs on groundwater and solute transport within the MMBA.

This investigation used the groundwater model to simulate "Base Case" conditions and the effects of various RAAs, including: pump-and-treat of shallow groundwater, pump-and-treat of deep high

concentration areas, and a combination of both shallow and deep pump-and-treat scenarios. Additionally, the Base Case simulation results were used in a transient particle-tracking analysis to identify capture zones of the water-supply wells and to evaluate whether or not the known or inferred areas of contamination within the Site could affect water quality conditions at those wells.

The modeling results suggested that all of the simulated RAAs would be effective to some degree in reducing downgradient migration of ammonia within the aquifer. However, based on results of the particle-tracking analysis, any improvement that might be realized at the supply wells would likely be minimal.

Evaluation of Remedial Action Alternatives for OPWD Study Area

The groundwater model was used in support of the Final Phase III Remedial Action Plan for the off-Property West Ditch Study Area (GEI, 2004g) to evaluate certain RAAs that might be implemented to achieve regulatory closure for the Study Area. The methodology and results of that investigation were described in Geomega (2003b).

The groundwater model was used to investigate groundwater–surface water interactions in the OPWD Study Area under existing conditions, and the effects of potential RAAs on the hydrologic regime within that area. The model was used to simulate "Base Case" conditions and two potential RAA scenarios. The Base Case simulation represented typical conditions in the OPWD Study Area prior to implementing any RAA. (Two variations of the Base Case, involving different assumptions about Sanmina well pumping rates, were also investigated with the model.) The potential RAA scenarios that were considered involve (1) lining the OPWD with an impermeable membrane to prevent groundwater discharge to the ditch and, (2) in addition, enclosing the OPWD DAPL pool with a slurry wall and cap (or infiltration pump) to prevent the migration of contaminants in groundwater from exiting the OPWD Study Area.

Model results were used in a particle-tracking analysis to identify areas of groundwater contributing to the OPWD and the limits of seasonal groundwater divide fluctuations. Additionally, flux quantities for the OPWD and upper part of the South Ditch were computed and compared to quantify the potential effects of changing the Sanmina pumping regime and/or implementing the RAAs.

2.3.3 2005 FEFLOW Model Update

Substantial changes in groundwater stresses within the MMBA necessitated an update to the model in 2005. In particular, the Town of Wilmington stopped pumping from the MWSWs in the MMBA between September 28, 2002, and March 3, 2003, and this condition has continued to the present. For 10 years prior to 2003, these wells pumped a combined average of 1.4 million gallons per day, based upon reported production data from 1993 through 2002.

In addition, the Sanmina facility at One Jewell Drive closed in September 2004. Consequently, its two industrial supply wells ceased operation in June and September, 2004. Furthermore, new field observations and monitoring data (including new seismic surveys and drilling information pertaining to the top of bedrock) were acquired between June 2003 and October 1, 2005, the 2005 model update cutoff date. The results of the calibrated 2005 model update reflect these and all of the changes that have been made to the model since it was originally developed, including those changes that were incorporated as part of previous updates. Documentation of the 2005 model update is presented in Appendix A.

2.4 SUMMARY OF ANALYTICAL PROGRAM

Site investigations began at the Eames Street property in 1989 and have continued through 2007. During this time period a large number of field samples have been collected for chemical analysis in support of a variety of activities including remedial investigations, remedial action testing and monitoring, media chemistry evaluations, groundwater monitoring, and surface water and sediment investigations. Investigations were completed by several parties from 1989 to present:

The major phases of investigation and remediation work at the Site are summarized below:

- 1989 – 1993 (CSA) Preliminary Investigations and Comprehensive Site Assessment
- 1995 – 1996 Supplemental CSA Activities
- 1996 – present Multiple investigation and remedial activities

All programs were conducted using USEPA Analytical Methods (where available) with the primary chemical analyses including USEPA Target Compound List (TCL) and Target Analyte List (TAL) analyses for VOCs, SVOCs, pesticides and PCBs, metals and inorganics. Additional

USEPA methods were also used to evaluate other potential contaminants and to measure water chemistry parameters. For some chemicals, custom procedures were developed by subcontracted laboratories to test for unusual compounds that had no published procedures. The collection of Quality Assurance/ Quality Control (QA/QC) samples (blanks, spikes, and duplicates) and formal data quality reviews were included in all investigation programs. During the remedial investigations full target compound lists were reported for these analyte groups. During monitoring investigations completed after 2000, shorter lists were designated for some tasks based on site-specific knowledge of contaminants present.

2.4.1 Analytical Methods

During each of these time periods a variety of tasks were completed as described in Sections 2.1 though Section 2.3. Table 2.4-1 includes a listing of sample collection tasks and associated methods that have been used during the general time periods covering the primary investigation phases listed in Section 2.5 above. This table includes information on the primary sampling tasks, media, and analytical data that may be used in this RI, and it is not intended to be a complete listing of all sampling activities and data analyses that have been completed at the Site.

Analytical methods were completed by subcontracted laboratories using USEPA Contract laboratory Program (CLP) SOW methods, USEPA SW-846 (USEPA, 1986) including subsequent revisions, USEPA drinking water (500 series) methods and waste water methods (600 series) CFR Part 136], Methods for the Chemical Analysis of Waters and Wastes (USEPA, 1983), Standard Methods (APHA, 1989) and subsequent editions, American Society for Testing and Materials (ASTM) procedures, and other testing procedures developed by Olin. Starting in 2000, the MADEP began the Data Enhancement Process with the goal of establishing standards for the analysis of samples and reporting of data under the MCP. Draft analytical method guidance documents were prepared and a final compendium of analytical standards was published in 2003 (MADEP, 2003h). The MADEP guidelines cover analytical methods listed in Table 2.5-2. These MCP analytical standard have been incorporated into analytical sampling and analyses completed from 2002 to present.

Descriptions of the majority of analytical methods referenced on Table 2.4-1 can be found in the documents listed above. Analytical testing has been completed for a subset of chemicals that are not routinely included in analytical programs completed at CERCLA or MCP sites. Some

chemicals do not have formal published EPA methods. For a subset of chemicals analytical methods were developed by subcontract laboratories as performance based methods. These methods are described below:

Hydrazine

Hydrazine was analyzed by Severn Trent Laboratory (STL) Denver, Colorado, which included reporting of monomethylhydrazine (MMH), and unsymmetrical dimethylhydrazine (UDMH), which were not reported as used at the Facility. Samples were analyzed using a modified USEPA Method 300 ion chromatography procedure that was developed at STL Denver. Samples were filtered with a 0.2 µm filter and preserved with sulfuric acid in accordance with the STL Denver laboratory standard operating procedure. The STL quantitation limit for each compound was 10 µg/L.

Formaldehyde

Formaldehyde analyses were completed by STL Tallahassee using high performance liquid chromatography (HPLC) using a modified Method 8315A (STL Tallahassee) procedure. A reporting limit of 50 µg/L was reported using this procedure.

Opex and Kempore

Groundwater samples were analyzed for Kempore and Opex by Lancaster Laboratories in Lancaster, Pennsylvania. Analytical methods were developed at the laboratory using HPLC procedures and USEPA Method 8000. The procedures achieve reporting limits of 100 µg/L for Opex and 1000 µg/L for Kempore.

NDMA - Aqueous

Samples were analyzed for NDMA by modified Method 1625. The majority of samples collected at the Site were analyzed by Montgomery Watson Laboratories (MWH) located in Monrovia, California. Method 1625 is a high resolution/mass spectrometry (HR/MS) procedure that was selected to achieve a detection limit less than the California drinking water notification level of 10 ng/L. A reporting limit of 2 ng/L was used for NDMA reporting. Samples were analyzed by modified Method 1625 in accordance with the MWH Laboratories Standard Operating Procedure (SOP) for NDMA by GC/MS. All samples were collected in amber-glass bottles and preserved with sodium thiosulfate at the time of collection. Quality control evaluations were based on project

specific method performance objectives developed for this project in conjunction with the MADEP (Pancorbo, 2002).

In addition to the MWH samples, a small subset of samples were analyzed by Weck Laboratories, City of Industry, California and Alpha Analytical Laboratory in Westboro, Massachusetts using modified Method 1625 procedures.

During groundwater investigations completed in 2004, a subset of NDMA samples were analyzed by USEPA Method 625 because sample concentrations were high and there was no need for the low detection limits analysis provided by Method 1625. A general procedure was established for running samples with concentrations greater than 1 µg/L using Method 625.

NDMA Soil Analysis

A low concentration soil method was developed by Olin and STL-Westfield in 2003 to analyze for NDMA in soil. STL Westfield developed a modified 8270 soil procedure to obtain data for NDMA that achieved a quantitation limit less than the 9.5 µg/kg EPA Region 9 residential soil PRG. The method has a quantitation limit of 5 µg/kg (adjusted for moisture). Based on the methods development and MDL data, values between 2.5 and 5 µg/kg are reported as J qualified results. Detections less than 2.5 µg/kg are reported as non-detect at the reporting limit.

EPA National Exposure Research Laboratory (NERL)

A subset of groundwater samples were collected for a special analytical procedure performed at the USEPA NERL in Las Vegas, Nevada that was designed to identify unknown organic compounds (USEPA, 2004a). Based on a request from the MADEP, water samples were collected from nine locations (GW-83S, GW-83D, GW-84S, GW-84D, GW-86S, GW-86D, and MP-2 ports 1, 9 and 17, including samples from the DAPL, diffuse and overlying groundwater) at the Site and submitted to STL in Westfield, Massachusetts for extraction using USEPA Method 3510. This is a separatory funnel solvent extraction with methylene chloride similar to what is done during a Method 8270 semivolatile sample preparation. The sample extracts were shipped to NERL for analysis using Ion Composition Elucidation (ICE) using Gas Chromatography and High Resolution Mass Spectrometry (GC/HRMS). This method is similar to a Method 8270 semivolatile gas chromatography/mass spectrometry (GC/MS) analysis, but the USEPA ICE procedure is completed using a HRMS, which produces much more detailed ion fragment mass data that can be used to assess the chemical structure of compounds that are detected. The ICE process has the capability

to differentiate and identify chemical components with much greater detail and specificity than the traditional Method 8270 semivolatile procedure due to the use of the HRMS detector. The ICE system also utilizes a computerized data evaluation process that has been developed by the NERL The NERL has posted information and several technical papers on the analytical method on the following web site:

http://www.epa.gov/nerlesd1/chemistry/ice/default.htm

The USEPA NERL is the only laboratory that is performing the ICE procedure and the analytical method and data evaluation software is not available through other commercial laboratories.

Andy Grange, Ph.D. was the primary contact and USEPA chemist at the NERL Environmental Science Division. After the initial analysis of the groundwater samples, USEPA and MADEP requested funding from Olin to purchase additional chemical standards for approximately 100 chemicals that were tentatively identified in Olin samples during the ICE analysis. These standards were used to confirm, or not confirm, the identification of the tentatively identified chemicals by comparing the samples to known standards. A study report was completed (USEPA, 2004) in November 2004. The report included summaries of compounds and that were tentatively identified and confirmed based on the standard comparisons.

2.5 ANALYTICAL DATA QUALITY REVIEW

During remedial investigations and monitoring programs all data were validated prior to entering final results in the project database. For data collected from 1996 to present, project-specific data validation processes were developed by Olin to ensure that all data met minimum, specific, analytical quality standards and were of known quality. For some data sets this included full validation using USEPA National or Region I Data Validation Guidelines. Olin also established modified data validation procedures and goals referred to as modified Tier I procedures in the 1999 Quality Assurance Project Plan (Olin, 1999). In 2002 data validation procedures were modified to incorporate QC requirements from analytical program specifications in the MCP Analytical Data Enhancement Process which began in the late 2000 and was finalized in 2003 (MADEP, 2003h). These procedures are described as Olin Level I. Data validation has been performed by a project chemist and/or a senior QA/QC chemist assigned to the Wilmington project.

2.5.1 Data Validation Procedures

The data validation procedures have consisted of two levels of review including the Olin modified Tier I or Olin Level I review, and a more comprehensive review (full USEPA functional guideline validation) used for some project tasks.

2.5.1.1 Modified Tier I - Olin Level I

The Level I review procedures were designed to evaluate the precision, accuracy, representativeness, and completeness of sample data from each laboratory sample delivery group. During Level I validation the primary QA/AC indicators of data quality are reviewed using laboratory generated QC report forms, but a full data validation as specified in EPA functional guidelines is not completed. Appendix B contains the SOPs and check lists used to document the Level I review. For some sample sets, samples were collected for methods that did not have Level I SOPs. For these methods, data validation was completed by the project chemist and the general chemist review checklist in Appendix B was used. These checklists were completed by the project chemist for each data set that was validated. The following QC checks and reviews are completed during a Level I review:

<u>Olin Level I Review Parameters</u>

- Data package narrative review
- Sample chain of custody documentation and sample receipt
- Sample collection and preservation
- Holding time compliance
- QC Blanks - field or lab contamination
- Lab control sample (LCS)
- Matrix spike (MS/MSD)
- Surrogate Recovery
- Lab and field duplicate precision
- Detection limits and data completeness, and
- Electronic data accuracy

The Level I reviews were completed using QC summary forms that are reported in the data packages along with sample results. For the majority of monitoring program samples collected from 2002 to present full CLP-type data deliverable packages were not requested from the lab, and the Level I reviews were completed using the QC summary forms. Prior to 2002, QC limits used to evaluate accuracy and precision were based on control limits provided by the laboratories or those described in the Quality Assurance Project Plan (QAPP). When the MCP Data Enhancement Program began in 2000, QC limits from the MCP method guidelines were incorporated in the data validation procedures for methods that were covered under this program. A summary of analytical methods covered in the MADEP Data Enhancement Program is presented in Table 2.4-2. A summary of MCP QC limits is provided in Table 2.5-1 and Table 2.5-2.

2.5.1.2 USEPA Functional Guideline Validation

Full data validation was conducted for a subset of investigation programs or analytical methods. This included samples that were used for remedial investigation and/or risk assessments. During full validation QC checks include those done in Level I, plus the review of other QC parameter that are specified in Region I USEPA data validation guidelines including instrument tuning (GC/MS), instrument calibration response and accuracy, internal standard response for organics, and calibration checks and blanks, detection limit standards, interference checks, and serial dilutions for inorganics. Full validation also includes a review of raw instrument printouts and calculation checks to verify that systematic errors were not occurring in the reporting of sample and QC results. Data validation reports from Supplemental Phase RI Activities indicate that validation was completed in accordance with Region I guidelines, but the level of review is not specified in the RI report. For studies completed from 2000 to present, full validation was completed on the following data:

<u>Full Validation Tasks</u>

- Comprehensive Sampling Round 2000
- East Ditch SW-SED 2003
- South Ditch SW-SED 2003
- OPWD SED 2003
- NDMA Precursor Study - 2004
- NDMA - All groundwater samples 2002 to present
- Kempore/Opex - All samples 2000 to present

2.5.2 Comparability to USEPA Region I Data Validation Guidelines

The combination of Olin Level I, Tier II, and full validation procedures provide a quality assurance review process that is similar to the tiered data validation procedures used by USEPA Region I. For all samples a review of analytical data quality was completed and an assessment of data usability was recorded in data validation reports. USEPA Region I guidelines identify two levels of data validation that are routinely used for the validation of data collected during remedial investigations or monitoring activities. These validation levels are identified as Tier II and Tier III. Tier II validation involves the review of the majority of QC checks that are specified in the USEPA CCLP SOW analytical methods. Tier II validation is completed using QC summary forms and does not include the review of raw data or calculations. Tier III data review includes Tier II review and raw data and calculation checks.

The Olin Level I review contains most of the QC checks specified in the Region I Tier II procedure. Both procedures include basic reviews of the most important indicators of precision and accuracy including reviews of holding time compliance, QC blanks, surrogates, LCS, MS/MSD, and duplicate sample results. In both procedures data review is completed with laboratory QC summary forms. Tier II checks not completed during the Olin Level I review include reviews of instrument tuning, calibration data, and internal standard response for organics, and interference checks and serial dilution data for inorganics.

The Olin Full validation contains all of the QC data checks completed in the Region I Tier III procedure that would be applicable to SW-846 methods. Both methods include raw data review and calculation checks to verify lab procedures used for data reporting. One difference between the Region I guidelines and the Olin validation is that QC limits for precision and accuracy from the MCP Data Enhancement Program have been used rather than the CLP based limits identified in the USEPA guidelines. The MCP limits were developed by a Data Enhancement Work Group including many professionals with experience in laboratory analytical work and environmental sciences. The MCP limits set QC goals that were developed with good understanding of the SW-846 analytical methods, and represent an adequate standard to measure data quality based on the professional judgment of leading environmental regulators in Massachusetts. A summary of the QC limits from the Massachusetts MCP are included in Table 2.5-1 and Table 2.5-2.

2.5.3 Data Quality and Usability

Results from samples collected at the Site are currently stored in a database that has been developed and maintained by Olin throughout the history of site investigation work. All results from remedial activities have been validated at a level that provides reasonable assurance that the data are of known quality. The analytical data from the Site are interpreted to be usable as definitive data and data are acceptable for general use in site characterization, remedial investigations, risk assessment, and engineering design.

During the validation process data qualifiers have been added to results in accordance with procedures in the Olin Level I validation procedures in Appendix B, or the National USEPA or Region I Functional Guidelines. Qualifiers include the standard EPA validation qualifiers as indicated below:

U = not detected above the laboratory specified detection limit
J = the concentration or detection limit associated with the result is an estimated value
R = the result is rejected and is unusable
N = there is presumptive evidence regarding the identification of the reported analyte

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA AND LAND USE

The following subsections provided a general description of both the regional and local (i.e. site specific) physical features including topography, geology, hydrogeology, surface water, meteorology, land use and ecology. As noted in Section 2.0 of this report, a large number of investigations have been conducted at the Site primarily under regulatory authority of MADEP and have contributed greatly to the current understanding of Site physical characteristics. Detailed description of the physical characteristic are also provided in several early reports including the Comprehensive Site Assessment (CRA, 1993), and the Supplemental Phase II Report (Smith 1997). Subsurface data contained in those reports have been augmented by additional borings and studies including but not limited to the Town and Sentinel monitoring wells program (2001-2005), additional seismic studies in the MMBA (Geomega, 2001c, Geomega, 2004d), borings and subsurface investigation of the Main Street Saddle Area (Geomega, 2001d), and seismic studies in the off-Property West Ditch Study Area (MACTEC, 2006d).

3.1 TOPOGRAPHY

Figure 3.1-1 presents Site topography that has been developed since the early 1990's based on ground and aerial surveys. Regionally the area has subdued topography ranging in elevation from approximately 80 feet above Mean Sea Level (MSL) to 155 feet above MSL, and is typically flat over large areas, with broad north east trending ridges and smaller hills (see also Figure 1-1 presented previously). Figure 3.1-2 presents a three dimensional (3-D) depiction of the topography shown in Figure 3.1-1. Figure 3.1-2 also includes an overlay of several prominent roads for location reference (Main Street, Eames Street, and Jewel Drive) and other site features such as 3-D buildings projections and the rail road tracks which will be used as reference points in other 3-D figures. Figure 3.1-3 is ortho-photographic projection of the Site developed from an orthographically rectified photograph (ortho-photo) of the area that has been draped over the 3-D topographic surface shown in Figure 3.1-2. This ortho-photographic projection aids in visualizing Site topography and it relationship to cultural and hydrologic features. The Site is located within the headwater regions of both the Aberjona River Basin and the Ipswich River Basin (CRA, 1993). The topography defines the surface water divide for these river basins. The topographic and surface water divide is located to the northwest of the Olin Property approximately along Main Street, and hence along Eames Street to the northern end of the Property.

The developed northern portion of the Olin Property is essentially flat with the ground surface located at an elevation of approximately 85 to 95 feet above MSL. The undeveloped, southern portion of the Property consists largely of wetlands and mature forest lands and has slightly more topographic relief as compared to the more developed northern portion. The topographic features include an east-west trending low lying area that forms the South Ditch and Ephemeral Drainage and includes Central Pond, and a detention pond located between containment area and South Ditch. This low lying area is intersected at the Property boundaries by the East and West Ditches. These features are part of the interconnected drainage system that border two sides of the Property and that cross the center of the Property. Each of these surface water bodies occupy lower topographical areas and are shown on Figure 3.1-1 and discussed further in Subsection 3.4. In the vicinity of the South ditch and the Ephemeral Drainage, topography ranges in elevation from approximately 80 feet MSL in the west, sloping to an elevation of approximately 77 feet MSL to the east along the course of the East Ditch system. A small upland knoll is present between the South Ditch and the Ephemeral Drainage, and attains an elevation of 86 feet MSL.

The topography adjacent to the Property ranges from low lying wetlands to flat paved industrial areas. The land north of the Property is developed and is generally flat. The MBTA rail line creates and occupies a topographic low along the eastern side of the Property. Immediately east of the Property, across from the MBTA line the area is mostly commercially developed land that is paved or landscaped and generally flat but with a gradual topographic rise directly to the east attaining elevations approximately 115 feet above MSL. A low ridge runs along the southern boundary of the Property and reaches a maximum elevation of 108 feet MSL. The Calcium Sulfate Landfill was constructed on the western end of this ridge. The Woburn landfill is immediately south of the property beyond which the land becomes lower in elevation and flatter (80 feet MSL) draining to wetlands to the southwest, toward Halls Brook.

The area immediately west of the northern half of the Property includes commercially developed lots along Jewel Drive, and Eames Street and then residential lots along Main Street that are all relatively flat. The area immediately west of the southern half of the Property includes a small hill or knoll that extents to 140 feet MSL which includes several residences along Cook Avenue and Border Avenue in Wilmington. Additional residential development occurs further to the southwest

in North Woburn. To the northwest of the Property, on the western side of Main Street in Wilmington, the topography drops to lower elevations and is relatively flat at 80 feet MSL near and within the MMB wetland (see Figure 3.1-1 and Figure 1-1). The MMB wetland is bordered by upland areas to the west of Chestnut Street, and to the north by a broad ridge that runs parallel to Butters Row.

3.2 GEOLOGY

The geology of the study area includes organic materials and quaternary glacial deposits over igneous and metamorphic bedrock. The thickness of the overburden ranges from 0 feet below ground surface (bgs) where bedrock outcrops to more than 100 feet bgs within the Western Bedrock Valley. Both the overburden and bedrock units are described below. Additional details on both overburden and bedrock geology is provided in the Supplemental Phase II Report. (Smith, 1997).

3.2.1 Overburden Geology

Shallow regional geology includes peat and unconsolidated glacial deposits overlying crystalline metamorphic and igneous bedrock formations. The unconsolidated units include peat and organic silts, ice contact deposits, outwash deposits and glacial till and are described below.

Peat / Organic Silts. The organic peat layer is typically encountered just below the ground surface and ranges from very dark brown, organic peat to olive gray-green plastic, organic silty 'muck'. The majority of the peat and organic silts are encountered in the MMB Wetland, with the thickest deposits in the central portion of the wetland. Boring logs from monitoring well installations in MMB wetland indicate that the peat deposits can be thick in the center of the wetland (up to 30 feet) and have high porosities (up to 70 %). These peat formations are thick enough to affect the propagation of seismic energy and interpretation of seismic refraction velocity profiles within the MMB area.

Glacial Till. Both basal and ablation till have been identified in the overburden soils within the Site. Basal, or lodgment till, is deposited at the base of the glacier and tends to consists of well

graded fine to coarse sand and gravel and may contain appreciable amounts of silt and clay sized particles. Because of this, basal till generally has a lower transmissivity than the ablation till and is located directly over the bedrock. Ablation till is deposited at the front or toe and sides of a glacier forming lateral and end moraines. These formations generally consist of well graded sands and gravels with less silt and clay sized particles that the basal till. Ablation till is often formed in 'ridges' and may have a higher transmissivity than the denser basal formation. Within the Site till intermittently underlies the ice contact and outwash deposits.

Finally, in addition to the glacial deposits, directly under the industrialize portion of the Site, fill soils were also used prior to construction to bring the ground surface to grade. Fill soils may include imported material and local soil that has been re-graded.

3.2.2 Bedrock Geology

Several studies have been conducted to characterize the underlying bedrock formations and particularly to understand the shape of the bedrock surface and how it relates to both groundwater flow and the past migration of site related contaminants. These studies, including the Supplemental Phase II investigation (Smith, 1977), which included completion of numerous borings and seismic reflection, and refraction surveys, additional seismic investigations of the MMB area (Geomega, 2001c, Geomega, 2004d) the Main Street Bedrock Saddle Investigations (Geomega 2001d), the off-Property West Ditch Seismic Investigation (MACTEC 2006d) are described in Section 2.

The bedrock geology of the Site is shown on Figure 3.2-1 from Smith (Smith, 1997). Geologic mapping has identified two primary classes of bedrock: mylonites and intrusives. Both may very texturally and in composition and both are found within the Site. The mylonites are formed within fault zones and are metamorphosed by the pressure and heat generated along the fault zone. . The intrusives are igneous rocks that are formed by the cooling of molten rocks and include gabbro-diorites that forming later in dikes and fractures. However, in some areas they have been altered to metamorphic rocks, such as the horneblende-biotite schist identified in some rock cores (Smith, 1997).

Generally, bedrock below the Site is associated with the Composite Platform of Southeast New England or more specifically the Milford-Dedham Zone (Smith 1997). This zone includes late Proterozoic and early Paleozoic rocks that lie between the Bloody Bluff Fault and the Northern Boundary Fault of the Boston Basin. The area northwest of the Bloody Bluff Fault is called the Nashoba Zone and is predominantly made up of late Proterozoic mafic meta-volcanic and meta-volcaniclastics (i.e. Andover Granites). The area southwest of the Bloody Bluff Fault is called the Milford-Dedham Zone and is predominantly made up of gabbro-diorites. The Milford-Dedham Zone and the Nashoba Zone were separate tectonic plates that were joined together at the Bloody Bluff Fault, creating a mylonite fault zone.

Within the Site the Milford-Dedham Zone is represented by three distinguishable gabbro-diorites with varying amounts of deformation and each group is associated with the Burlington Mylonite Zone created within the Bloody Bluff Fault Zone. The different gabbro-diorites include un-deformed or normal gabbro-diorites, gabbro-diorite cataclastics, and gabbro-diorite with granite intrusives.

- The normal gabbro-diorites are fine-grained, weakly foliated and moderately resistant to weathering and erosion.
- The cataclastic gabbro-diorites are more easily weathered, and in turn are found in the topographically lower terrain with more gentle slopes. These rocks underlie the central portion of the facility and the South Ditch, as well as between Main Street and the east edge of the MMB Wetland, both north and west of Eames Street.
- The gabbro-diorite with granitic intrusions is the most competent bedrock type within the study area. These rocks outcrop at the elevated areas near the Calcium-Sulfate Landfill and near Cook Avenue, between Jewel Drive and Main Street.

The Burlington Mylonite Zone has been characterized as a 3-mile wide zone around the Bloody Bluff Zone where the bedrock has been severely deformed. As expected in fault zones, there are varying degrees of impact.

3.2.3 Bedrock Morphology

Based on previous investigations, the Bloody Bluff Fault Zone is the northeast-southwest trending fault zone located below Maple Meadow Brook and a splay of the fault lies between Jewel Drive

and the western boundary of the Property. The trending of this zone is also seen in the contours of the top of bedrock. Northeast-southwest ridges are seen in sequence in this area, creating buried bedrock valleys. The bedrock surface, based on interpreted bedrock elevation contours, is shown on Figure 3.2-2. Figure 3.2-3 compares this bedrock surface in 3-D to the surface topography, depicting areas where hills are supported by bedrock.

Based on previous investigations (Smith, 1997; Law, 2001d; Geomega, 2001d) which included borings, and seismic studies, and the primary feature of the bedrock surface is the Western Bedrock Valley that extends westward from the Property and reaches depths of over 120 feet beneath the MMB wetlands. An eastern bedrock valley was indicated in the CSA (CRA, 1993) but more recent data (Smith, 1997) showed that this feature does not extent significantly beyond the eastern Property boundary. Both of these bedrock features are identified in Figure 3.2-4 which presents a 3-D visualization of the bedrock surface and other bedrock features including the Main Street Bedrock Saddle at the Jewel Drive Bedrock Saddle.

This figure also identifies the two bedrock saddles discussed in Section 2 that impeded the migration of DAPL within the WBV system. These saddles are formed bedrock ridges that trend across the bedrock valleys. The most prominent saddle is the Main Street Bedrock Saddle which was investigated by Olin in great detail (Geomega, 2001d). In its 2001 study of the Main Street Bedrock Saddle, Geomega concluded that the bedrock saddle provided an effective barrier to westward DAPL migration in the Western Bedrock Valley. Repeated inductance logging (Geomega, 2001b, and subsequent years) has shown that the top of DAPL elevation (approximately 40 feet MSL) was, within measurement error, consistently equal to the elevation of the low point along the bedrock saddle and the overlying clayey basal till. Bedrock coring to install a multilevel piezometer in bedrock allowed microscopic inspection of bedrock core samples which determined the presence of Al–Cr sulfates as a mineral precipitate in bedrock fractures. These data indicate that interaction of bedrock groundwater in fractures with DAPL causes precipitation reactions that infill fractures and reduce the porosity and thus transmissivity of bedrock underlying or in contact with the DAPL pools. The Jewel Drive Bedrock Saddle that contains the western side of the Upper DAPL pool was determined to be at a slightly higher elevation (approximately 60 feet MSL) based on seismic refraction data, borings, inductance logging and multilevel piezometer groundwater sampling. The shape and the location of the low point of the OPWD study area bedrock depression

was refined by additional seismic refraction studies completed in 2005 (MACTEC, 2006d). Based on repeated inductance logging results, the elevation of the DAPL pools remain stable.

Each of these features is discussed further in Sections 4.0 and 5.0, as the bedrock surface influenced the past migration of the DAPL and the deeper, dissolved phase contamination.

3.3 HYDROGEOLOGY

The following section summarizes the occurrence and movement of groundwater at the Site. Groundwater occurs in two primary geologic units including the unconsolidated sand and gravel deposits and the underlying fractured crystalline bedrock. The unconsolidated overburden deposits are locally heterogeneous, however over the Site scale these sand and gravels are found to exhibit fairly uniform properties (Geomega, 2001a) with typically high porosity and permeability, and are capable of transmitting large quantities of water. In general the unconsolidated deposits are unconfined except within the central portion of the MMBA, where the thick sequences of peat and muck restrict the vertical movement of groundwater, leading to locally confined groundwater conditions. Groundwater in bedrock occurs principally in secondary porosity features (e.g., fractures) as the bedrock has very low primary porosity. Thus the bedrock groundwater system has low permeability and low yield and transmits a small amount of groundwater compared to the overburden aquifer. With respect to the bulk movement of groundwater within the hydrogeologic system, the bedrock system contributes an insignificant amount of groundwater compared to the overburden aquifer.

The hydraulic properties of the MMBA were previously evaluated and wells screened in the sand and gravel were reported to have horizontal hydraulic conductivities in the range of 2 and 3,000 ft/day (Smith, 1997). Results of pumping tests from the Town wells indicated the transmissivity of the sand and gravel deposit to be between 11,500 and 14,000 ft^2/day (Smith, 1997). These ranges of hydraulic properties were used in the development of a numerical groundwater flow model for the Site (Geomega, 2001a, and subsequent model revisions) as discussed in Section 2.4.

Since the cessation of pumping from the Town of Wilmington municipal water supply wells in 2003, the water table elevations closer to the municipal well field have rebounded and now

represent ambient (non-pumping) conditions. Potentiometric groundwater conditions interpreted by Geomega from an October 2004 groundwater level measurements data set (Figure 3.3-1), indicate that horizontal groundwater gradients throughout the MMBA are very flat (approximately 0.0005 ft/ft). These gradients are substantially flatter than those under conditions of the Town Wells pumping in 1998 (Geomega, 2001a). Although the overburden soils below this area are highly transmissive the low hydraulic gradient implies that average groundwater flow is relatively slow under ambient conditions.

Due to the high permeability of the shallow overburden deposits, the shallow groundwater is influenced by surface water features; with less influence on the deeper water bearing zones. Groundwater within the Site flows both to the northwest and to the south east away from a groundwater divide that bisects the Site from north east to south west (Figure 3.3-1). Since 1997, the existence of a seasonally variable groundwater divide has been documented (Smith 1997, GEI, 2000l, Geomega, 2001a). The location of the divide is sensitive to relatively small changes in groundwater elevation owing to the generally flat gradients in the area where the divide occurs. Thus the divide moves laterally seasonally in response to changing precipitation patterns, groundwater recharge and groundwater elevation conditions. This shallow groundwater divide is located between a groundwater mound in the northern part of the Property and the hill bordering Cook Avenue, situated approximately 350 feet west of the southern half of the Property (see also 3.1-1). This groundwater divide is not coincident with the surface water divide identified by IEP (IEP, 1990) nor the Zone II designation. During presentation of the nature and distribution of contamination (Section 4), and the fate and transport of contaminants (Section 5), the significance of groundwater flow conditions related to the groundwater divide location will be further discussed. A general discussion of groundwater flow patterns over the remainder of the Site follows.

Below the former Facility, groundwater flow is generally from northwest to southeast, with a zone of radial flow, from a small groundwater mound, in the north end of the Property. This groundwater mound is within an area of the Property where the overburden soils are relatively thin and a higher percentage of fine grained material may be present. The existence of slightly steeper hydraulic gradients in this area also support the notion that these soils are finer grained and have lower transmissivity. On the northeast side of the Property, groundwater is captured by the Plant B

groundwater extraction system. South of the Plant B groundwater capture zone, a groundwater flow stagnation point is interpreted to exist somewhere between the two opposing 79-foot contour intervals, with shallow overburden groundwater south of this point migrating southeast parallel to East Ditch. If the Plant B groundwater extraction system did not exist, this stagnation point would move north up the East Ditch, toward the topographic divide (e.g., the highest elevation in the East Ditch) which occurs several hundred feet north of the Eames Street overpass, based on a current detailed survey. Under such conditions, groundwater on the northeastern side of the Site would be expected to flow to the southeast.

For the remaining areas within the Property, with the exception of the area upstream of the weir in the Upper South Ditch, most of the surface waters are generally receiving water bodies, and their interaction with shallow groundwater influences shallow groundwater flow patterns. Although groundwater generally supports base flow in these streams, under low summer recharge conditions, some reaches of all of the ditches occasionally go dry as the groundwater potentiometric surface drops below the stream bottom elevation. The weir located in Upper South Ditch was specifically designed to hold back water in the off-Property West Ditch, thereby increasing its hydrostatic head and preventing discharge of shallow groundwater to the off-Property West Ditch. Since 1992, a weir has been located in the Upper South Ditch, near the location of the current weir which was constructed in 2001 (GEI, 2001m). The hydraulic effects of the weir at either location was generally similar (Smith, 1997, GEI, 2003g). The increased hydraulic head within the stream results in recharging condition from the stream to groundwater and a mounding of groundwater upstream of the weir. When groundwater levels are low this results in groundwater flow away from the ditch, but only for a short periods of time following storm events. The current and previous weirs were installed to reduce groundwater discharge to the off-Property West Ditch system thereby reducing floc formation and ammonia concentrations in the off-Property surface water. Both of these objectives were met by the upstream hydraulic conditions created by the weir. Immediately downstream of the weir, the surface water - groundwater gradient reverses and groundwater discharges to surface water.

At the southwestern corner of the Property, a small groundwater divide is present underlying the calcium sulfate landfill. Groundwater moves both to the southwest and to the east-northeast. The groundwater flow pattern here is influenced by shallow bedrock below the Calcium Sulfate

Landfill and surface drainage patterns and groundwater originating under the adjacent Woburn Landfill.

North and northwest of the groundwater divide, groundwater flows, northwest and north toward the MMB Wetland. Groundwater flow to the MMBA includes contributions from areas bordering Main Street and the landfill on the Spinazola Trust Land. Groundwater entering the MMBA eventually turns and flows northeast following MMB after its confluence with Saw Mill Brook.

Vertical gradients within the overburden groundwater system have been measured at numerous vertical well couplets in on-Property and off-Property areas. In general, vertical head potentials are weakly downward or neutral between shallow and deep overburden groundwater. Upward vertical head potentials are only present within or in the immediate adjacent vicinity of gaining surface water bodies such as the MMB, Sawmill Brook, and South Ditch, where groundwater discharges. Further discussion of groundwater / surface water interaction and the relationship of groundwater gradients to stream stage is provided in Section 5.

Due to the limited contribution and importance of the bedrock groundwater system compared to the overburden groundwater aquifer, the bedrock groundwater flow conditions have not been studied as intensively. Based on extensive bedrock coring and mineralogical assessments (Smith 1997), and borehole geophysical investigations (Smith 1997, and Geomega, 2001c and Geomega, 2001d) the bulk movement of bedrock groundwater is dominated by secondary porosity features, such as fractures. Locally, orientation of fractures are dominated by past tectonic deformation and the presence of structures such as the Bloody Bluff Fault Zone giving rise to a dominance of the northeast- southwest fractures and bedrock fabric. Groundwater hydraulic conductivities measured in the bedrock in the Main Street Bedrock Saddle area range from 0.5 to 3.0 feet/day, and are representative of typical conditions found elsewhere in New England. Because the measured horizontal flow in bedrock is lower than the transmissivity of the overburden water bearing zone, more than 95% of groundwater transport in this area of the Site will be in the overburden with remaining flow most likely in the most shallow and most weathered portion of the bedrock (Geomega, 2001a).

3.4 SURFACE WATER

As discussed previously in Section 1, the Site contains a network of man made ditches, generally named for their physical location, relative to former operations. They include: West Ditch, East Ditch, South Ditch, and Ephemeral Drainage. There is also Central Pond, located as its name implies in the central portion of the facility. Prior to the construction of the Slurry Wall/Temporary Cap containment area, a storm water detention pond was constructed between South Ditch and the containment area. Construction of the detention pond required bedrock removal as bedrock is at depth shallow and outcrops on the eastern end of the detention pond. Each of these features is shown on Figure 3.4-1.

West Ditch. The West Ditch begins along the northwest border of the Facility and drains to the south. The on-Property West Ditch is the point of discharge for the current Remediation General Permit discharge and enters the South Ditch along the western portion of the Site. The Off-Property West Ditch collects surface runoff west of the Property boundary and flows into the South Ditch. As discussed in Subsection 2.1.4.1.1, the on-Property West Ditch has been remediated and this portion of the ditch was reconstructed as a concrete culvert. Wetlands surrounding Off-Property West Ditch have been delineated and hydrologic attributes assessed through numerical modeling (Geomega, 2003b) as part of assessment remedial alternatives under the Off-Property West Ditch Study Area under the MCP (GEI, 2004g). The watershed for the Off-Property West Ditch encompasses 38 acres of which about 20 acres are impervious areas (pavement) or standing water. Estimates of storm water run-off range from 34,000 to 70,000 gallons per day (gpd). The estimated monthly contribution to stream base flow from groundwater ranges from 38,500 gpd (July) to 64,000 (February) gpd (Geomega, 2003b).

East Ditch. Surface water in the railroad ditch referred to as the East Ditch, located to the east of the Property, flows southeastward from north of the Eames Street overpass bridge, parallel to the MBTA Commuter Rail Line (and the eastern Property boundary). The East Ditch receives storm water runoff via sheet flow abutting developed properties and adjacent wetlands. South of the Property, the East Ditch enters and exits a series of culverts eventually flowing into Halls Brook, which flows to Halls Brook Holding Area and eventually to the Aberjona River. Specific discharge from the East Ditch has been measured below South Ditch and simulated in groundwater

models (Geomega, 2003b). The outflow measured by stream gauging was approximately 34,560 cubic feet per day.

The East Ditch is owned by or occupies right of ways controlled by the rail company and is regularly maintained to remove encroaching vegetation and debris from ballast that lines the ditches. Access to the East Ditch is restricted for protection of the public.

South Ditch. The South Ditch begins at the Property boundary along the west side, and receives surface flow from the off-Property West Ditch and the on-Property West Ditch. The South Ditch bisects the property flowing east across the center of the Property and discharging into East Ditch. During seasonal high groundwater conditions, there is constant base flow within the South Ditch indicating that it receives groundwater recharge. However during dryer periods, the lower portion of the South Ditch may go dry, indicating that the stream recharges groundwater during these periods. As noted previously the weir at the head of the south ditch creates a localized mounding of groundwater and in turn creates a localized recharging area upstream of the weir.

Permitted discharge to South Ditch from Plant B occurs in batches during most weekdays during normal working hours (Monday through Friday from morning to afternoon). Based on a recent average groundwater extraction rate of 8.5 gpm, discharge to the South ditch averages approximately 17,000 gpd over a typical weekday period. Flow measurements on the South Ditch were obtained by Smith (Smith, 1997) in a series of stainless steel flumes constructed to fit the ditch at each of five locations. The flow measurements were timed to preclude contribution from Plant B discharge. The general conclusions from the Smith South Ditch flow measurements were that the lower reach of the South Ditch (between Central Pond and the Property boundary) did not gain or lose flow during the majority of monitoring events from spring and winter periods. Summer and fall periods did not provide conclusive data due to very shallow low flows experienced that were not easily quantified with a flow meter. The central reaches of the stream were variable, both gaining and losing at different monitoring events. The upper reaches of the stream were generally gaining; however the contribution to surface water flow from groundwater discharge was limited and averaged only +1.1gpm between the uppermost flume stations. The study also concluded that stage height had no relationship to whether the stream was gaining or

losing. Smith estimated annual flows of 1.6 million cubic feet per year for the South Ditch system (Smith, 1997).

Ephemeral Drainage. The Ephemeral Drainage is located just south of and parallel to South Ditch and represents a low lying area that most likely represents the flood plain for South Ditch. During prolonged wet periods and following large precipitation events, flow in the drainage may develop and join the South Ditch in vicinity of the eastern Property boundary.

Central Pond. Central Pond is a shallow pond located east of the former Lake Poly, north of South Ditch. The pond is generally round in shape and approximately 100 feet wide. The underlying aquifer in this area is unconfined, and Central Pond is an expression of the shallow water table, both receiving and discharging groundwater.

Maple Meadow Brook Wetland Area. This area is located approximately 2,000 feet west and north of the Property and also west of Main Street and is an extensive wetland complex located between surrounding upland areas. Two brooks are defined within the wetland complex: Saw Mill Brook and Maple Meadow Brook. The main brook is Maple Meadow Brook that flows to the north in the central portion of the wetland. The Saw Mill Brook flows from Mill Pond Reservoir and joins the Maple Meadow Brook northwest of the Property in the central portion of the wetland area. Specific discharge from the MMB has been measured at Route 38 and other locations and this data has been used in groundwater flow models (Geomega, 2001a, Geomega, 2003b). Flow in MMB ranges from nearly stagnant condition to high flows in spring runoff and is dependent on the season and precipitation conditions. The outflow measured by stream gauging at Route 38, was 5.96 cubic feet per second (CFS) in April 1998, (approximately 514,900 cubic feet per day). During this same time, flow in Sawmill Brook at Chestnut Street was measured 3.32 CFS.

3.5 METEOROLOGY

The climate in this area is described as humid and temperate with a fairly uniform monthly precipitation. Precipitation in the Wilmington area averaged 47 inches per year for the period from 1970 through 2000. (NOAA, 2002)) In the nearby town of adjacent town of Reading, Massachusetts average annual precipitation data recorded at is in the range of 41 inches with October generally being the driest month and April being the wettest. It is estimated that approximately half of the precipitation leaves the Site as infiltration to groundwater or as surface water flows, and that the remaining half is lost to evapotranspiration (Geomega, 2001a).

Mean January temperature is approximately 27 degrees Fahrenheit (F) and the mean July temperature is 74 degrees F. The mean annual temperature is 50 degrees F. (CRA, 1993)

Prevailing wind direction is from the west northwest during the winter months and from the southwest during the summary months. The average wind speed is seven knots. (CRA, 1993)

3.6 DEMOGRAPHY AND LAND USE

This section presents the regional socio-economic conditions for the area surrounding the Site as well as the land use and groundwater classifications for areas within and around the Site.

3.6.1 Socioeconomic Setting

The Property is located in the southern part of Wilmington, Massachusetts and it lies on the border of The Town of Wilmington and the City of Woburn. Because of it's proximity to Woburn, the demography of both municipalities are discussed in this Subsection.

Wilmington, Massachusetts The Town of Wilmington is a 17 square mile mixed residential, commercial and industrial community located 16 miles northwest of Boston. The town has a population of 21,575 (2005 U.S. Census estimate) and median family income in Wilmington has $70,652/year with 31.4% of the population college educated. The Town of Wilmington boasts a poverty level of 1.8%, well below the national average of 9.2%.

The town has a Caucasian majority of 96.3% and a minority population of 3.7%. The dominant minority is Asian at 2.0% with the Hispanic population at 1.0%. Blacks represent 0.4% and various other minorities comprise the remaining 0.2%. Wilmington has an unemployment rate of 3.8% (2006 Massachusetts Department of Employment and Training), which is below the national average.

Woburn, Massachusetts The City of Woburn is a mixed residential, commercial and industrial community located 10 miles northwest of Boston and is located within the Mystic River Watershed. It has a population of 37,508 (2005 U.S. Census estimate) with a median family income in of $54,897/year with 29.5% of the population college educated. The City of Woburn also currently has a poverty level of 4.5% which is below the national average.

The town has a Caucasian majority of 90.6% and a minority population of 9.4%. The dominant minority is Asian at 4.8% with the Hispanic population at 3.1%. Blacks represent 1.9% and various other minorities comprising the remaining 0.6%. Woburn has an unemployment rate of 4.3% (2006 Massachusetts Department of Employment and Training), which is below the national average.

3.6.2 Surrounding Land Use

Land use surrounding the Property is indicated in Figure 3.6-1. The property is immediately surrounded to the east, north, and west by industrial facilities and the Woburn Town Landfill abuts the Facility to the south. The MBTA Commuter Rail line immediately abuts the property to the east. Further to the west, along Main Street, Cook Avenue and Border Avenue, the primary land use is for single-family homes with some commercial and light industrial development.

Farther away from the property the land use is mixed residential with a large area included in the Maple Meadow Brook Wetland to the west.

Several commercial properties near the Property have reported independent environmental problems to the MADEP. These include, but may not be limited to Altron Industries, Koch Membrane, United Tool and Die, Raffi and Swanson, Pepsi Cola, Jewel Drive Industrial Mall, the

Getty Station, the Rutland Corporation and the City of Woburn Landfill. Several of these sites to the west of the property are listed as Downgradient Property Status properties under the MCP.

There are several schools located within 2 miles of the site. These include Woburn's Altavesta Elementary School, located less than one half of a mile to the south, Linscott Rumford Elementary School at 1.2 miles to the south, and Wilmington's Wildwood Early Childhood Center at 1.3 miles to the north.

There are several public parks within 2 miles of the site. These are Ferullo Park in North Woburn and Wilmington's Town Park. Both are located on Route 38.

The Maple Meadow Brook Aquifer is the location of one of several municipal well fields used by the Town of Wilmington. Pumping of five of Wilmington's MWSWs was suspended in February 2003 subsequent to the detection of NDMA in the MMBA as discussed in Section 1. Olin and the respondents have funded construction of a new connection to the MWRA drinking water system that is currently being built by the Town of Wilmington.

The areas around the property do not contain areas designated by the Massachusetts Executive Office of Environmental Affairs (EOEA) as "Environmental Justice Zones" (EJ). EJ zones were created by the EOEA to display neighborhoods across the state with high minority, non-English speaking and low-income populations (based on 2000 U.S. Census data). Such areas are identified and eligible to use state resources to ensure that EJ populations receive a strong voice in environmental decision-making.

3.6.3 Groundwater Use Classification.

As discussed in Section 1, the groundwater under a portion of the Site has been classified as Zone II in the northern portion of the Property, extending northwest including the MMBA. Other areas of the Site are outside the Zone II area. The Zone II boundary was developed from a water supply study prepared for the Town of Wilmington by IEP (IEP, 1990), and includes the zone of contribution of areas beyond the interpreted surface water watershed boundaries between the Ipswich and Aberjona River Basins. The zone of contribution analysis was very conservatively

based on a coarse regional scale MODFLOW groundwater model that considered pumping of the Wilmington MMB well field at maximum design capacity under six month drought conditions. The IEP document is the current definitive source of that zone of contribution boundary upon which the Zone II boundary is in part based. The IEP boundary is slightly offset from the current MassGIS Zone II boundary, which acknowledges the original source studies as the definitive boundary. Projection of the IEP boundary onto current surface features also has some uncertainties due to minor differences in projections of older and newer topographic base maps. Therefore for the purpose of this Focused RI Report, the Zone II classification presented by the MassGIS is used on Figures in this Section and in subsequent discussions of the nature and extent of groundwater contaminants.

Under the MCP, groundwater data from both Zone II and Non-Zones II may be evaluated by one or more of the following standards:

- GW-1. MCP Category GW-1 Standards (310 CMR 40.0974(2)) apply to groundwater that is considered either a current or a future source of drinking water. The regulatory criteria used to determine the applicability of the GW-1 standards are described at 310 CMR 40.0932(4).
- GW-2. MCP Category GW-2 Standards (310 CMR 40.0974(2)) apply to groundwater that is considered a potential source of indoor air contamination via vapor intrusion. These standards apply to groundwater that is both shallow and below an occupied building. The specific regulatory criteria used to determine the applicability of the GW-2 standards are described at 310 CMR 40.0932(6).
- GW-3. MCP category GW-3 Standards (310 CMR 40.0974(2))) apply to all groundwater in the Commonwealth, as stipulated in the MCP at 310 CMR 40.0932(2). The GW-3 standards are based on protection of aquatic life in surface water and can be regarded as the minimum standards for sites evaluated using MCP Risk Characterization Method 1.

Zone II Area. Within Zone II, groundwater is considered a potential drinking water source and the MCP GW-1 Criteria as well as the EPA MCL Criteria are considered applicable. In addition to evaluating the groundwater as a potential drinking water source, groundwater may also be evaluated in the context of ecological receptors in surface water. Because site-specific Ecological Risk Assessments have been conducted for surface water bodies, the GW-3 Standards are not considered applicable.

For the Zone II areas, the MCP GW-1 groundwater classification is used here as a starting point for identifying areas of groundwater with current or future potable use (Figure 3.6-1). The MADEP considers Massachusetts MCLs to be applicable public health standards in GW-1 areas. Groundwater is not currently used for any purpose at the Property. A comprehensive drinking water well survey and testing program was implemented by Olin. There are no operating private drinking water wells located within the boundaries of impacted groundwater. There are industrial facilities within the boundaries of impacted groundwater that have in the past operated industrial water wells (Sanmina, formerly Altron). Residential well locations closest to the Site, but outside the Site boundary and the former Altron wells (Altron B1 and B3) are shown in Figure 3.6-2. The use of Wilmington's five MWSWs located in the MMBA, has been suspended since 2003 by the town of Wilmington. Currently no downgradient properties are using potable wells and measures have been taken to inure that no private residential wells will be installed downgradient of the Site (Smith, 1997).

Areas Outside of Zone II. Within areas outside of Zone II, groundwater is evaluated under the MCP based on the potential risk to ecological receptors as well as on the potential for vapor intrusion. Most of the Property as well as areas to the south and southeast are outside of the Zone II area and, are areas that are not currently or not anticipated to be used as a potential drinking water source. As noted above, under the MCP, the GW-2 (in the immediate area of occupied buildings) and GW-3 criteria are guidelines for groundwater evaluation. Because of the extensive site–specific ecological risk assessments completed to date, a more appropriate evaluation of the groundwater data is through the determination of risk for each exposure pathway and receptor. Risk assessments conducted to date are discussed in Section 2.0 and summarized in Section 6.0. Because of these studies, the GW-3 standards are not appropriate and will not be discussed in this report.

3.7 ECOLOGY

This section describes ecological characteristics, including natural communities and potential wildlife, which occur in the various on- and off-Property study areas related to the Site. Information presented in this section has been summarized from existing investigation reports.

3.7.1 Terrestrial Habitat

The northern portion of the Property is heavily developed, containing office buildings, a parking area, several non-operational plant buildings, paved roadways and the foundations of former plant structures. The northern portion of the Property provides no significant habitat for ecological receptors. The southern portion of the property consists of maintained open field over the Calcium Sulfate landfill, and forested upland. The central portion of the property contains a mix of maintained open field and upland forest areas (ABB, 1993).

Upland forest consists of mixed stands of hardwoods and pines dominated by white pine (*Pinus strobus*), northern red oak (*Quercus borealis*), and white ash (*Fraxinus americana*). Terrestrial wildlife potentially inhabiting the site include eastern cottontail (*Sylvilagus floridanus),* woodchuck (*Marmota monax*), red fox (*Vulpes vulpes*), and birds such as American robin (*Turdus migratorius*) and American woodcock (*Scolopax minor*).

3.7.2 Aquatic Habitat

The aquatic habitat associated with the Property consists primarily of a network of shallow-man-made ditches and a centrally located 0.2 acre pond. The pond and ditches do not support a diverse aquatic community.

The ditches, which tend to go dry during summer months, are incapable of supporting a diverse aquatic community because they are generally of insufficient depth, temperature, and oxygen content to support populations of fish or sensitive benthic macroinvertebrates (e.g. mayflies, stoneflies), , even in the absence of the existing contamination. The aquatic fauna associated with these aquatic habitats consist primarily of stress-tolerant taxa such as crayfish, dragonfly nymphs, amphipods, and midge larvae. Emergent vegetation, algae, and phytoplankton have also been observed in these areas. During the various site walkovers and habitat surveys conducted throughout the numerous investigations, no fish have been observed in the ditches and no evidence of stressed biota attributable to the facility have been noted

The MMB and Sawmill Brook wetland complex (SB WC), located approximately one-half mile northwest of the Site. Potential aquatic and semi-aquatic wildlife include fish, amphibians, aquatic invertebrate, and aquatic plants.

Wildlife and habitats associated with each system are described below.

Central Pond

The central pond has an approximate area of 0.2 acres, and is centrally located at the facility. The pond is connected hydraulically to the South Ditch only during periods of high flow via a low point in the berm along the southwest edge of the pond. The bottom of the pond is unconsolidated mud, which is covered with a layer of flocculent material. Submerged vegetation is nearly absent and emergent herbaceous growth is sparse. The edges of the pond are vegetated with shrubs and herbaceous pant species. The north edge of the pond is heavily vegetated, dominated by grey birch (*Betula populifolia*), red maple (*Acer rubrum*), glossy buckthorn (*Rhamnus frangula*) and chokecherry (*Prunus virginiana*). A scrub-shrub wetland characterizes the north and east sides of the pond where dominant vegetation consists of grasses and sedges with scattered grey birch and red maple saplings.

West Ditch

The off-Property West Ditch consists of three constructed ephemeral drainage ditches that converge just west of the stone box culvert under the abandoned railroad line that parallels the western property boundary. The West Ditch system receives water from a detention basin located west of Jewel Drive, from several roof and parking lot drainages, from surface runoff, and from groundwater discharge. Following installation of the weir, the section of the West Ditch just east of the railroad culvert is typically inundated throughout most of the year. Red maple (*Acer rubrum*) and glossy buckthorn (*Rhamnus frangula*) dominate the West Ditch riparian zone MACTEC, 2003h. Emergent plants including purple loosestrife, cattail, rushes, and sedges have also been observed within the West Ditch channel. The bottom substrate consists of a poorly drained mineral soil. The general poor quality of this manmade drainage system is unsuitable for fish and the more sensitive macroinvertebrate species.

South Ditch

In the upper portion of the South Ditch (immediately downstream of the weir), flow is minimal, and the water surface is sometimes covered with an algal film. The algae is general absent in the most downstream segment (i.e., east of the fence at the property boundary with New England Resins & Pigments). Flocculent material is commonly observed in the Upper South Ditch and is also observed in lower portions of South Ditch.

Speckled alder (*Alnus rugosa*) saplings and shrubs line the stream banks in the upper portion of the South Ditch while glossy buckthorn (*Rhamnus frangula*) dominates the shrub layer in other portions of the South Ditch MACTEC, 2005j. The lower portion of South Ditch has a relatively closed canopy that is dominated by red maple (*Acer rubrum*) with scattered gray birch (*Betula populifolia*). Arrowhead (*Sagittaria latifolia*) was observed in the open, delta portion of the South Ditch. Cattails (*Typha latifolia*), and purple loosestrife (*Lythrum salicaria*) have also been observed in the delta area. Other vegetation observed along or within the ditch has included jewelweed (*Impatiens capensis*), skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), grasses, sedges, and mosses. Vegetation along the entire length of the ditch has appeared healthy. During site visits, frogs are frequently observed in the South Ditch. No other wildlife has been directly observed in the South Ditch.

East Ditch

The East Ditch is a man-made surface water drainage ditch which parallels the MBTA railroad tracks. Water in the East Ditch is warm and perennial. The East Ditch channel is approximately 1 to 2 meters wide and ranges from approximately 0.1 to 0.8 meters deep. Gravel rip-rap associated with the railroad ballast extends along the eastern bank of the ditch and covers much of the ditch bottom. Bottom substrate typically consists of cobble/ballast covered with a mat of algae and floc, with small amounts of silt, detritus, and muck also present. An anaerobic odor has been detected in association with East Ditch sediments. A petroleum odor and sheen are typically associated with surface water and sediment in the East Ditch but does not appear to be associated with the Plant B area.

Land use surrounding the East Ditch is primarily industrial and commercial. Due to its proximity to the railroad tracks, the East Ditch is subject to regular maintenance, including dredging of

sediments and cutting and/or spraying of vegetation. As a result of on-going maintenance, vegetation growing within and along the East Ditch is generally sparse and includes species typically present in disturbed areas, including purple loosestrife (*Lythrum salicaria*) and glossy buckthorn (*Rhamnus frangula*) and cattails (Typha latifolia). The East Ditch receives little shading, due to a lack of tree or sapling canopy in most areas. It consequently provides minimal cover for wildlife. Aquatic fauna which have been observed in the East Ditch during various site investigations include water striders, dragonfly nymphs, beetle larvae, bloodworms, amphipods, crayfish, water boatmen, cladocerans, predaceous diving beetle larvae, midge larvae, bullfrogs (*Rana catesbiana*), green frogs (*Rana clamitans*), a northern leopard frog (*Rana pipiens*), and a garter snake (*Thamnophis sirtalis sirtalis*).

Upper NBSD and Lower NBSD

The upstream portion of the New Boston Street Drainway (Upper NBSD), including the remediated section located upstream of Landfill Brook, the section which runs underground though a culvert, and an above-ground rip-rapped channel located immediately downstream of the underground portion, provides minimal cover and poor to non-existent habitat for aquatic and semi-aquatic wildlife.

The downstream portion of the New Boston Street Drainway (Lower NBSD) flows through a wooded riparian area dominated by red maple before its confluence with Hall's Brook. This reach provides better habitat for both aquatic and wildlife receptors than the Upper NBSD. In addition, fish and semi-aquatic wildlife, such as raccoon (*Procyon lotor*) and green heron (*Butorides striatus*) may occur in the Lower NBSD

Maple Meadow Brook/Sawmill Brook Wetland Complex

Maple Meadow Brook originates at Mill Pond Reservoir in Burlington, MA, and drains to the north. Sawmill Brook originates in Burlington one-quarter mile to the west of Maple Meadow Brook, and drains to the northeast before joining Maple Meadow Brook approximately one-half mile northwest of the Property. The upper reaches of these brooks have well-defined stream channels with steep, over-hanging banks; however, both brooks drain into a large, topographically flat area approximately one-quarter mile upstream of their confluence. This general area, referred to as the MMB/SBWC is a scrub-shrub swamp approximately 15 acres in size and is bounded by

Butters Row to the north and northwest, Chestnut Street to the southwest, Spinazola property and former landfill to the south, and Route 38 to the east MACTEC, 2002b. Downstream of the confluence with Sawmill Brook, Maple Meadow Brook flows north northeast, passing under the MBTA rail line and to the east of the center of Wilmington before joining with Lubbets Brook to form the Ipswich River.

The entire MMB/SB WC has frequently been inundated. Water depths may reach over 3 feet and flow is generally negligible. The substrate in the MMB/SB WC is highly organic in nature with variable firmness. Along the eastern perimeter of the wetland complex (in the vicinity of the Maple Meadow Brook channel), some areas of very soft muck and silt are encountered, as well as areas with a firm, fibric substrate comprised of roots. Hydrogen sulfide odors have been noted in many parts of the MMB/SB WC.

Vegetation in the scrub-shrub swamp consists of a mixture of small saplings, shrubs, and herbaceous vegetation. Red maple (*Acer rubrum*) was common in the sapling layer. Shrubs common in the swamp include buttonbush (*Cephalanthus occidentalis*), speckled alder (*Alnus rugosa*), smooth alder (*Alnus. serrulata*), red-osier (*Cornus stolonifera*), silky dogwood (*Cornus amomum*), winterberry (*Ilex verticillata*), sweet pepperbush (*Clethra alnifolia*), and rose (*Rosa* sp.). Herbaceous vegetation observed in the swamp included sensitive fern (*Onoclea sensibilis*) and other ferns, purple loosestrife (*Lythrum salicaria*), tussock sedge (*Carex stricta*) and other sedges (*Carex* sp.), iris (*Iris* sp.), and mosses.

Floating and rooted aquatic vegetation in the MMB/SB WC include duckweed (*Lemna minor*), water smartweed (*Polyganum* sp.), pickerelweed (*Pontedaria cordata*), grasses, naiad (*Najas* sp.), and waterweed (*Elodea* sp.). Cattail (*Typha* sp.) has been observed along the edge of the wetland.

The forested wetlands bordering the MMB/SB WC consists of a mixture of trees, shrubs, vines, and herbaceous vegetation. The canopy is primarily dominated by deciduous species, including grey birch (*Betula populifolia*), black willow (*Salix nigra*), cherry (*Prunus* sp.), and red maple. At its borders, wetland vegetation transitions to communities more characteristic of upland communities dominated by oaks (*Quercus* sp.) and white pine (*Pinus strobus*) in the canopy layer,

and winterberry, cedar (*Juniperus* sp.) sweet fern (*Comptonia peregrina*), northern arrow-wood (*Viburnum recognitum*), and dogwood (*Cornus* sp.) in the shrub/sapling layer.

Benthic macroinvertebrates which have been observed in the MMB/SB WC include amphipods, chironomid midge larvae, snails, small freshwater clams, predacious diving beetles, backswimmers, freshwater oligochaetes, and dragonfly nymphs. It is expected that Maple Meadow Brook and Sawmill Brook also support populations of small fish and crayfish.

The MMB/SB WC likely provides suitable forage and refuge habitat for a variety of species, including aquatic and terrestrial invertebrates, reptiles, amphibians, mammals, songbirds, waterfowl, and wading birds. A white tailed deer (*Odocoilus virginianus*) was observed approaching the Maple Meadow Brook near the bridge abutment. In addition, beaver (*Castor canadensis*) gnaw marks were observed at the base of a tree. Birds heard or observed during the characterization include cardinal (*Cardinalis cardinalis*), white breasted nuthatch (*Sitta canadensis*), crow (*Corvus brachyrhyncos*), and red-tailed hawk (*Buteo jamaicensis*).

3.7.3 Threatened and Endangered Species

Consultations with the United States Fish and Wildlife Service (USFWS) have indicated that no federally-listed and proposed, endangered or threatened species are known to occur within the general vicinity of the site MACTEC, 2202b, Smith, 1997, and MACTEC, 2004i. The Mystic Valley Amphipod (*Crangonyx aberrans*) has historically been reported as occurring in a wetland near the Hall's Brook drainage; however this species was recently delisted by the Massachusetts Natural Heritage and Endangered Species Program.

4.0 NATURE AND EXTENT OF CONTAMINATION

4.1 OU1

OU1 comprises on-Property soil, surface water and sediment including On-Property West Ditch, on Property South Ditch, Ephemeral Drainage, and Central Pond. This section discusses the sources of contamination, the nature and distribution of contaminants in these media.

4.1.1 Sources

As discussed in section 2.0, potential contaminant source areas were identified and investigated and remedial actions were successfully implemented to eliminate, control, or mitigate those sources. For OU1, potential sources that have been the subject of remedial actions include the Plant B area, Drum Area A and Drum Area B, the Buried Debris Area, the former Lake Poly, Central Pond, and the on-Property DAPL area. Other potential source areas such as the East and West Pits, 3 Acid Pits located south of the East and West Warehouses and waste water treatment plant were was not remediated during Olin's 2000 remedial actions. This area was located within the footprint of the lined lagoons and the lined lagoons investigations concluded that no source control measures were required. This area is currently within the Containment Area. There are no known underground storage tanks at the Property that have not been closed in place.

Plant B remedial action included an AS/SVE system for trimethylpentenes in the VPH/EPH area, and LNAPL recovery. Removal actions were completed for Drum Area A and Drum Area B, the Buried Debris Area, and the former Lake Poly. The on-Property DAPL area has been isolated and contained by the Slurry Wall / Temporary Cap (the containment structure). The remedial actions that have been completed with respect to potential source areas makes it possible to discuss nature and extent of contamination in on-Property soil, surface water, and sediment in the context of the distribution of contaminants in those media considered as a whole.

4.1.2 Soils/Vadose Zone

Several remedial actions have been completed and those actions have removed impacted soils from the Property. The stockpiled soil that remains at the Property has been approved by MADEP for use as upland fill. The discussion of nature and extent of contamination is focused on current site

conditions, specifically excluding soils that have previously been removed from the Property and considering stockpiled soils as a separate topic. Table 4.1-1 identifies those samples and associated location identifiers that are no longer representative of site conditions because the associated soil has been excavated from that location. As previously discussed, Figure 2.1-3 identifies those soil sample locations where soils have been excavated since sample collection and analysis. The samples collected at those locations are no longer representative of current soil conditions at the Property. Soil sample locations that are representative of current on-Property surface soil and subsurface soil conditions are presented on Figure 2.1-4 and Figure 2.1-5 respectively. Soil samples representative of current on-Property conditions include all soil samples listed in Table 2.1-3 that are not identified as "Excavated" or "Background" in the RI Status Field. The following subsections discuss background conditions for soils and the nature and distribution of contaminants by chemical class for site surface soil and site subsurface soil respectively.

4.1.2.1 Background Conditions for Soil

Site-specific background conditions for soil were investigated prior to the 1997 Phase II Report. While that investigation focused on specific indicator parameters that were not addressed by the soil background section of the 1995 MADEP risk assessment guidance document concerning background soil concentrations of metals and inorganics in Massachusetts (MADEP, 1995), it also included many of the same parameters. To date, background soil conditions for VOCs, pesticides PCBs, and SVOCs other than PAHs were considered to be "not detected". The site-specific background investigation supplements the background information presented in the 1995 MADEP risk assessment guidance document. The soil background sample locations are shown on Figure 2.1-16. Table 4.1-2 presents a summary concerning soil background conditions for metals and inorganics and PAHs at the time of the 1997 Phase 2 Report and it also includes post-1997 updates to the MADEP's guidance with respect to soil background conditions in Massachusetts. The MADEP added background concentrations for PAHs in their 2002 document (MADEP, 2002a). The characterization of background soil conditions is therefore a combination of the MADEP's published background concentration (the default background concentration) and the maximum detected concentration among site-specific background soil samples for those chemical parameters that are not listed in the MADEP soil background document. A summary of the site-specific

background data was presented in Table 4-1 of the 1997 Phase 2 Report (Smith, 1997) and in Attachment 2 of Appendix R of that report.

In response to MADEP comments on the 1997 Phase 2 Report, five background soil samples (from previously sampled background locations) were collected for arsenic analysis in order to determine site-specific background soil conditions for arsenic. This information was used to evaluate whether arsenic concentrations in Site soils are consistent with site-specific background data. The Site arsenic soil data were also compared to the MADEP background data set (MADEP, 1995) for arsenic in soil at non-urban sample locations. A comparison of Site soil arsenic concentrations to the MADEP background data set and to the site-specific background data conducted concluded that on-Property surface and subsurface soil arsenic concentrations are not significantly different statistically from either the MADEP background data or the site-specific data set (HLA, 1999). In other words, the data indicated that the arsenic concentrations in soil were not associated with a release.

4.1.2.2 Site Surface Soil

The analytical results associated with on-Property surface soil sampling have been compiled and summarized. The discussion that follows summarizes the nature and extent of inorganics and metals, VOCs, SVOCs, pesticides and PCBs, and petroleum hydrocarbons in on-Property surface soil for current conditions. Table 4.1-3 identifies those surface soil and subsurface soil samples and associated sample location identifiers that represent current site conditions and are discussed in subsections that follow. Table 4.1-3 listed each sample, its sample date, the area from which it was collected, and the number of parameters analyzed within each analytical group. Figure 2.1-4 identifies the locations of surface soil samples that are representative of current site conditions. Table 4.1-4 presents summary statistics of surface soil (generally within 0-2 ft bgs) analytical data for compounds or elements that were detected in at least one surface soil sample. These data represent current conditions for OU1. The analytical data for detected analytes for all of these surface soil samples are presented in Table D.1-1 in Appendix D.

Figures 4.1-1 through 4.1-11 (surface soil) and Figures 4.1-12 through 4.1-20 (subsurface soil) present the distributions of concentrations of analytical parameters or groups of parameters that are

most frequently detected in surface soil and subsurface soil and/or that are of interest from a site investigation perspective. In those figures, one symbol (a yellow plus sign) typically identifies sample locations where the analyte concentration is consistent with background conditions or not detected and another symbol (a green circle) indicates the location of analyte concentrations above the background screening value. In these figures, the location identifier and the concentration are shown for each location. For individual analytes that do not have available background values or that are not typically associated with background conditions (such as BEHP, NDPA) and for groupings of analytes (such as total pesticides, total VOCs) that do not have available background values, the figures distinguish locations where the analyte is not detected (yellow plus sign) and where the analyte has been detected (green circle).

4.1.2.2.1 Inorganic and Metals

The presence and distribution of inorganics and metals in on-Property surface soil [including Lower South Ditch floodplain soils] and the representative nature of the data for current site conditions is discussed in the following paragraphs. As shown in Table 4.1-4, among inorganics and metals detected in surface soils, only arsenic and chromium had at least one reported concentration greater than the corresponding published MADEP natural soil background concentration and the Region IX Industrial Soil PRG (USEPA, 2004b). However, a July 1999 submittal to MADEP demonstrated that the distribution of arsenic concentrations in surface soil is consistent with Massachusetts background conditions rather than with a release of arsenic to soil. The comparison of maximum soil concentrations to Region IX Industrial PRGs in Table 4.1-4 is intended to provide context for this industrial property, not to include or exclude any analytical parameters from further study. Although the Site is located in USEPA's Region I, the Region IX PRGs have been selected to provide context because these PRGs are recommended for use in risk assessments conducted for Region I sites.

Region IX PRGs are not available for the following detected inorganics/metals: calcium, magnesium, mercury; potassium; sodium; chloride, ammonia, and sulfate. The maximum reported concentration of magnesium is lower than the corresponding MADEP natural soil background concentration. Natural background concentrations are not available from MADEP for the following detected inorganics and metals: calcium; hexavalent chromium; potassium; sodium;

chloride; ammonia; and sulfate. Because the 1995 MADEP background soil publication did not address several inorganics/metals that are indicator parameters for the Site, Olin developed background data sets for several inorganics/metals in soils. Those site-specific background data sets were presented in the 1997 Supplemental Phase II Report (Smith, 1997). The maximum reported concentrations of calcium, potassium, sodium, ammonia, and sulfate in Site surface soil were higher than the corresponding maximum site-specific soil background concentrations (Smith, 1997) but those concentrations cannot be compared to Region IX PRGs (no PRGs are available). Site-specific risk assessments have evaluated the concentrations of these soil constituents as discussed in Section 6 and in Appendix F.

Speciation of chromium can be an important factor in risk assessments due to the differences in toxicity among species. Investigations were conducted to determine speciation of chromium in surface soils at the Site including the former Lake Poly area. Hexavalent chromium concentrations in all samples collected for that purpose indicate that trivalent chromium is the predominant species in soils at the Facility. Hexavalent chromium was not detected at concentrations approaching or above the MADEP's threshold level of 200 mg/kg level for allergic contact dermatitis and were below the Region IX Industrial Soil PRG for hexavalent chromium of 64 mg/kg and the MADEP 2002 published background of 30 mg/kg. Forty one soil samples were collected and analyzed for both total chromium and hexavalent chromium to determine speciation of chromium in soil. Hexavalent chromium concentrations in all samples collected for that purpose indicate that trivalent chromium is the predominant species in soils at the Facility. Table 4.1-5 presents a comparison the total chromium and hexavalent chromium data for soil samples that were analyzed for both species. Detected concentrations of hexavalent chromium in soil samples ranged from 0.42 mg/kg to 28 mg/kg. The detected hexavalent chromium concentrations are below the 200 mg/kg level of concern for allergic contact dermatitis published by MADEP and the Region IX Industrial Soil PRG for hexavalent chromium of 64 mg/kg. The maximum detected concentration for hexavalent chromium is also less than the MADEP 2002 published background of 30 mg/kg.

In July 1999, the relationship between total chromium concentrations and reported hexavalent chromium concentrations for 8 surface soil and 8 subsurface soil samples collected from the former Lake Poly area were evaluated (HLA, 1999). A review of the pH and oxidation-reduction data for the 1998 soil samples from the Lake Poly area indicate that chromium in these soils would be

expected to be in the trivalent form and would be expected to be in insoluble Cr-Fe hydroxide or Cr hydroxide mineral forms. Electron microprobe analysis of sample SS101 provided confirmation evidence that chromium exists in the trivalent form in soil.

The Region IX Industrial Soil Preliminary Remediation Goal for total chromium is 450 mg/kg. It should be noted the Region IX PRG for total chromium assumes a 1:6 ratio of hexavalent chromium : trivalent chromium. The Region IX Industrial Soil PRG for trivalent chromium is 100,000 mg/kg while the PRG for hexavalent chromium is 64 mg/kg. As discussed above, sampling and analysis has demonstrated that trivalent chromium is by far the predominant form of chromium in Site soil. The Site data are not consistent with a 1:6 ratio of hexavalent:trivalent chromium. Therefore, the Region IX PRG for trivalent chromium (100,000 mg/kg) is a more appropriate value to use for evaluating total chromium results for soil at the Site.

Figure 4.1-1, presents the distribution of concentrations of total chromium in surface soil at the Property. Chromium concentrations are variable but are lower in the northern portion of the Facility than they are in the southern portion of the Facility, particularly in the Central Wetland Area and the floodplain of the Lower South Ditch. All total chromium concentrations in soil samples at the Site are below the trivalent chromium Region IX PRG Industrial Soil PRG. The total chromium concentrations in surface soil in the developed portion of the Property are generally below the Region IX Industrial/Commercial Preliminary Remediation Goal of 450 mg/kg (Figure 4.1-1).

Total chromium concentrations in surface soil in the floodplain immediately adjacent to the Lower South Ditch (downstream of the Property boundary and upstream of the East Ditch) are higher than the concentrations in surface soil throughout the remainder of the property. The area of chromium-impacted soil is limited to the floodplain area. This suggests that deposition of floc or other chromium-containing material may be associated with the elevated soil concentrations. Figure 4.1-2 shows the distribution of concentrations of sulfate in surface soil. Sulfate is distributed across the central portion of the Facility and in the Central Wetland Area. Figure 4.1-3 presents the distribution of ammonia nitrogen concentrations in surface soil.

4.1.2.2.2 VOCs

As shown in Table 4.1-4, 29 VOCs were detected in at least one surface soil sample. However, only formaldehyde, hydrazine, and methylene chloride were detected in at least 10% of the surface soil samples. Analytes with a frequency of detection of 10% or greater are specifically mentioned and those analytes that are prevalent compared to other analytes are generally discussed in greater detail. None of the detected VOCs in surface soil samples had any concentration greater than the corresponding Region IX Industrial Soil PRG. Region IX Industrial Soil PRGs are not available for the following detected VOC compounds: 1,2,3-trichlorobenzene; 2,4,4-trimethyl-1-pentene and 2,4,4-trimethyl-2-pentene; m,p-xylene; o-xylene; p-isopropyl toluene; and sec-butylbenzene. VOCs, including trimethylpentene compounds, were detected at frequencies less than 10% - in fact, they were actually detected at frequencies less than 5% in surface soil samples

As shown in Figure 4.1-4, trimethylpentenes were not detected in more than 90% of the surface soil samples. Di-isobutylene, a mixture of 2,4,4-trimethyl-1-pentene and 2,4,4-trimethyl-2-pentene, was a raw material in the production of Wytox ADP (also known as dioctyldiphenylamine). Trimethylpentenes were detected in the area of Lake Poly, SWMU-27, and near the former Plant D area. At the locations with detectable TMPs, total trimethylpentene concentrations ranged from 0.54 mg/kg to 15.4 mg/kg (LPB-10). Figure 4.1-5 shows the distribution of total VOCs concentrations in surface soils under current conditions. The VOCs are presented as a total fraction to convey their distribution since, with the exception of trimethylpentenes; VOCs are not a characteristic contaminant at the Olin Chemical Site.

4.1.2.2.3 SVOCs

Only benzo(b)fluoranthene, benzoic acid, BEHP, chrysene, di-n-butyl phthalate, fluoranthene, NDPA, phenanthrene, and pyrene were detected in at least 10% of surface soil samples. BEHP was detected most frequently among SVOCs (72.5%) in surface soil samples. Among SVOCs, only BEHP and benzo(a)pyrene were detected above the corresponding Region IX Industrial soil PRGs.

Figure 4.1-6 presents the distribution of BEHP concentrations in surface soil samples. Generally, low levels of residual BEHP (well below the Industrial Soil PRG of 120 mg/kg) are present in confirmatory surface soil samples from excavations of the on-Property West Ditch, South Ditch, Central Pond, Drum Areas A and B, and Lake Poly. BEHP is present at concentrations above the Region IX Industrial Soil PRG in only seven of the more than one hundred ten surface soil samples analyzed for that compound. These seven samples were all collected from soils beneath the South Ditch after excavation of sediments. Figure 4.1-7 presents the distribution of concentrations of NDPA in surface soil samples. NDPA was reported in surficial soil samples at a frequency much lower than that of BEHP and at concentrations substantially lower than those of BEHP (no concentrations above the Region IX Industrial Soil PRG of 350 mg/kg). . The low level residual NDPA in surface soil was detected, in confirmatory soil samples associated with former source areas and the excavated ditches. Figure 4.1-8 shows the distribution of concentrations of benzo(a)pyrene in surface soil samples. Benzo(a)pyrene was detected at low frequency and only one surface soil sample had a concentration greater than the published MADEP soil background concentration. Figure 4.1-9 shows the distribution of total PAH concentrations in surface soil samples. PAHs were detected sporadically throughout the Facility, with a somewhat higher frequency of detection in the Central Pond drainage area and the floodplain soils of the Lower South Ditch. Although NDMA was the subject of investigations in all environmental media, NDMA was not detected in any of the nine surface soil samples from the Facility that were tested specifically for NDMA. In fact, NDMA was not detected in any soil or sediment samples from the Site. NDMA is degraded biologically under aerobic conditions and persistence in soil, if present, would not be expected.

4.1.2.2.4 Pesticides and PCBs

As shown in Table 4.1-4, seventeen pesticides and only one Aroclor (Aroclor 1016) were detected in at least one surface soil sample. Seven pesticides including DDD, DDE, DDT, alpha-chlordane, gamma-BHC, gamma-chlordane, and hexachlorobenzene were detected in at least 10% of the surface soil samples. None of the pesticides were detected at concentrations greater than the corresponding Region IX Industrial soil PRGs. Region IX PRGs are not available for endosulfan I, endosulfan II, and endrin ketone. Each of these compounds was detected at low frequency and at concentrations less than 0.01 mg/kg. The information in Figure 4.1-10 indicates that pesticides were detected at low levels in the Facility surface soils, with the highest total pesticide

concentrations of less than 1 mg/kg. The highest total pesticide concentrations in surface soil were 0.768 mg/kg in a composite sample from Area 8. The distribution of total pesticide concentrations and their low concentrations indicates they are residuals from use rather than a release of pesticides from a manufacturing operation or a pesticide mixing or staging area. The only Arolcor detected, Aroclor-1016, was detected in only one surface soil sample at 0.98 mg/kg. PCBs and pesticides are not site-related contaminants of concern.

4.1.2.2.5 Petroleum Hydrocarbons

The hydrocarbons reported to be present are not related to petroleum sources. Table 4.1-4, shows three VPH fractions that were detected in one of six surface soil samples at concentrations well below MCP soil standards. The three EPH fractions were each detected in more than 10% of the surface soil samples analyzed for EPH. The VPH and EPH analytical parameters are specific to the MCP and therefore, there are no corresponding Region IX PRGs for those parameters. The total VPH concentration (the sum of concentrations of C5-C8 Aliphatics, C9-C12 Aliphatics, and C9-C10 Aromatics) detected in that one surface soil sample was 38 mg/kg. Total EPH concentrations (the sum of concentrations of C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) in surface soil samples ranged from 5.7 mg/kg to 13,000 mg/kg. The MCP soil standards for category S-2 soil (industrial/commercial) in non-drinking water areas for C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) are 2,500 mg/kg, 5,000 mg/kg, and 2,000 mg/kg respectively. Figure 4.1-11 presents the concentration data for total EPH fractions in surface soil. The information on that figure indicates that the EPH petroleum fractions in surface soil have been reported in the area of the former Lake Poly, adjacent to the Central Pond, and in the floodplain of the lower South Ditch.

4.1.2.2.6 Data Gap Assessment

A review of the available data characterizing current Site conditions provides information concerning the delineation of the nature and extent of contamination, the availability of data for conducting risk assessments, and the information necessary to evaluate the need for remedial activities and the evaluation of remedial alternatives. Based on a review of the sampling and

analytical information with respect to soil at OU1, no data gaps have been identified for surface soils.

Surface soils have been well characterized both in potential source areas as well as throughout the former Facility and other on-Property areas. The sample density is lower in the portion of the facility south of the South Ditch. This area was not part of the industrialized portion of the Facility and the only identified area, SWMU-33 (oil-stained soil) has been thoroughly investigated, and there is no other evidence of releases in that area. In addition, the area is subject to the terms of a Conservation Easement that restricts future development activities on the portion of the Property. The recent sampling and analysis of surface soils in the floodplain of the Lower South Ditch has focused on total chromium analysis. Characterization of concentrations of other site constituents would be appropriate to support future human health and ecological risk assessments for the Lower South Ditch floodplain soils. The soil sampling and analysis has focused on the former Facility Property with a limited investigation in the area of North Pond is the only exception. The available historical information indicates that manufacturing and waste disposal activities were limited to the Property and the potential for overland flow to surface soil on adjacent properties is limited by several physical features, including Eames Street to the north, the off Property West Ditch to the west, the elevated railroad line to the west, the South Ditch that intercepts overland flow to the south, and the East Ditch and railroad tracks immediately to the east of the Facility.

4.1.2.3 Site Subsurface Soil

The analytical results associated with OU1 subsurface soil sampling have been compiled and summarized. The discussion that follows summarizes the nature and extent of inorganics and metals, VOCs, SVOCs, pesticides and PCBs, and petroleum hydrocarbons in on-Property subsurface soil for current conditions. Table 4.1-1 identifies those surface soil and subsurface soil samples and associated sample location identifiers that represent current site conditions. These results are discussed in the following subsections. Figure 2.1-5 previously identified the locations of surface soil samples that are representative of current site conditions within OU1 and does not include samples that were excavated, or isolated within the Slurry Wall, or contained within the Calcium Sulfate Landfill. Table 4.1-6 presents a summary of subsurface soil (deeper than 2 ft bgs) analytical data for any compounds or elements that were detected in at least one subsurface soil

sample that is representative of current OU1 site conditions. The analytical data for detected analytes for all of these subsurface soil samples are presented in Table D.1-2 in Appendix D.

4.1.2.3.1 Inorganics and Metals

As shown in Table 4.1-6, among inorganics and metals detected in subsurface soils, only arsenic and total chromium had at least one reported concentration greater than the corresponding published MADEP natural soil background concentration and the Region IX Industrial Soil PRG. In Table 4.1-6, if the maximum reported concentration has a highlighted border, the maximum detected concentration is greater than the Industrial PRG or there is not an Industrial PRG available. If a background value has a highlighted border, the maximum detected concentration is higher than that background value. Arsenic concentrations ranged from less than 0.81 mg/kg to 89 mg/kg in subsurface soil samples. The mean subsurface soil arsenic concentration in 129 samples was 4.77 mg/kg. Only one of 119 subsurface soil samples had arsenic concentrations greater than the published MADEP arsenic concentration of 20 mg/kg (89 mg/kg at CP-C69). Moreover, a July 1999 submittal to MADEP demonstrated that the distribution of arsenic concentrations in subsurface soil was consistent with Massachusetts background conditions rather than with a release of arsenic to soil. Chromium concentrations in subsurface soil samples ranged from 3.5 mg/kg to 7, 900 mg/kg. Figure 4.1-12 (northern portion of Site), Figure 4.1-13 (central portion of Site), and Figure 4.1-14 (southern portion of Site) depict the distribution of total chromium concentrations in subsurface soil samples at the Property. Virtually all of the remaining subsurface soil sample locations with total chromium concentrations greater than the total chromium Region IX Industrial soil PRG of 450 mg/kg are located in the former Lake Poly area. As discussed previously, trivalent chromium is the predominant form of chromium in soil at the Site. The Site data are not consistent with a 1:6 ratio of hexavalent:trivalent chromium that is the basis of the region IX PRG for total chromium (for samples with detected hexavalent chromium, the ratio is typically more in the range of 1:20 to 1:100 as shown in Table 4.1-5. Therefore, the Region IX PRG for trivalent chromium (100,000 mg/kg) is a more appropriate value to use for evaluating total chromium results for soil at the Site. Concentrations of total chromium in all Site soil samples are below the Region IX PRG for trivalent chromium. Calcium, potassium, sodium, ammonia, and sulfate had at least one concentration in a subsurface soil sample that was above the site-specific soil background concentration, but no PRGs are available for those parameters. Magnesium, chloride, nitrate, and

urea were detected but neither a background concentration nor a PRG is available for those parameters.

4.1.2.3.2 VOCs

As shown in Table 4.1-6, 29 VOCs were detected in at least one subsurface soil sample. However, only seven compounds were detected in at least 10% of the subsurface soil samples: 2,4,4-trimethyl-1-pentene; 2,4,4-trimethyl-2-pentene; 2-butanone; 2-hexanone; acetone; formaldehyde; and toluene. Only one VOC, hydrazine, was detected at a concentration greater than the corresponding Region IX Industrial Soil PRG. Hydrazine was detected in only one of 30 subsurface soil samples. Region IX Industrial Soil PRGs are not available for five of the VOC compounds detected: 1,2,3-trichlorobenzene; 2,4,4-trimethyl-1-pentene; 2,4,4-trimethyl-2-pentene; 2-hexanone; and p-Isopropyl toluene. The TMPs are indicator compounds for the Facility and were detected in approximately 50% of the subsurface soil samples. The other three VOCs without Region IX soil PRGs were detected at lower frequency in subsurface soil.

As shown in Figure 4.1-15, trimethylpentenes were detected in subsurface soil samples in multiple locations at the Facility. Trimethylpentenes were detected in the area of Lake Poly, the area of the East Pit and West Pit, near the former Plant D Tank Farm Area, and at the former Plant B Production Area and Plant B Tank Farm Area. At the locations with detectable TMPs, total trimethylpentene concentrations ranged from 0.001 mg/kg to 750 mg/kg (location AS-7 prior to AS/SVE activities).

4.1.2.3.3 SVOCs

As shown in Table 4.1-6, 33 SVOCs were detected in at least one subsurface soil sample. However, only BEHP and NDPA were detected in at least 10% of subsurface soil samples which is consistent with plant operational history. The following SVOCs had at least one subsurface soil concentration greater than the corresponding Region IX Industrial Soil PRG: benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; BEHP; indeno(1,2,3-cd)pyrene; N-nitrosodipropylamine; and NDPA. The compound 4-chlorophenyl-phenylether was detected in only one of two hundred seventy four subsurface soil samples at a concentration of 0.17 mg/kg. No PRG is available for

this compound. Figures 4.1-16 and 4.1-17 depict the distributions of concentrations of BEHP and NDPA in subsurface soil samples. The distributions of di-n-butylphthalate and di-n-octylphthalate are similar to that of BEHP. NDMA was not detected in the thirty-five subsurface soil samples from the Facility that were tested for NDMA. Most of those samples were collected from the Lake Poly area.

4.1.2.3.4 Pesticides and PCBs

As shown in Table 4.1-6, nine pesticides were detected in at least one subsurface soil sample and no Aroclors were detected. All nine pesticides were detected in fewer than 10% of the subsurface soil samples that were analyzed for pesticides. None of the pesticides were detected at concentrations greater than the corresponding Region 9 Industrial Soil PRGs. Region IX PRGs are not available for endosulfan I, endosulfan II, and endrin ketone. Each of these compounds was detected in only one subsurface soil sample at trace levels. The information in Figure 4.1-18 indicates that pesticides were detected with very low frequency and at very low levels in the Facility subsurface soils, with the highest total pesticide concentrations of less than 1 mg/kg. The highest total pesticide concentration in subsurface soil was 0.335 mg/kg at sample location BH12. The distribution of total pesticide concentrations in subsurface soils is suggestive of residuals from use of pesticides for their intended use rather than a release of pesticides from a manufacturing operation. No PCBs were detected in subsurface soil samples. Fewer pesticides were detected in subsurface soil than in surface soil, and concentrations detected in subsurface soil were typically lower than in surface soil samples. PCBs and pesticides are not site-related contaminants of concern.

4.1.2.3.5 Petroleum Hydrocarbons

The hydrocarbons reported to be present are not related to petroleum sources.. As shown in Table 4.1-6, the three VPH fractions and the three EPH fractions were each detected in more than 10% of the subsurface soil samples analyzed for those parameters. The total detected VPH concentrations (the sum of concentrations of C5-C8 Aliphatics, C9-C12 Aliphatics, and C9-C10 Aromatics) in subsurface soil samples ranged from 3.2mg/kg to 1,100 mg/kg (location SVE-16 was sampled and analyzed prior to AS/SVE activities). Figure 4.1-19 depicts the distribution of concentrations of total VPH fractions in subsurface soil. VPH analysis has primarily been focused on areas of known

or suspected releases of petroleum based hydrocarbons (or trimethylpentenes) such as the former Plant B production area and the former Lake Poly disposal area. The VPH concentrations depicted in the former Plant B production area on Figure 4.1-19 are indicative of conditions prior to the completion of the successful air sparge/ soil vapor extraction remedial activities in the area referred to as the EPH/VPH portion of the former Plant B Production Area. This area was the location of a historical release of trimethylpentenes which are detected as a component of the VPH analysis. The two trimethylpentene compounds are C8 Aliphatic compounds that are identified and quantified by the C5-C8 Aliphatic fraction of the VPH analysis.

The AS/SVE system in the VPH/EPH area operated from 2001 to 2006 and successfully removed more than 2,035 pounds of VOCs (primarily trimethylpentenes) from the subsurface. The rate of mass removal of TMPs had diminished to de minimis levels and operation of that portion of the AS/SVE system was discontinued in 2006. MADEP issued a conditional approval of the Modification to the IRA Plan for Plant B which called for the discontinuance of the operation and the dismantling of that portion of the AS/SVE system. The substantial mass removal by the AS/SVE system and the subsequent reduction in TMPs removal rate was considered a demonstration that TMP concentrations (and C5-C8 Aliphatic VPH concentrations) in subsurface soil had been reduced to minimal levels. Post-AS/SVE system operation soil sampling and analysis was not conducted in this area due to the final low removal rates. Therefore, the VPH data for the EPH/VPH area of the former Plant B Production Area depicted on Figure 4.1-19 overestimate the contaminant concentrations for current subsurface soil conditions.

Total detected EPH concentrations (the sum of concentrations of C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) in subsurface soil samples ranged from 5.2 mg/kg to 3,800 mg/kg (location LPB-10). The MCP soil standards for category S-2 soil (industrial/commercial) in non-drinking water areas for C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) are 2,500 mg/kg, 5,000 mg/kg, and 2,000 mg/kg respectively. Only one sample had a total EPH concentration greater than 2,000 mg/kg (location LPB-10 in former Lake Poly Area). Figure 4.1-20 depicts the concentration data for total EPH fractions in subsurface soil. The information on that figure indicates that the EPH petroleum fractions in subsurface soil are located in the area of Plant B, former Lake Poly, and Central Pond.

4.1.2.3.6 Data Gap Assessment

A review of the available data characterizing current Site conditions provides information concerning the delineation of the nature and extent of contamination, the availability of data for conducting risk assessments, and the information necessary to evaluate the need for remedial activities and the evaluation of remedial alternatives. Based on a review of the sampling and analytical information with respect to soil at OU1, data gaps have been identified as shown below.

- Based on the final Site redevelopment plan, certain buildings and foundations will be removed from the Site. Since characterization of subsurface soils beneath these structures has not been conducted (except as noted below), characterization of soils at these structures planned for removal is recommended. Investigations have been conducted within the East and West Warehouses and the Plant B Production Area, and data collected do not indicate further investigation is warranted. Proposed development would increase soil cover over the warehouse foundation areas, further limiting access to existing subsurface soil. Building foundations left in place will prevent access to site soil and would be covered by land use restrictions and would not be investigated. Furthermore, groundwater analytical data from wells located downgradient of and in vicinity of Plant A and Plant C foundations do not indicate these areas as sources of groundwater contaminants.
- Post-remedial subsurface soil confirmatory sampling and analysis in the EPH/VPH area west of Plant B to confirm the effectiveness of the previous remedial activities in that area.

4.1.3 Surface Water

The discussion of nature and extent of contamination in surface water is focused on current conditions. The following subsections discuss the nature and distribution of contaminants by chemical class for on-Property surface water. Historically, two ditches were located on the property—the on-Property West Ditch and the South Ditch, as well as the Ephemeral Drainage area (which is not a clearly defined ditch). As described in Section 2.1.4, in 2000, the on-Property West Ditch was remediated, backfilled and replaced with a concrete culvert. No current surface water samples are associated with this historical ditch. Discussions of on-Property surface water are limited to the South Ditch and Ephemeral Drainage areas.

The analytical results associated with on-Property surface water sampling have been compiled and summarized.

As described in Section 2.1.4, there were two surface water accidental release incidents associated with the remedial efforts in the South Ditch. The surface water samples that were collected to monitor the effects of those incidents are excluded from the analysis of nature and extent of contamination, since they do not represent current conditions. The samples that are not representative of current conditions are listed in Table 4.1-7.

The discussion that follows summarizes the nature and extent of inorganics and metals, VOCs, SVOCs, pesticides and PCBs, and petroleum hydrocarbons in on-Property surface water for current conditions. Table 4.1-8 identifies those samples and associated sample location identifiers that represent current site conditions and which are the focus of the following discussions. The locations of all surface water samples are identified on Figure 2.1-7. A summary of on-Property surface water analytical data representative of current conditions is presents in Table 4.1-9. All of the surface water data collected since July 2000 can be viewed in Appendix C.3-1. The data for the surface water samples summarized in Table 4.1-9 are presented in Appendix D.1-3.

4.1.3.1 Background Conditions for Surface Water

Site-specific background conditions for surface water were investigated prior to the 1997 Supplemental Phase II Report (Smith, 1997). One sample (SDREF-012), included in this dataset, was collected in January 1997, and was not included in the original background dataset evaluated as part of the 1997 Supplemental Phase II. That sample was collected from a "background" location as a reference sample to support ecological risk assessments. Background conditions for VOCs, SVOCs, pesticides, and PCBs in surface water are considered to be "not detected". The surface water background conditions are presented in Table 4.1-10 and sample locations were presented previously on Figure 2.1-15.

4.1.3.2 South Ditch and Ephemeral Drainage Areas

The South Ditch and Ephemeral Drainage areas include the entire length of the South Ditch, between the off-Property West Ditch and the East Ditch, and the wetland area south that includes the Ephemeral Drainage. Surface water in this area has been sampled since the 1970's for various studies as discussed in Section 2.1.4. Due to the mobile nature of surface water, only the surface

water sampling conducted since July 2000 is considered to reflect current conditions at the site. Even though the flowing surface water is transient in nature, data collected since 2000 are considered here because the use of data from the seven year period provides the full suite of analytical parameters and is in large part reflective of the groundwater/surface water interaction that has an influence on surface water quality in the South Ditch. These data are summarized in the following subsections.

4.1.3.2.1 Inorganics and Metals

The nature and distribution of inorganics and metals in on-Property surface water and the representativeness of the data for current site conditions is discussed in the following paragraphs. In Table 4.1-9, the surface water background concentration is bolded and bordered for any analyte detected in on-Property surface water with maximum detected concentration greater than the maximum background concentration.

As shown in Table 4.1-9, among inorganics detected in surface water, chloride, ammonia and sulfate were detected at concentrations greater than the maximum detected background concentration. The analytes are characteristic of the liquid waste disposed at the Facility.

The distribution of chloride in surface water samples is shown on Figure 4.1-21. The concentrations shown on all distribution figures represent arithmetic mean concentrations. Chloride was detected throughout the length of the South Ditch at relatively consistent concentrations. The lowest concentrations of chloride were detected in the Ephemeral Drainage near the confluence with the South Ditch.

As will be discussed in greater detail in Section 5.4, which concerns the interaction of groundwater and surface water, this uniform, distribution is characteristic for South Ditch for those contaminants that migrate in a conservative manner. To summarize, the South Ditch receives groundwater discharge within the first several hundred feet down stream of the weir (see Figure 1.3-1 and 2.1-7). Beyond that point, almost to the confluence of Ephemeral Ditch, the South Ditch is neither typically a gaining nor losing stream. Just prior to the property boundary, South Ditch becomes a gaining stream in proximity to the outlet from the Central Wetland. Groundwater discharge of

dissolved inorganics and metals in the upper reach of South Ditch is not appreciably diluted by additional groundwater discharge downstream and analytes concentrations along on-Property South Ditch tend to be fairly uniform.

The distribution of ammonia in surface water samples is shown on Figure 4.1-22. The ammonia data also suggest inputs of ammonia to the South Ditch near the weir structure. Ammonia was detected throughout the length of the South Ditch. In general, lower concentrations of ammonia were detected near the confluence of the Ephemeral Drainage with the South Ditch, which should be a function of dilution from additional groundwater discharge in this area.

The distribution of sulfate in surface water samples is shown on Figure 4.1-23. Sulfate was detected throughout the length of the South Ditch. In general, lower concentrations of sulfate were detected upstream of the weir and near the confluence of the Ephemeral Drainage with the South Ditch. The data indicate impacts of sulfate in the upper portion of the South Ditch as indicated above.

As shown in Table 4.1-9, among metals detected in surface water, total beryllium, total calcium, total chromium and total sodium were detected at concentrations greater than the maximum detected background concentration in at least one sample. There are no Massachusetts state surface water background concentrations and no federal regulatory standards for surface water available.

Total beryllium was detected at only one surface water sample location (NP-2) on July 20, 2000. Beryllium is not considered to be a site related analyte. Beryllium was not detected in filtered surface water.

The distribution of total calcium in surface water samples is shown on Figure 4.1-24. Calcium was detected throughout at locations the South Ditch sampling locations at relatively consistent concentrations. The lowest concentrations were detected at sampling locations closest to the weir. The calcium concentration in filtered surface water was only analyzed for at one location (NP-2) and was detected at 31 mg/L.

The distribution of total chromium in surface water samples is shown on Figure 4.1-25. Total chromium was detected at locations throughout the South Ditch. In general, the concentrations of total chromium detected in the upper portion of the South Ditch were greater than the concentrations detected further downstream of the Central Pond area. Chromium is removed from surface water by formation of a Al-Fe-Cr sulfate (Redingtonite) flocculent and a Al-Cr hydroxide flocculent (Gibbsite). Thus dissolved chromium concentrations in surface water should decline with downstream migration.

The distribution of chromium in filtered surface water samples is shown on Figure 4.1-26. The lowest concentrations of filtered chromium were detected upstream of the weir and downstream of the delta area. Once again, higher concentrations of chromium were detected in the upper portion of the South Ditch, indicating groundwater impacts in that area.

The distribution of total sodium in surface water samples is shown on Figure 4.1-27. Sodium was detected at locations throughout the South Ditch at relatively consistent concentrations. The lowest concentration of sodium was detected in the Ephemeral Drainage near the confluence with the South Ditch.

The distribution of sodium in filtered surface water is shown on Figure 4.1-28. The detected concentration of sodium in filtered surface water was relatively consistent throughout the length of the South Ditch. The lowest concentration of sodium in filtered surface water was detected in the Ephemeral Drainage near the confluence with the South Ditch.

4.1.3.2.2 VOCs

There were no detections of VOCs in the on-Property surface water samples considered in this analysis. VOC analysis of recent surface water samples has been limited to three samples, due to the low concern of VOC impacts to surface water given the nature of historical releases from the Facility.

4.1.3.2.3 SVOCs

As shown in Table 4.1-9, two SVOCs were detected in on-Property surface water: BEHP and NDMA. BEHP was detected in eleven of twenty samples and NDMA was detected in each of the three surface water samples for which it was analyzed.

The distribution of BEHP is shown on Figure 4.1-29. BEHP was only detected at locations downstream of the Delta in the South Ditch. BEHP was consistently detected at sample location NP-1, but was only detected at ISCO2 during the May 23, 2001, sampling event.

NDMA was analyzed for and detected on the July 10, 2003, sampling event at three locations. The detected concentration at ISCO1 was 0.0000057 mg/L, at SD-17 was 0.00021 mg/L and at ISCO2 was 0.000042 mg/L.

4.1.3.2.4 Pesticides and PCBs

There were no detections of pesticides or PCBs in on-Property surface water samples. Pesticides and PCB analysis of surface water samples has been limited to three samples considered in this analysis due to the low concern of pesticide and PCB impacts to surface water given the nature of historical releases from the Facility.

4.1.3.2.4 Herbicides

There were no detections of herbicides in on-Property surface water samples. Herbicide analysis of surface water samples has been limited to three samples considered in this analysis for the same reasons.

4.1.3.2.6 Petroleum Hydrocarbons

There were no detections of petroleum hydrocarbons in on-Property surface water samples. Petroleum hydrocarbon analysis of surface water samples has also been limited to three samples considered in this analysis.

4.1.3.2.7 Data Gap Assessment

Much of the surface water sampling and analysis for OU1 in recent years has focused on the Site groundwater indicator parameters and constituents of floc (chloride, ammonia, sulfate, aluminum, chromium, iron and sodium) that are characteristic of historical releases to groundwater because groundwater discharge contributes to surface water quality in the South Ditch. The PCMP program has gathered a substantial body of information concerning the groundwater/surface water interaction for the South Ditch area.

Three surface water samples were analyzed for NDMA in 2003. This compound is a groundwater indicator parameter. At the low concentrations detected NDMA does not pose a risk to human health and ecological receptors as discussed in Section 6.0.

The downstream extent of contamination in surface water has been investigated during East Ditch/New Boston Street Drainway sampling events since the South Ditch surface water flows into the East Ditch. The results of those investigations are discussed in Section 4.2 (OU2).

4.1.4 Sediments

Several remedial actions have been completed to remove impacted on-Property sediments. The discussion of nature and extent of contamination is focused on current site conditions, specifically excluding sediments that have previously been removed from the site. Samples and associated location identifiers that are no longer representative of site conditions because the associated sediment has been excavated from that location are identified in Table 4.1-11. Locations where sediments have previously been excavated are shown in Figure 2.1-10. The following subsections discuss the nature and distribution of contaminants by chemical class for on-Property sediment.

The analytical results associated with on-Property sediment sample locations have been compiled and summarized. Sample locations have been identified that do not have known coordinates and these locations are presented in Table 4.1-12 and are not summarized with other sediment data. The discussion that follows summarizes the nature and extent of inorganics and metals, VOCs,

SVOCs, pesticides and PCBs, and petroleum hydrocarbons detected in on-Property sediment for current conditions, including confirmatory sampling conducted in sediment in the West Ditch Wetland area and the Buried Debris area. Table 4.1-13 identifies those samples and associated sample location identifiers that represent current site conditions and which are the focus of the following discussions. The locations of sediment samples that are representative of current site conditions are identified on Figure 2.1-11. Table 4.1-14 presents a summary of all sediment analytical data for current OU1 conditions. The data corresponding to the summary table are contained in Appendix D.1.4.

4.1.4.1 Background Conditions for Sediment

Site-specific background conditions for sediment were investigated prior to the 1997 Supplemental Phase II Report (Smith, 1997). One sample that represents background conditions (SDREF-012) was collected in January 1997 and was not included in the original background dataset evaluated as part of the 1997 Supplemental Phase II. That sample had been collected, at an off-Property location, specifically as a reference location sample to support toxicity testing of sediment samples. Background conditions for VOCs, SVOCs, pesticides and PCBs were considered to be "not detected". The sediment background conditions are presented in Table 4.1-15 and shown on Figure 2.1-15. Attachment 3 of Appendix R of the 1997 Supplemental Phase II Report (Smith, 1977) thoroughly discusses the sediment background characterization.

4.1.4.2 West Ditch Wetland Area

The West Ditch Wetland area includes the West Ditch Wetland and the Buried Debris area. It is located on the western side of the Property, west of the Former Lake Poly, and north of the Slurry Wall containment area. This area was excavated in September and October 2000, with additional excavations conducted in May 2001. The confirmatory sediment samples in this area were collected from the sediment or peat layer, and the analytical results for those samples are discussed in the following subsections. Table 4.1-16 presents summary statistics for analytes detected in sediment collected from the West Ditch Wetland Area. The data corresponding to the summary table are contained in Appendix D.1.5.

4.1.4.2.1 Inorganics and Metals

The presence and distribution of inorganics and metals in on-Property sediment in the West Ditch Wetland area and the representativeness of the data for current site conditions is discussed in the following paragraphs. The area was remediated to remove chromium and phthalates, and therefore only chromium is discussed in this section. As shown in Table 4.1-16, among inorganics and metals detected in sediment, chromium and sodium were detected at concentrations greater than the maximum detected background concentration. Sodium was detected at only one of two sample location. The detected concentration at RSD-02 was 3200 mg/kg. There are no federal or Massachusetts state sediment background concentrations and no federal or state regulatory standards for sediment.

Chromium (a natural constituent of sediment) was detected in 75 percent of sediment samples in the West Ditch Wetland area. The arithmetic mean chromium concentration in sediments in the area is 36.3 mg/kg with the range of not detected to 410 mg/kg. Chromium is detected in the wetland area with the higher concentrations found in the eastern portion of the area (Figure 4.1-30). On Figure 4.1-30, West Ditch Wetland samples are designated with the "WDW" Prefix. The West Ditch Wetland area is located in the upper left quadrant of Figure 4.1-30. When the chemical concentration distribution figures present data for locations with multiple samples, the concentration presented is the arithmetic mean of the concentrations from all samples at that location. The number of samples and their distribution provide adequate aerial coverage for characterization of existing conditions in the area.

4.1.4.2.2 VOCs

As shown in Table 4.1-16, eight VOCs were detected in at least one West Ditch Wetland sediment sample. However, only 2,4,4-trimethyl-1-pentene, 2,4,4-trimethyl-2-pentene and methylene chloride were detected in at least 10 percent of the sediment samples.

Both 2,4,4-trimethyl-1-pentene and 2,4,4-trimethyl-2-pentene were detected in two of ten confirmation samples collected in the West Ditch Wetland area and analyzed for these compounds

(Figure 4.1-31 and Figure 4.1-32). Both TMPs were detected at the same two sample locations, at low concentrations, on the eastern boundary of the wetland area.

Methylene chloride was detected in three of twenty-two samples, at low concentrations, from locations in the West Ditch Wetland area. As shown on Figure 4.1-33, the detections were in confirmation samples at the eastern perimeter of the wetland area.

4.1.4.2.3 SVOCs

As shown in Table 4.1-16, seven SVOCs were detected in West Ditch Wetland sediment. However, only BEHP was detected in greater than 10 percent of the sediment samples.

The distribution of BEHP concentrations is shown on Figure 4.1-34. BEHP was detected in 53 percent of the sediment samples throughout the West Ditch Wetland area, with higher concentrations detected in confirmation samples along the eastern and southern edges of the wetland area. Concentrations ranged from not detected to 871 mg/kg, with an arithmetic mean concentration of 26.9 mg/kg.

4.1.4.2.4 Pesticides

There were no detections of pesticides in sediment sampled in the West Ditch Wetland area. Eight confirmation samples were collected in the area and analyzed for pesticides.

4.1.4.2.5 Petroleum Hydrocarbons

Sediment samples representative of current conditions in the West Ditch Wetland area were not analyzed for petroleum hydrocarbons as they are not considered characteristic of the contaminants historically released at the Facility

4.1.4.2.6 Data Gap Assessment

The extent of chromium and phthalates remaining after excavation within the full extent of sediment in the West Ditch Wetland area is fully delineated. With respect to chromium and phthalate distribution, for which the removal action was conducted, there remain no data gaps.

4.1.4.3 Upper South Ditch Area

The Upper South Ditch area includes the South Ditch from the point of confluence with the off-Property West Ditch to the Delta and the Central Pond. Site features are shown on Figure 1.3-1. The sediment in this area was excavated in September 2000. Additional removal actions were conducted in October 2000 and May 2001. The Upper South Ditch sediments were completely excavated until native mineral soil was observed in the bottom and sides of the excavation. Since there was no remaining sediment, extensive confirmatory sampling was conducted from the mineral soil at the bottom and sides of the excavation. The analytical data for these confirmatory soil samples is discussed with soils in Section 4.1.2 and shown on Figure 2.1-1. Additional detail concerning sediment excavations is presented in Section 2.4.1.

Annual sediment sampling has been conducted in the Upper South Ditch area as part of the PCMP to assess potential recontamination of sediments from discharging groundwater and floc. The annual sediment samples in the Upper South Ditch are collected at locations SD-SD2 through SD-SD5. At these locations, sediment samples are collected at two depths—surficial sediment (top 4 inches) and from a depth just below the surface (4 inches to 12 inches or 18 inches) and analyzed for metals that comprise the floc. The results of these sampling events are described in the following subsections.

Table 4.1-17 presents summary statistics for analytes detected in sediment collected from the Upper South Ditch. The data corresponding to the summary table are contained in Appendix D.1.6.

4.1.4.3.1 Inorganics and Metals

The presence and distribution of inorganics and metals in Upper South Ditch sediment and the representative nature of the data for current site conditions is discussed in the following paragraphs. As shown in Table 4.1-17, among inorganics and metals detected in sediment, aluminum, chromium, iron and zinc were detected at concentrations greater than the maximum detected background concentration in at least one sample from this area. There are no federal or Massachusetts state sediment background concentrations and no federal or state regulatory standards for sediment available.

The post-remedial distribution of chromium in the Upper South Ditch is shown on Figure 4.1-30. Chromium was detected throughout the Upper South Ditch, and the detected concentrations ranged between 15 mg/kg and 4200 mg/kg. Most of the chromium concentrations above the maximum sediment background concentration are from samples located within the stream channel. The maximum concentration detected was from sample location SD-SD2 in 2004, and the chromium concentration at that location was equal to background the following year. The 2004 sample with the maximum detected concentration of chromium was also elevated in aluminum and iron, suggesting that the sample incorporated some floc material.

The distribution of aluminum in the Upper South Ditch is shown on Figure 4.1-35. The detected concentration of aluminum exceeded the maximum background concentration at only one sampling location (SD-SD2) during only the August 2004 sampling event. As noted previously, it is interpreted that this sample likely contained some floc, and is not representative of in-place sediment conditions.

The distribution of iron in the Upper South Ditch is shown on Figure 4.1-36. Iron was detected throughout the Upper South Ditch at concentrations between 6570 mg/kg and 92,000 mg/kg. Concentrations in two samples, one from SD-SD2 and one from SD-SD3 were above the maximum background concentration (34,100 mg/kg). Since the distribution figures present average concentrations, individual detected concentrations are not posted on the figure for sample location with multiple detected concentrations. As noted previously, elevated concentrations of iron in

sediment samples are likely representative of the presence of floc material in the Upper South Ditch.

The distribution of zinc in the Upper South Ditch sediment is shown on Figure 4.1-37. Zinc was detected throughout the Upper South Ditch. The detected concentration of zinc exceeded the maximum background concentration at only one sampling location (SD-SD2 between 0-0.25 ft bgs) during the June 2003 sampling event.

Based on data collected to date there is no evidence of an increasing concentration trend for metals in sediment.

4.1.4.3.2 VOCs

The annual Upper South Ditch sediment samples were not analyzed for VOCs because there is no indication that recontamination of sediments by VOCs is likely.

4.1.4.3.3 SVOCs

The annual Upper South Ditch sediment samples have been analyzed for only one SVOC (NDMA). There were no detections of NDMA in the sediment samples collected from the Upper South Ditch sediment or in any other sediment samples collected at the Site.

4.1.4.3.4 Pesticides and PCBs

The annual Upper South Ditch sediment samples were not analyzed for pesticides and PCBs because there is no indication that recontamination of sediments by pesticides and PCBs is likely.

4.1.4.3.5 Petroleum Hydrocarbons

The annual Upper South Ditch sediment samples were not analyzed for petroleum hydrocarbons because there is no indication that recontamination of sediments by petroleum hydrocarbons is likely.

4.1.4.3.6 Data Gap Assessment

The Upper South Ditch has been remediated and on-going sampling of sediment has occurred annually under the PCMP which is being continued in accordance with the IRSWP. The number of sediment samples collected in the Upper South Ditch is not a data gap but rather is representative of post-remediation sediment conditions.

Data for metals collected to date for sediment do not indicate an increasing trend in metals concentrations in sediment. Based on recent remedial actions and ongoing monitoring results, there are no data gaps for the Upper South Ditch Sediment.

4.1.4.4 Lower South Ditch and Ephemeral Drainage Area

The Lower South Ditch is the area between the Delta (Figure 1.3-1) and the East Ditch. This area was not remediated as part of the 2000 C-RAM. Although part of the Lower South Ditch is located off-Property, the entire South Ditch is discussed here for continuity and completion of discussions on the South Ditch. The Ephemeral Drainage area is the low-lying area to the south of the South Ditch that drains to the South Ditch.

Sediment in the Lower South Ditch and surrounding wetlands has been sampled, and the results of the sampling efforts since 1997 are discussed in the following subsections. These include results associated with sample locations SDC-1 through SDC-8, BS011, BS030, BS031, BS032 and SD-SD5. On the concentration distribution figures discussed below, for sediment samples SDC-1 through SDC-8, the concentrations shown for a given location are the arithmetic average concentration for samples collected at two depths. Sediments samples collected in the Ephemeral Drainage area include sample locations RSD-09 through RSD-13.

Downstream of the Lower South Ditch, delineation of the extent of sediment contamination continued with investigations in the East Ditch and New Boston Street Drainway. The results of those investigations are presented in Section 4.2 (OU2).

Table 4.1-18 presents summary statistics for analytes detected in sediment collected from the Lower South Ditch and Ephemeral Drainage area. The data corresponding to the summary table are contained in Appendix D.1.7

4.1.4.4.1 Inorganics and metals

The presence and distribution of inorganics and metals in on-Property sediment in the Lower South Ditch and Ephemeral Drainage area and the representativeness of the data for current site conditions is discussed in the following paragraphs. As shown in Table 4.1-18, among inorganics and metals detected in sediment, chromium, hexavalent chromium, iron, mercury and vanadium were detected at concentrations greater than the maximum detected background concentration. There are no federal or Massachusetts state sediment background concentrations and no federal or state regulatory standards for sediment available.

The distribution of chromium concentrations in sediment samples from the Lower South Ditch and Ephemeral Drainage area is shown on Figure 4.1-30. Chromium concentrations in sediment samples from the Ephemeral Drainage (range of 1.7 mg/kg to 400 mg/kg) indicate little or no site impact. The Lower South Ditch sediment samples have chromium concentrations, ranging from 140 mg/kg (at SDC-7, deep sample) to 10,000 mg/kg (at SDC-2, shallow sample), that are indicative of historical releases to the ditch system.

The distribution of hexavalent chromium concentrations in sediment samples from the Lower South Ditch is shown on Figure 4.1-38. Hexavalent chromium was detected in 32 percent of nineteen sediment samples analyzed for that parameter. Hexavalent chromium concentrations in lower South Ditch sediment samples ranged from not detected to only 13.8 mg/kg. These low concentrations are not indicative of a substantial release of hexavalent chromium. The highest detected concentration (95 mg/kg) was reported at sampling location RSD-10 in the Ephemeral Drainage area.

The distribution of iron concentrations in the Lower South Ditch area sediment samples is shown on Figure 4.1-36. Iron was detected in all eleven samples collected in this area. Only one sample location (RSD-14 sampled on 1/19/2000) had a detected iron concentration greater than the

background concentration. Detected concentrations ranged between 210 mg/kg and 35000 mg/kg; the highest detected concentrations of iron were detected in the Ephemeral Drainage area.

4.1.4.4.2 VOCs

As shown in Table 4.1-18, four VOCs were detected in Lower South Ditch sediment samples. However, only 2,4,4-trimethyl-1-pentene was detected in at least 10 percent of the sediment samples.

The distribution of 2,4,4-trimethyl-1-pentene is shown on Figure 4.1-31. Four samples out of twenty-two samples had trace levels of 2,4,4-trimethyl-1-pentene. Detected concentrations ranged from 0.1 mg/kg to 1.4 mg/kg.

4.1.4.4.3 SVOCs

As shown in Table 4.1-18, four SVOCs were detected in Lower South Ditch sediment samples, but only BEHP was reported in more than 10 percent of the sediment samples. Reporting limits for all SVOCs were elevated due to high moisture content of the samples.

The distribution of detected BEHP concentrations (average concentration at each location) in sediment samples in the Lower South Ditch is shown on Figure 4.1-34. The concentrations of BEHP in the Lower South Ditch sediment samples reported in Table 4.1-18 ranged from 0.26 mg/kg to 24,827 mg/kg, with the maximum detected concentration at the deep sample collected at SDC-3. BEHP was detected in only one sediment sample from the Ephemeral Drainage area, at location RSD-10 (0.98 mg/kg).

No PAHs were detected in the sediment samples collected in September 2001 (locations SDC-1 through SDC-8, two depths at all locations). However, due to high moisture content of the sediment samples, reporting limits for SVOCs were high, and the SVOC data from those samples are not suitable for determining nature and extent of analytes that were not detected. As shown in Table 4.1-18, PAH (SIMM) analysis was conducted for three samples collected in 2005 from this area. Several PAHs were detected using this analytical method, and four of the compounds had

maximum reported concentrations greater than corresponding maximum background concentrations: benzo(a)pyrene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene and pyrene. The reported concentrations of individual compounds were typically less than 1 mg/kg.

4.1.4.4.4 Pesticides and PCBs

As shown in Table 4.1-18, pesticide/PCB analysis was conducted on four samples collected from this area. Three pesticides were detected in these samples: 4,4'-DDT, heptachlor and hexachlorobenzene. Each pesticide was detected at only one sample location at concentrations less than 0.1 mg/kg. The distribution and concentration of pesticides is suggestive of residuals from historical uses of pesticides for their intended use rather than a release of pesticides from a manufacturing operation.

4.1.4.4.5 Petroleum Hydrocarbons

As shown in Table 4.1-18, three EPH fractions were detected in Lower South Ditch sediment samples (locations SDC-1 through SDC-8). The total EPH concentration (the sum of concentrations of C11-C22 Aromatics, C19-C36 Aliphatics and C9-C18 Aliphatics) ranged between 110 mg/kg and 39,000 mg/kg in on-Property sediment samples. Chrysene, fluoranthene and indeno(1,2,3-cd)pyrene were detected using the MADEP EPH analytical detection method.

The distribution of total EPH in the Lower South Ditch area is shown on Figure 4.1-39. The concentrations presented in this figure represent the arithmetic average of concentrations in surficial sediment (top 4 inches) and from a depth just below the surface (4 inches to 12 inches or 18 inches). EPH fractions were detected in all fifteen samples from the Lower South Ditch that were analyzed for EPH. No samples collected from the Ephemeral Drainage area were analyzed for EPH fractions.

4.1.4.4.6 Data Gap Assessment

The concentrations of site-related contaminants in sediments (particularly chromium and BEHP), in the unremediated lower South Ditch have been evaluated in human health and ecological risk

assessments. The distribution of sediment samples over the small area defined as the Lower South Ditch are adequate to determine whether existing concentrations pose a risk to site receptors. Based on the data requirements for a Feasibility Study, the nature and distribution of chromium and BEHP in sediment are adequately delineated. Throughout the Lower South Ditch, sediment samples were collected from the channel of the narrow ditch and bank soil samples were collected from both sides of the narrow stream. The lateral limits of the stream sediments have been defined by the presence of soil (rather than sediment) on the upland banks of the ditch.

In the comprehensive sediment sampling and analysis program of 2001, reporting limits in fifteen sediment samples from the Lower South Ditch were elevated due to high moisture content. Very few SVOCs were detected, but reporting limits for the non-detects were above typical sediment screening values. This represents some uncertainty with respect to nature and extent. However, PAHs are not characteristic of sediments in the Upper South Ditch, and the uncertainty in that Lower South Ditch data is not a substantial concern. The ecological risk assessment relied primarily on sediment toxicity testing (frog embryo) and associated population modeling as well as food chain modeling using measured biological tissue data as inputs to assess the ecological risk for aquatic life in the ditches. These measures of ecological risk make the uncertainty in measured sediment concentrations of lesser concern. Additional sediment sampling and analysis in 2005 in the Lower South Ditch confirmed the presence of BEHP and NDPA in sediments. Overall, the body of information for Lower South Ditch sediments has been sufficient to evaluate human and ecological risks as described in Section 6.0.

4.2 OU2

OU2 comprises off-Property surface water and sediment including off-Property West Ditch, East Ditch, and MMB and Sawmill Brook within the MMB wetlands. This section discusses the nature, and distribution of contaminants in these media.

These areas are off-Property areas and were not directly affected by direct discharge from the Facility as was the on-Property ditch system. Therefore “Sources” are not discussed as they were with respect to OU1. The East Ditch receives surface water from the South Ditch. The off-Property West Ditch flows into the on-Property South Ditch. The distribution of contaminants in

the small segment of the South Ditch located between the Property and East Ditch was presented in the OU1 discussion. The two brooks in the MMB wetland are hydraulically isolated from surface waters on-Property. The only migration pathway for site contaminants to surface water and sediment in the MMB area is groundwater discharge. As will be shown in this section, that migration pathway is not complete.

4.2.1 Surface Water

The following subsections discuss the nature and distribution of contaminants by chemical class for off-Property surface water. There are three areas associated with off-Property surface water: the East Ditch, the off-Property West Ditch and the Maple Meadow Brook wetland (including Maple Meadow Brook and Sawmill Brook).

The analytical results associated with off-Property surface water sampling have been compiled and summarized. The discussion that follows summarizes the nature and extent of inorganics and metals, VOCs, SVOCs, pesticides and PCBs, and petroleum hydrocarbons in off-Property surface water for current conditions, including discussions about the East Ditch, off-Property West Ditch and the Maple Meadow Brook area. Table 4.2-1 identifies those samples and associated sample location identifiers that represent current conditions and which are the focus of the following discussions. Figure 4.2-1 identifies the locations of surface water samples that are representative of current conditions in OU2.

4.2.1.1 Background Conditions for Surface Water

Site-specific background conditions for surface water were investigated prior to the 1997 Supplemental Phase II Report (Smith, 1997). One sample (SDREF-012), included in this dataset, was collected in January 1997 and was not included in the original background dataset evaluated as part of the 1997 Supplemental Phase II. That sample was collected from a “background” location as a reference sample to support ecological risk assessments. Background conditions for VOCs, SVOCs, pesticides, and PCBs in surface water are considered to be “not detected”. The surface water background conditions are presented in Table 4.1-10 and shown on Figure 2.1-15.

4.2.1.2 East Ditch Area

The East Ditch is located between the eastern property boundary and the adjacent rail line. This section presents a discussion of the samples collected throughout this surface water body starting north or upstream of the Facility at surface water sample location EDSW0 and extending downstream to the confluence of the East Ditch and Halls Brook at surface water sample location EDSW8. This subsection presents data collected from 2001 through 2005. A summary of the analytical data from the East Ditch is presented in Table 4.2-2. All analytical data for surface water samples collected since June 2001 are presented in Table C.3-1 of Appendix C. The analytical data that are the basis of the statistical summary in Table 4.2-2 are presented in Appendix D.2-1.

4.2.1.2.1 Inorganics and metals

Site-related inorganics and metals have been detected in surface water samples collected from the East Ditch. As shown in Table 4.2-2, among site-related inorganics and metals detected in surface water, calcium, chromium, iron, sodium, chloride, ammonia and sulfate were detected at concentrations greater than the maximum detected background concentration. Vanadium has also been detected at an average concentration above the maximum detected background concentration, however based on the historic operations and contaminant sources, vanadium is not considered to be Site related.

As shown on Figures 4.2-2 and 4.2-3, the concentrations of calcium in unfiltered and filtered samples are relatively consistent along the property boundary as well as downstream in the New Boston Street Drainway. Average concentrations of total calcium range from 37 mg/L at sample locations EDSW1 to 54 mg/L at sample location EDLBSW1. Average concentrations of calcium in filtered samples range from 38 mg/L at sample location EDSW1 to 58 mg/L at sample location EDLBSW1. The maximum detected background concentration is 30.7 mg/L.

In the East Ditch, the average concentration of total chromium is 0.0376 mg/L as compared to the background concentration of 0.0219 mg/L. The distribution of total chromium concentrations in the East Ditch surface water is shown in Figure 4.2-4.

The distribution of chromium in filtered surface water samples from the East Ditch is shown on Figure 4.2-5. As compared to the unfiltered samples, average concentrations are lower and detections have only been reported at and south of the confluence with South Ditch. Chromium was not detected in filtered surface water samples collected from the downstream portion of the East Ditch and in the New Boston Street Drainway.

As shown on Figure 4.2-6, the concentration of total iron in surface water within the East Ditch ranges from 0.1 mg/L at sample location EDSW0 to 121.1 mg/L at sample location EDSW2. However, the average concentrations reported at EDSW2 are a least an order of magnitude higher than the remaining locations. The concentration of iron in filtered samples of surface water ranges from 0.2 mg/L reported at the downstream location EDSW8 to 1.17 mg/L, reported immediately up stream of the property at EDSW1. The distribution of iron in filtered surface water samples is shown in Figure 4.2-7.

The distribution of concentrations of total sodium and sodium in filtered surface water samples in the East Ditch are shown on Figures 4.2-8 and 4.2-9, respectively. As noted on Table 4.2-2, the average concentration of sodium in unfiltered samples in the East Ditch was calculated at 140 mg/l, as compared to the background value of 126 mg/L. The highest average concentrations are reported at the sample collected from location EDSW0, located up gradient and north of the Facility. This data suggested that there are additional contributions of sodium to surface water within the East Ditch from other off-Property sources.

As shown on Figure 4.2-10, the distribution of chloride concentrations in surface water samples from the East Ditch is reasonably consistent. Highest near-Property concentrations are located immediately south of the confluence of the South Ditch and East Ditch, but the concentrations are only marginally higher than elsewhere in the East Ditch. However, it should be noted that the highest average concentration of chloride is reported at EDSW0 at 340 mg/L. This surface water sample is located north of the Facility and represents upgradient conditions. As with the reported sodium concentrations, the presence of elevated chloride upstream from the facility supports an off-Property source, most likely road salt for melting snow and ice during the winter seasons.

Ammonia has been detected at all surface water locations with the highest concentrations detected downstream of the confluence of the East Ditch and South Ditch. The highest average concentrations are reported at EDSW5, located downstream of South Ditch. The ammonia concentrations in the lower portion of the East Ditch reflect ammonia in the South Ditch surface water that flows into the East Ditch. Concentrations of ammonia in surface water samples from Landfill Brook average 10.95 mg/L (EDLBSW1). This represents an input of ammonia to the New Boston Street Drainway. As shown on Figure 4.2-11, concentrations of ammonia above background are reported at EDSW8, the most downstream surface water sample location.

Finally, the distribution of sulfate in surface water within East Ditch is shown on Figure 4.2-12. Although sulfate is reported in surface water samples collected upstream (at sample location EDSW0) the highest average reported concentration (of 189.8 mg/L) is located at EDSW3, downstream of the confluence of the East Ditch and South Ditch. Average concentrations of sulfate then decrease with distance downstream. The sulfate concentration of 42 mg/L at Landfill Brook (EDLBSW1) represents a sulfate input to the New Boston Street Drainway. Landfill Brook flows into the New Boston Street Drainway.

4.2.1.2.2 VOCs

Ten VOCs were detected at a frequency of more than 10 percent in surface water samples collected from the East Ditch (Table 4.2-2). These include TMP-1, chlorinated solvents (1,1,1-TCA, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, TCE, and PCE), m,p-xylene, toluene and MTBE.

As shown on Figure 4.2-13, the highest average surface water concentration of TMP-1 in East Ditch surface water samples was detected a surface water sample location EDSW2 at a reported concentration of 0.004 mg/L. Lower concentrations were detected downstream, decreasing to non-detect at surface water sample location EDSW6 and further downstream.

The distribution of total chlorinated solvents in East Ditch surface water samples is shown on Figure 4.2-14. The highest reported average concentration of total chlorinated solved was detected at surface water sample location EDSW4, downstream of the Property. However, chlorinated solvents were not detected in samples collected upstream and directly adjacent to the property (location EDSW2). Furthermore, samples collected from the confluence of East Ditch and South

Ditch reported average concentrations of total chlorinated solvents at significantly lower concentrations (0.004 mg/L at EDSW3 as compared to 0.0172 mg/L at EDSW4). These data suggest that there are potential sources other than the Olin Site contributing chlorinated solvents to the East Ditch surface water.

The distribution of BTEX and MTBE concentrations in East Ditch surface water samples is shown on Figure 4.2-15. The average concentrations of these VOCs are highest at the sample collected just northeast of the property (EDSW1) with an average total concentration of 0.088 mg/L. Average concentrations then decrease steadily in the downstream direction with a concentration of 0.0025 mg/L at EDSW8.

4.2.1.2.3 SVOCs

As shown in Table 4.2-2, NDMA was the only SVOC detected in East Ditch surface water samples collected during three separate comprehensive sampling rounds. The distribution of the average concentrations of NDMA is shown on Figure 4.2-16. With the exception of the farthest upstream sample location (surface water sample EDSW0), NDMA was detected at all locations, with the highest average concentration reported at EDSW4 at (0.0000283 mg/L or 28.3 ng/L). Concentrations then decrease downstream to an average reported concentration of 0.0000072 mg/L or 7.2 ng/L at surface water sample location EDSW8.

4.2.1.2.4 Pesticides and PCBs

No pesticides or PCBs were detected in surface water samples representative of current conditions in the East Ditch. Pesticides and PCB analysis was conducted for samples from three separate comprehensive sampling rounds.

4.2.1.2.5 Herbicides

One herbicide, DCPA, was detected in the surface water sample from EDSW6 at a concentration of 0.00054 mg/L. No herbicides were detected upstream suggesting that this detection is not site

related. No other herbicides were detected in samples collected during three separate comprehensive sampling rounds.

4.2.1.2.6 Petroleum Hydrocarbons

The distribution of the average concentrations of total PAHs in surface water samples from the East Ditch is shown on Figure 4.2-17. These data show consistent concentrations are present both in samples collected adjacent to the property (EDSW2 and EDSW3) and locations downstream. The highest reported average concentration was reported at the upstream location EDSW1 (0.0168 mg/L for total PAHs). PAHs are common in industrialized areas and these data do not suggest an on-Property source, but rather that the PAHs are present due to the industrialized surroundings and the railroad line that is the dominant feature of the East Ditch.

4.2.1.2.7 Data Gap Assessment

Several site-related compounds have been detected in downstream locations. NDMA and ammonia have been detected in the farthest downstream locations (EDSW8). The NDMA concentrations at the downstream surface water sample locations are below screening benchmarks for aquatic life, and human exposure potential in the downstream area is minimal. Ammonia concentrations have not been delineated to background in the downstream direction. However, a substantial ammonia input from Landfill Brook to the New Boston Street Drainway appears to make the delineation of the Site-contributed impact infeasible.

4.2.1.3 Off-Property West Ditch Area

The off-Property West Ditch is located off-Property, along the western property boundary. Surface water samples have been collected from five locations within this area. Four rounds of samples were collected from location OPWD-SW-N, collected from the northern portion of the wetland. Five rounds of samples have been collected from OPWD-SW-S, OPWD-SW-SDW, and OPWD-SW-WS. Representative data associated with this surface water body were collected between November 2002 and August 2003. Analytical data from the off-Property West Ditch are presented in Table 4.2-3. All analytical data are presented in Table C.3-1 of Appendix C. The analytical data that are the basis of the statistical summary in Table 4.2-3 are presented in Appendix D.2-1.

4.2.1.3.1 Inorganics and metals

As shown in Table 4.2-3, inorganics and metals detected in surface water samples above background conditions include ammonia, calcium, chromium and sodium. All of these analytes are indicator parameters for Site groundwater. The distributions of concentrations of these analytical parameters for both filtered and unfiltered surface water samples are shown in Figures 4.2-2 through 4.2-12. The off-Property West Ditch is a relatively small area, so discussion of spatial distribution of concentrations of analytes is not necessary or appropriate.

More important, perhaps, is the relationship, for indicator parameters, between concentrations in surface water in the off-Property West Ditch and the South Ditch. Comparing concentration summary data in Table 4.1-9 (South Ditch surface water) and Table 4.2-3 (off-Property West Ditch surface water), the average concentrations of ammonia, calcium, chromium and sodium in the off-Property West Ditch are all lower than the corresponding average concentrations in the South Ditch. For example, the average ammonia concentration in the off-Property West Ditch is 11.2 mg/L compared to the South Ditch average ammonia concentration of 46.3 mg/L. The average total chromium concentration in off-Property West Ditch surface water samples is 0.0535 mg/L compared to the South Ditch average concentration of 0.34 mg/L. The construction and maintenance of the weir has successfully raised the surface water and suppressed discharge of impacted groundwater to the off-Property West Ditch. Prior to the construction of the weir structure, floc regularly formed in the off-Property West Ditch, an indication that impacted groundwater formerly discharged to the off-Property West Ditch. This is no longer the case. A more detailed discussion of groundwater surface water interaction for the off-Property West Ditch is presented in Section 5.

In general the unfiltered or total metal concentrations are greater than filtered or dissolved fractions. These data may be site related however the impacts to the surface water body are determined via the ecological risk assessment, presented in Section 6.0. Overall, ecological risks to aquatic receptors in the off-Property West Ditch are not significant, and this conclusion reflects the improved water quality in the off-Property West Ditch since the installation of the weir.

4.2.1.3.2 VOCs

Surface water samples representative of current conditions in the off-Property West Ditch were not analyzed for VOCs. VOCs are not present at concentrations in groundwater sufficient to be of concern in surface water.

4.2.1.3.3 SVOCs

Analytical data for surface water samples from the off-Property West Ditch are summarized on Table 4.2-3. NDMA, the only SVOC detected, was detected in two of the four surface water samples collected in the off-Property West Ditch and submitted for laboratory NDMA analyses. Samples were collected during the May 2003 round, and NDMA was detected at sample locations OPWD-SW-N and OPSE-SW-WS at 0.000087 mg/L (87 ng/L) and 0.000014 mg/L (14 ng/L), respectively. The locations of these samples are shown on Figure 4.2-17.

4.2.1.3.4 Pesticides and PCBs

Surface water samples representative of current conditions in the off-Property West Ditch were not analyzed for pesticides and PCBs. Pesticides and PCBs are not Site groundwater indicator parameters. Therefore, they would not be expected to be present in off-Property West Ditch surface water.

4.2.1.3.5 Herbicides

Surface water samples representative of current conditions in the off-Property West Ditch were not analyzed for herbicides. Herbicides are not Site groundwater indicator parameters. Therefore, they would not be expected to be present in off-Property West Ditch surface water.

4.2.1.3.6 Petroleum Hydrocarbons

Surface water samples representative of current conditions in the off-Property West Ditch were not analyzed for petroleum hydrocarbons. Petroleum hydrocarbons are not considered indicator parameters for groundwater, which is the most likely medium to impact surface water quality.

4.2.1.3.7 Data Gap Assessment

Off-Property West Ditch surface water samples have been collected during three sampling rounds from four locations, from 2002 through 2003. Investigations have focused on metals, inorganics and NDMA (indicator parameters for groundwater). NDMA was collected during one round and detected at two of the four locations. Analysis of surface water samples for phthalates, NDPA and other SVOCs would add to the understanding of nature and extent of contamination in surface water. This would support future risk assessment activities.

The weir was installed to suppress groundwater discharge and minimize groundwater impacts to the stream. Additional discussion pertaining to the groundwater surface water interaction is presented in Section 5.0. A summary of the historical ecological risk assessments is provided in Section 6.0

4.2.1.4 Maple Meadow Brook Wetland Area

The Maple Meadow Brook Wetland area is represented by those samples collected north and west of the property, to the west of Main Street. Surface water samples have been collected from both Maple Meadow Brook and Sawmill Brook. The nature and extent of contamination in this area of the surface water in this area is discussed in the following subsections. Analytical data for surface water from this wetland are summarized in Table 4.2-4 and on Figures 4.2-2 though 4.2-18. All surface water data are presented in Table C.3-1 of Appendix C. The analytical data that are the basis of the statistical summary in Table 4.2-4 are presented in Appendix D.2-3.

4.2.1.4.1 Inorganics and metals

Surface water sampling in the Maple Meadow Brook Wetland was conducted during twelve separate sampling events beginning in October 2001. Metals (filtered and a subset of unfiltered samples)and inorganics analyses was performed for all samples collected. NDMA analysis has been conducted for surface water samples collected since June 2003. The surface water sampling and analysis was performed to monitor surface water conditions subsequent to the cessation of MWSW pumping. In particular, the monitoring is intended to determine if there is any indication that impacted groundwater is migrating to surface water within the MMB Wetland. Approximately 100 surface water samples collected from the MMB Wetland area were submitted for analysis of filtered (or dissolved) constituents with seventeen samples submitted for analysis of unfiltered (or total) constituents. As shown in Table 4.2-4, calcium, chloride, ammonia and sulfate were detected in at least one surface water sample at concentrations greater than the maximum detected background concentration.

The distributions of ammonia concentrations and sulfate average concentrations in surface water samples from the MMB Wetland can be viewed on Figure 4.2-11 and Figure 4.2-12 respectively. The concentrations of each of those groundwater indicator parameters are consistent among all of the surface water sampling locations, including those upstream of the groundwater impact area. This suggests there is no impact to surface water quality from groundwater in the area. Shallow groundwater, underlying the MMB wetland, has not been shown to be impacted from the site-related indicator parameters present in deep groundwater and some areas of intermediate depth groundwater.

The analytical data for both groundwater and surface water sampling events in the MMB Wetland have been reviewed and analyzed statistically on a regular basis. The latest Western Bedrock Valley Statistical Report (Geomega, 2005b) summarized the statistical analysis of both groundwater and surface water data. That report concluded there is no indication that ammonia or sulfate concentrations in surface water in the Maple Meadow Brook Wetland are showing anomalous trends or behaviors. This is important, since those parameters are among the most mobile groundwater indicator parameters.

4.2.1.4.2 VOCs

Surface water samples representative of current conditions in the MMB Wetland area were not analyzed for VOCs. Groundwater quality data (absence of VOCs) indicate that VOCs would not be transported to surface water via discharging groundwater. VOC analysis of surface water samples was not necessary to meet the objectives of the monitoring.

4.2.1.4.3 SVOCs

Surface water samples collected from the MMB Wetland in ten sampling rounds since June 2003 have been analyzed for NDMA. These samples were not analyzed for other SVOCs. Shallow groundwater data indicate that other SVOCs do not represent a potential migration mechanism associated with groundwater/surface water NDMA is similar to ammonia and sulfate in that it is highly mobile in the groundwater and surface water environments, and therefore is a good indicator of migration pathways. The MMB Wetland surface water sample locations are shown on Figure 4.2-2.

NDMA was reported in only five of the 102 samples collected at three of the locations (MMB-SW-2, MMB-SW-5 and, MMB-SW-11) and all were qualified as NJ and are interpreted to be false positive results. The maximum reported concentration was at sample location MMB-SW-3 at a concentration of 3.1 ng/L or 0.0000031 mg/L with an average concentration of 1.3 ng/L (0.0000013 mg/L). A summary of the of the analytical method and detailed discussion of validation actions for these and other NDMA reported results by sample date and location follows.

The surface water samples were analyzed for NDMA by USEPA Method 1625. Quality control requirements and data reporting goals for the method were based on project specific method performance developed by Olin and the Massachusetts Department of Environmental Protection (MADEP) (Pancorbo, 2002). The MADEP requested a minimum reporting level of 10 ng/L based on an advisory notification level that has been established in California for drinking water. Method 1625 is a high resolution mass spectrometry (HR/MS) procedure that is highly sensitive and is designed to achieve a method detection limit of 2 ng/L in clean water. A limit of 2 ng/L is required

for the reporting of NDMA in drinking water testing program in California, and Method 1625 has historically been the primary method that labs in California use to meet this reporting objective.

Data validation was competed for all data sets using the SOPs developed for the project. The validation procedures were based on QC goals developed with MADEP and general data validation actions described in USEPA National Data Validation Guidelines (USEPA; 1999) as described in Section 2. Full review of raw data and calculations were completed for NDMA results. The majority of samples collected from MMB were reported as non-detected results (2.0 U ng/L). In a subset of samples which are discussed below, low concentrations (4.0 ng/L or less) of NDMA were initially reported by the laboratory. During validation, results for samples with detections of NDMA in MMB surface water were qualified due to uncertainties regarding the reliability of the detected results and the likelihood of false positive reporting. Individual results and validation actions are described in the following paragraphs.

Nov 2003

The laboratory reported a detection of NDMA at 4 ng/L in sample MMB-SW-2 during sampling that was completed in November 2003. NDMA was not detected in any other surface water samples during that sampling event. NDMA was also detected at a concentration of 1.38 ng/L in the method blank associated with this sample indicating low concentration contamination could have occurred during sample preparation. In accordance with the validation procedures the NDMA result for sample MMB-SW-2 was qualified non-detect (U) at a reporting limit of 4 ng/L.

Aug 2004

The laboratory reported a result for NDMA of 3.1 ng/L in sample MMB-SW-8A during sampling that was completed in August 2004. A review of the instrument raw data from the laboratory blanks and sample indicated that the detection was a false positive result. Low concentration detections of NDMA (0.57 - 0.6 ng/L) in the two laboratory method blanks was reported in the raw instrument data. These detections were based on weakly formed peaks that were apparent in the baseline noise. A rise in the chromatographic baseline (when compared to the standards and laboratory blanks) was observed for sample MMB-SW-8A and other samples in the data set. This

was interpreted to be due to a sample matrix effect. The detection of NDMA in this sample was based on a peak response that was less resolved than the responses observed in the method blanks, and this response was interpreted to be indistinguishable from the baseline noise. The result was qualified non-detect (U) at a reporting limit of 3.1 ng/L.

July 2005

Low concentration NDMA was reported in samples MMB-SW-11 (2.2 ng/L) and MMB-SW-8 (2.0 ng/L) during sampling completed in July 2005. These concentrations are equal to, or slightly above, the reporting limit of 2 ng/L. Chromatographic peaks were apparent at the NDMA retention time for these samples, but the instrument data processor did not identify them as NDMA in the initial computerized integration. The chromatographic peaks were poorly formed and only slightly discernable from the baseline noise with a low signal to noise ratio (< 3). The laboratory used manual integration to determine the peak areas for NDMA in the samples and report the detections. Because of the shape and small relative size of the chromatographic peaks, it is possible that instrument noise has contributed to the overall response reported by the lab. Due to the low concentrations reported and the uncertainties in the chromatographic response observed for the two NDMA detections, the results for NDMA in samples MMB-SW-11 and MMB-SW-8 were qualified NJ indicating the detections may represent false positive or high biased results and the concentration is estimated.

May 2006

Low concentration NDMA was reported in samples MMB-SW-8 (2.0 ng/L), MMB-5 (3.9 ng/L), and MMB-SW-2 (3.1 ng/L) during sampling completed in May 2006. These concentrations are equal to, or slightly above, the reporting limit of 2 ng/L. Chromatographic peaks were apparent near the NDMA retention time for these samples, but chromatographic interference made confirmation of NDMA identification difficult using the primary and secondary ion responses used in this GC/MS method for compounds identification. Matrix interference was present at or near the retention times for the secondary ion. For sample MMB-5 the retention time for NDMA did not closely match that of the previously run continuing calibration standard indicating that this peak may not represent NDMA. Due to the low concentrations reported and the uncertainties in the

chromatographic response observed for the three NDMA detections, the results for NDMA in samples MMB-SW-8, MMB-5, and MMB-SW-2 were qualified NJ indicating presumptive evidence for the identification of NDMA (potential false positive results) and the concentration is estimated.

Based on data validation reviews completed on the surface waters from MMB, there is potential for matrix related interference at concentrations at or near the 2.0 ng/L reporting limit that has been used for Method 1625. The reporting limit was developed for the analysis of clean drinking waters where the likelihood of matrix interference would be minimal. The 2.0 ng/L reporting limit is very close to the method detection limit (MDL) for the method for clean waters, and may not be appropriate for surface water samples collected from the Site. Surface water samples can contain dissolved organic components that make reporting to 2.0 ng/L less reliable due to matrix interference and increased baseline noise.

4.2.1.4.4 Pesticides and PCBs

Surface water samples representative of current conditions in the MMB Wetland area were not analyzed for pesticides or PCBs. The only potential mechanism for pesticide and PCB transport to Maple meadow Brook Wetland surface water would be discharge of groundwater to that surface water. However, pesticides and PCBs are not identified in groundwater in the area. Therefore analysis of those parameters in surface water is not necessary.

4.2.1.4.5 Herbicides

Surface water samples representative of current conditions in the MMB Wetland area were not analyzed for herbicides. The only potential mechanism for herbicide transport to Maple Meadow Brook Wetland surface water would be discharge of groundwater to that surface water. However, herbicides are not identified in groundwater in the area. Therefore analysis of those parameters in surface water is not necessary.

4.2.1.4.6 Petroleum Hydrocarbons

Surface water samples representative of current conditions in the MMB Wetland area were not analyzed for petroleum hydrocarbons. The only potential mechanism for petroleum hydrocarbon transport to Maple Meadow Brook Wetland surface water would be discharge of groundwater to that surface water. However, petroleum hydrocarbons are not identified in groundwater in the area. Therefore analysis of those parameters in surface water is not necessary.

4.2.1.4.7 Data Gap Assessment

- Surface water within MMB Wetland has not been impacted by site related constituents, particularly the very mobile constituents such as ammonia and sulfate. Although NDMA has been sporadically reported, these detections have been near the method detection limit, have not been confirmed during the analysis and are likely to be false positives. As discussed in the preceding section, these samples have been qualified NJ indicating there was only presumptive evidence that NDMA was present.

As noted in Section 6.0, the data provided adequately support the ecological risk assessment and no additional sampling of surface water in MMB is warranted.

4.2.2 Sediments

The following subsections discuss the nature and distribution of contaminants by chemical class for off-Property OU2 sediment. There are three areas associated with off-Property sediment: the East Ditch, the off-Property West Ditch and the Maple Meadow Brook wetland.

The analytical results associated with off-Property sediment sample locations with known coordinates have been compiled and summarized. Sample locations with unknown coordinates are presented in Table 4.1-13. The discussion that follows summarizes the nature and extent of inorganics and metals, VOCs, SVOCs, pesticides and PCBs, and petroleum hydrocarbons in Off-Property sediment for current conditions, including discussions about the East Ditch, off-Property West Ditch and the Maple Meadow Brook area. Table 4.2-5 identifies those samples and

associated sample location identifiers that represent current conditions and which are the focus of the following discussions. Figure 2.1-9 identifies the locations of sediment samples that are representative of current conditions. Table 4.2-6 presents a summary of sediment analytical data for current OU2 conditions.

4.2.2.1 Background Conditions for Sediment

Site-specific background conditions for sediment were investigated prior to the 1997 Supplemental Phase II Report (Smith, 1997). One toxicity test reference location (background) sediment sample was collected in January 1997 and was not included in the original background dataset evaluated as part of the 1997 Supplemental Phase II. . The analytical results for this reference location sample are similar to the background sample results. Background conditions for VOCs, SVOCs, pesticides and PCBs were considered to be "not detected". The sediment background conditions are presented in Table 4.1-16 and the background sample locations are shown on Figure 2.1-15.

4.2.2.2 East Ditch Area

The East Ditch area is located to the east of the property boundary along the western border of the MBTA commuter rail line. Sediment sampling results are discussed in this section for this drainage ditch.

4.2.2.2.1 Inorganics and metals

The presence and distribution of inorganics and metals in East Ditch sediment and the representativeness of the data for current conditions is discussed in the following paragraphs.

As shown in Table 4.2-7, among inorganics and metals detected in the East Ditch sediment, aluminum, arsenic, barium, calcium, chromium, cobalt, copper, hexavalent chromium, iron, lead, manganese, mercury, nickel, vanadium and zinc were detected at concentrations greater than the maximum detected background concentration. There are no federal or Massachusetts state sediment background concentrations and no federal or state regulatory standards for sediment.

The distribution of aluminum concentrations in sediment samples is shown on Figure 4.2-18. Aluminum was detected in all samples collected along the length of the East Ditch with the highest detected concentrations located in the middle portion of the ditch, south of the property boundary. The immediate upgradient sample located between these samples and the confluence of South Ditch is an order of magnitude lower in concentration, suggesting that the highest concentrations of aluminum are from a source not related to the Olin Property.

The distribution of calcium concentrations in sediment samples is shown on Figure 4.2-19. Calcium was detected in all samples collected along the length of the East Ditch, but only one detected concentration, at EDSD/SW5, exceeded the maximum detected background concentration. The highest detections of calcium were located in the middle portion of the ditch, south of the property boundary. The immediate upgradient sample located between these samples and the confluence of South Ditch is an order of magnitude lower in concentration, suggesting that the highest concentrations of calcium are from a source not related to the Olin Property.

The distribution of chromium concentrations in sediment samples is shown on Figure 4.2-20. Chromium was detected in all samples collected along the length of the East Ditch. The highest concentrations of chromium were detected at locations in the middle portion of the ditch, south of the property boundary. The immediate upgradient sample located between these samples and the confluence of South Ditch is an order of magnitude lower in concentration, suggesting that the highest concentrations of chromium are from a source not related to the Olin Property.

The distribution of iron concentrations in sediment samples is shown on Figure 4.2-21. Iron was detected in all samples collected along the length of the East Ditch. The highest concentrations of iron were detected at locations in the middle portion of the ditch, south of the property boundary. The immediate upgradient sample located between these samples and the confluence of South Ditch is an order of magnitude lower in concentration, suggesting that the highest concentrations of iron are from a source not related to the Olin Property.

The distribution of zinc concentrations in sediment samples is shown on Figure 4.2-22. Zinc was detected in all samples collected along the length of the East Ditch, but only one detected concentration, at EDSD/SW7, exceeded the maximum detected background concentration. The

immediate upgradient sample located between these samples and the confluence of South Ditch is an order of magnitude lower in concentration, suggesting that the highest concentrations of zinc are from a source not related to the Olin Property.

Although detected concentrations of ammonia in sediment samples in the East Ditch did not exceed the maximum background concentration, the distribution of detections is shown on Figure 4.2-23. The highest concentrations of ammonia were detected at locations in the middle portion of the ditch, south of the property boundary. The immediate upgradient sample located between these samples and the confluence of South Ditch is half the concentration, suggesting that the highest concentrations of ammonia are from a source not related to the Olin Property. These sources could include the adjacent Woburn landfill or contaminated soils from the Industriplex Site.

4.2.2.2.2 VOCs

As shown in Table 4.2-7, nine sediment samples were collected in the East Ditch and analyzed for VOCs. Only acetone, carbon disulfide, cis-1,2-DCE and TCE were detected in the East Ditch. Acetone was detected in all samples collected in the East Ditch; whereas, carbon disulfide, cis-1,2-DCE and TCE were only detected in the southern portion of the ditch.

4.2.2.2.3 SVOCs

As shown in Table 4.2-7, 13 SVOCs were detected in East Ditch sediment. Acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, BEHP, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene were all detected in at least 10 percent of the sediment samples. NDMA has not been detected in sediment in East Ditch.

Six samples collected from the East Ditch were analyzed for PAHs. The following 14 PAHs were detected: acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene.

The distribution of benzo(a)pyrene concentrations is shown on Figure 4.2-24. Benzo(a)pyrene was not detected at the northernmost and southernmost sample locations. The highest concentration of benzo(a)pyrene was detected at EDSD/SW7, one of the southern sampling locations. The distribution of the data and the magnitude suggest the benzo(a)pyrene is associated with railroad operations including ties and storage of ties along the rail line.

The distribution of BEHP concentrations is shown on Figure 4.2-25. BEHP was not detected at the two northernmost sampling locations and the two southernmost sampling locations. The highest concentrations of BEHP were detected in the middle portion of the ditch. BEHP shows a more uniform distribution along East Ditch after the confluence of the South Ditch down to Halls Brook, where concentrations begin to diminish. BEHP is present within the Lower South Ditch sediments, and is considered to be related to the releases from the Property. Based on the non-detect values reported farther downstream EDSD/SW7 and EDSD/SWD8, it appears that the downstream extent of BEHP

The distribution of chrysene concentrations is shown on Figure 4.2-26. The distribution of fluoranthene concentrations is shown on Figure 4.2-27. The distribution of pyrene concentrations is shown on Figure 4.2-28. As shown in the figures, chrysene, fluoranthene and pyrene follow similar patterns of distribution. The analytes were not detected in the northernmost and southernmost sampling locations and the highest concentrations for each analyte was detected at sample location EDSD/SW7. The distribution of the data and the magnitude of concentrations suggest the PAHs are identical to benzo(a)pyrene in distribution and appear to associated with railroad operations and nearby industrialized areas..

4.2.2.2.4 Pesticides and PCBs

As shown in Table 4.2-7, two pesticides were detected in East Ditch sediment. Delta-BHC and dieldrin were detected in at least 10 percent of the sediment samples. The distribution and concentration of pesticides is suggestive of residuals from historical uses of pesticides for their intended use rather than a release of pesticides from a manufacturing operation.

4.2.2.2.5 Herbicides

As shown in Table 4.2-7, chloramben and MCPA were the only herbicides detected in East Ditch sediment. Both were detected in at least 10 percent of the sediment samples. The compounds are not related to historical operations at the Olin Property, and may have been used by the rail road to control vegetation.

4.2.2.2.6 Petroleum Hydrocarbons

Sediment samples representative of current conditions in the East Ditch were not analyzed for petroleum hydrocarbons. Petroleum hydrocarbons are exempt from CERCLA.

4.2.2.2.7 Data Gap Assessment

The downstream extent of Site-related constituents in sediment in East Ditch has been delineated based on BEHP and other site related contaminants. The down stream extent of BEHP is bounded by the two sample locations farthest down gradient in which BEHP was not detected. Based on this data and discussion of other parameters above, it appears the down stream extent of chemical constituents that can be ascribed solely to the Property, has been delineated.

4.2.2.3 Off-Property West Ditch Area

The off-Property West Ditch is located off-property, along the western property boundary. The following subsections discuss the sediment sampling results since 1997.

4.2.2.3.1 Inorganics and metals

The presence and distribution of inorganics and metals in off-Property West Ditch sediment and the representativeness of the data for current conditions is discussed in the following paragraphs.

As shown in Table 4.2-8, among inorganics and metals detected in off-Property West Ditch. sediment, aluminum, calcium, chromium, copper, nickel, potassium, sodium and vanadium were

detected at concentrations greater than the maximum detected background concentration. There are no federal or Massachusetts state sediment background concentrations and no federal or state regulatory standards for sediment.

The distribution of aluminum concentrations in sediment samples is shown on Figure 4.2-18. Aluminum was detected in all samples collected in the off-Property West Ditch area. Only one detected a concentration, at OPWD-SD-N, exceeded the maximum background concentration. The highest detected concentration was detected in the northern portion of the ditch.

The distribution of calcium concentrations in sediment samples is shown on Figure 4.2-19. Calcium was detected in all samples collected in the off-Property West Ditch area, but only one detected concentration, at OPWD-SD-N, exceeded the maximum detected background concentration. The highest detection of calcium was detected in the northern portion of the ditch.

The distribution of chromium concentrations in sediment samples is shown on Figure 4.2-20. Chromium was detected in all samples collected in the off-Property West Ditch area. The highest concentration of chromium was detected in the northern portion of the ditch.

4.2.2.3.2 VOCs

As shown in Table 4.2-8, three sediment sample locations in the off-Property West Ditch area were analyzed for VOCs, and 2,4,4-trimethyl-1-pentene was only detected at OPWD-SD-N at 15 mg/kg.

4.2.2.3.3 SVOCs

As shown in Table 4.2-8, 13 SVOCs were detected in the four sediment samples collected in the off-Property West Ditch and analyzed for SVOCs. Acenapthylene, anthracene and BEHP were only detected in one sample. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene were detected in three of the four samples.

The distribution of benzo(a)pyrene concentrations in sediment samples is shown on Figure 4.2-24. Benzo(a)pyrene was not detected at the southernmost sample location in the off-Property West Ditch area. The highest concentration of benzo(a)pyrene was detected at OPWD-SD-N, the northernmost sampling location.

The distribution of chrysene concentrations in sediment samples is shown on Figure 4.2-26. The distribution of fluoranthene concentrations is shown on Figure 4.2-27. The distribution of pyrene concentrations is shown on Figure 4.2-28. As shown in the figures, chrysene, fluoranthene and pyrene follow a similar pattern of distribution as benzo(a)pyrene. The analytes were not detected in the southernmost sampling location and the highest concentration for each analyte was detected at sample location OPWD-SD-N.

The distribution of PAHs and cPAHs in sediment samples, appear related to the presence of the rail line, and these compounds are also relative commonly found in industrialized areas. Though present in sediment they are not considered to be indicative of releases from operations at the former Facility on the Olin Property.

4.2.2.3.4 Pesticides and PCBs

As shown in Table 4.2-8, gamma-chlordane was the only pesticide or PCB detected in off-Property West Ditch sediment. Gamma-chlordane was detected at one sample location at a very low concentration (0.0036 mg/kg). This is suggestive of residual from historical uses of pesticides for their intended use rather than a release of pesticides from a manufacturing operation.

4.2.2.3.5 Herbicides

Sediment samples representative of current conditions in the Off-Property West Ditch were not analyzed for herbicides.

4.2.2.3.6 Petroleum Hydrocarbons

Sediment samples representative of current conditions in the off-Property West Ditch were not analyzed for petroleum hydrocarbons. Since the route of migration for site contamination to the off-Property West Ditch is through groundwater discharge, petroleum hydrocarbons are not expected in sediment.

4.2.2.4 Maple Meadow Brook Area

The Maple Meadow Brook area is represented by those samples collected north and west of the property, west of Main Street. The sediment was sampled from the Maple Meadow Brook, the Sawmill Brook and the MMB Wetlands area. The results of the sediment sampling efforts conducted in this area are discussed in the following subsections.

4.2.2.4.1 Inorganics and metals

As shown in Table 4.2-9, 17 samples were collected and analyzed for ammonia and TOC.

The distribution of ammonia is shown in Figure 4.2-23. The concentrations of ammonia were all detected during the October 2001 sampling event, and ammonia was not detected at any sample locations during the June 2002 sampling event. The lowest concentration of ammonia was detected at MMB-SD7, the southernmost sampling location. The highest concentration of ammonia was detected in the Maple Meadow Brook sediment, but the average concentrations were consistent throughout the Maple Meadow Brook area.

Ammonia is naturally produced in wetland environments as a consequence of the nitrogen cycle. The concentrations reported in sediment were evaluated in the Stage 1 Ecological Screening Assessments (MACTEC, 2003, see also Section 6.2) and the ammonia in sediment was determined to be from natural causes.

4.2.2.4.2 VOCs

Sediment samples representative of current conditions in the Maple Meadow Brook area were not analyzed for VOCs because there is no complete migration pathway for VOCs between the Property and the Maple Meadow Brook wetland surface water. Since there is no direct connection between surface water in the MMB and the Olin Property, surface water from the Olin Property cannot impact sediment in the MMB. If groundwater is to be a source of sediment contamination in MMB, then the contaminant must be sufficiently mobile to be transported there, and be transported through the thick organic rich peat deposits present in the wetland before reaching surface water. Because of these factors, VOCs were not analyzed.

4.2.2.4.3 SVOCs

Sediment samples representative of current conditions in the Maple Meadow Brook area were not analyzed for SVOCs. SVOCs are not present in shallow groundwater. Surface water is analyzed for NDMA at low level detection limits a detection limit of 2 ng/L. NDMA has not been definitively detected in surface water and it is not present in shallow groundwater within the MMBA monitoring well network. There have been five reported detections of NDMA in surface water in the Maple Meadow Brook wetland. However, the data validation process concluded that the evidence for presence of NDMA is only presumptive as the detections could not be confirmed and were therefore qualified NJ and are likely false positive results.

Since there is no direct connection between surface water in the MMB and the Olin Property, surface water from the Olin Property cannot impact sediment in the MMB. If groundwater is to be a source of sediment contamination in MMB, then the contaminant must be sufficiently mobile to be transported there, and be transported through the thick organic rich peat deposits present in the wetland before reaching the sediment. Because of these factors, SVOCs were not analyzed.

4.2.2.4.4 Pesticides and PCBs

Sediment samples representative of current conditions in the Maple Meadow Brook area were not analyzed for pesticides and PCBs. Pesticides and PCBs have not been demonstrated to be

compounds released as result of former Facility operations at the Olin Property and are not present in shallow groundwater underlying the MMB wetland. Since there is no direct connection between surface water in the MMB and the Olin Property, surface water from the Olin Property cannot impact sediment in the MMB. If groundwater is to be a source of sediment contamination in MMB, then the contaminant must be sufficiently mobile to be transported there, and be transported through the thick organic rich peat deposits present in the wetland before reaching the sediment. Because of these factors, pesticides and PCBs were not analyzed.

4.2.2.4.5 Herbicides

Sediment samples representative of current conditions in the Maple Meadow Brook area were not analyzed for herbicides. Herbicides have not been demonstrated to be compounds released as result of former Facility operations at the Property and are not present in shallow groundwater underlying the MMB wetland. Since there is no direct connection between surface water in the MMB and the Olin Property, surface water from the Olin Property cannot impact sediment in the MMB. If groundwater is to be a source of sediment contamination in MMB, then the contaminant must be sufficiently mobile to be transported there, and be transported through the thick organic rich peat deposits present in the wetland before reaching the sediment. Because of these factors, herbicides were not analyzed.

4.2.2.4.6 Petroleum Hydrocarbons

Sediment samples representative of current conditions in the Maple Meadow Brook area were not analyzed for petroleum hydrocarbons. Petroleum hydrocarbons are exempt from CERCLA. Since there is no direct connection between surface water in the MMB and the Olin Property, surface water from the Olin Property cannot impact sediment in the MMB. If groundwater is to be a source of sediment contamination in MMB, then the contaminant must be sufficiently mobile to be transported there, and be transported through the thick organic rich peat deposits present in the wetland before reaching the sediment. Because of these factors, petroleum hydrocarbons were not analyzed.

4.2.2.4.7 Data Gap Assessment

The discussion of the distribution of ammonia in groundwater in shallow groundwater within the MMBA in Section 4.3 makes it clear that shallow groundwater is not a source of ammonia to surface water. The shallow groundwater that interacts with surface water in the MMBA and MMB wetland is not contaminated by releases from the Property. Site related contaminants reside in deep groundwater within the western bedrock valley and at some intermediate depths at lower concentrations. Shallow groundwater is not impacted.

The monitoring program in MMB sediment indicates this media is not impacted by Olin Property related contamination. Based on discussions above, there are no data gaps for MMB sediment.

4.3 OU 3

OU3 comprises both on-Property and off-Property groundwater that have been impacted by releases from the Olin Property. This subsection describes the nature and extent of groundwater contamination associated within the Property and in the downgradient areas located off-Property to the east and to the northwest. The structure of the presentation of OU3 data is similar to that of OU1 and OU2, but with several differences to 1) accommodate discussion of the presence of on-going sources, 2) to point out important three dimensional patterns of contaminant distribution (both vertical and horizontal), and 3) to place discussion of data in context with regulatory classification of Site groundwater. Data from the Calcium Sulfate Landfill area are also presented and discussed. A closure certification letter and Post Closure Monitoring and Maintenance Plan for the Calcium Sulfate Landfill has been submitted to the Massachusetts Solid Waste Program and is under review.

As described in Section 2.0 of this report, numerous investigations and monitoring programs have been completed for groundwater. These investigations have been completed to: support the delineation of the nature and extent of site-related constituents in groundwater; identify migration pathways; identify potential human and ecological receptors; support risk assessments; and support focused evaluations of remedial alternatives for specific areas. These investigations were completed over the last two decades under the MCP in accordance with work plans approved by

the MADEP. In order to maintain a consistent approach with previous reports and provide a context to discuss groundwater quality this report considers relevant Town and State groundwater use classifications and categories in addition to Federal drinking water regulations, where appropriate. The Town groundwater use classification pertains to the land area within the zone of contribution of its municipal well fields and is referred to as the Zone II area. The State groundwater use categories pertain to standards and assessment methods for evaluating water quality.

The following discussion of groundwater is organized primarily by groundwater use classification and secondarily by watershed. The MCP defines current and potential drinking water source areas as category GW-1 groundwater. Current and potential drinking water sources areas may be identified as such due to current or potential future public, community or private water supplies. Within the boundaries of the Site, there are currently no community or private water supplies. A municipal water supply for the Town of Wilmington, including five MWSWs, is located within the boundaries of the Site. A consultant for the Town of Wilmington has previously identified the zone of contribution for the five MWSWs. That zone of contribution is referred to as the Zone II of the public water supply system. Currently, within the boundaries of the Site, the groundwater area identified as Zone II is the groundwater that is classified as category GW-1 per the MCP (Figure 4.3-1). In other words, the Zone II area represents the current or potential drinking water source area within the Site. Most of the Zone II groundwater flows to the Ipswich River Watershed. A small portion of the Zone II (located at the northeast corner of the Site) flows to the Aberjona River Watershed.

That area of the Site that is not included in the Zone II is not a current or potential drinking water source area. This area is referred to hereafter as the area outside the Zone II. This area includes most of the Facility Property and areas to the west and southwest of the Property. The groundwater beneath most of the Facility Property is outside the Zone II and flows to the Aberjona Watershed. A small area to the west of the Facility Property is outside the Zone II and flows to the Ipswich River Watershed. In summary, the two major components of the groundwater discussions focus on the Zone II area (current and potential drinking water source and classified as category GW-1 per the MCP) and the area outside the Zone II area (not a current of potential drinking water source).

Massachusetts has promulgated drinking water quality regulations, including Massachusetts Drinking Water Standards (including Massachusetts Maximum Contaminant Levels (MCLs)), that are in large part based on Federal National Primary Drinking Water Regulations (NPDWRs). These standards are applicable to public water supplies. Massachusetts also publishes Drinking Water Guidelines for substances without MCLs that are used by MADEP and municipal water providers to evaluate public water supplies. These guidelines are not incorporated in regulation but are used often to evaluate contamination of water supplies or water supply sources.

In addition to the drinking water standards, MADEP has also published, per the MCP, standards that are applicable at monitoring wells and water supply wells within category GW-1 groundwater areas. Per the MCP, in a Method 1 Risk Assessment-based evaluation, GW-1 standards are applicable cleanup standards for GW-1 areas. Also, per the MCP, in a Method 3 Risk Assessment-based evaluation, the Massachusetts MCLs are considered applicable public health standards in category GW-1 groundwater areas. Therefore, the federal and Massachusetts MCLs, Massachusetts Drinking Water Guidelines, and the MCP GW-1 groundwater standards are relevant numerical criteria for evaluating nature and extent of contamination within the Zone II groundwater area (also classified as category GW-1 per the MCP). These same numerical criteria are not relevant outside the Zone II area, since those areas are not current or potential drinking water sources.

The Massachusetts MCLs applicable to Site Zone II groundwater are presented in Table 4.3-2. For detected analytes for which no MCL exists, background concentrations published for the Industriplex Superfund Site, Region IX PRGs for tap water and relevant MADEP groundwater criteria are provided in Table 4.3-2 for context for data comparison. This table includes a comprehensive list of compounds in the target analyte lists for VOCs, and SVOCs, Pesticides/PCBs, inorganics and metals.

The MCP also classifies groundwater with respect to potential for vapor migration from groundwater into occupied buildings and also with respect to the potential for groundwater to discharge to surface water and to potentially impact surface water quality. According to the MCP, shallow groundwater in close proximity to occupied buildings is classified as category GW-2 groundwater due to the potential for vapor intrusion into buildings from the groundwater. This

classification is independent of the drinking water use classification. Therefore, areas both within and outside the Zone II may be classified as category GW-2 groundwater. The MCP contains generic standards for category GW-2 groundwater. Per the MCP, all groundwater in Massachusetts is considered to have the potential to discharge to surface water and potentially impact surface water quality. The MCP contains generic standards for category GW-3 groundwater. The MCP contains provisions for conducting site-specific fate and transport investigations and risk assessments in lieu of the application of the generic GW-2 and GW-3 standards. Numerous investigations and risk assessments have been conducted to address these GW-2 and GW-3 issues at the Site.

The discussion of groundwater quality outside of Zone II takes into consideration available background values that have been identified through review of available literature and published information from the nearby Industriplex Site. Groundwater outside of Zone II and within Zone II is discussed in relation to background, for those analytes with background information, to provide a context for discussion of the nature and extent of contaminants in groundwater.

The Zone II boundary was established by IEP, based on numerical modeling using MODFLOW, to include the interpreted zone of contribution for the Wilmington MWSWs under conditions of extended drought (6 months) and groundwater extraction at the well field design yield. Historically, the MMB wetland has been dewatered by the MWSW field during drought summer conditions and on that basis it appears that conditions modeled by IEP may not represent well yields that can be sustained without environmental harm to the wetland. The boundary conditions for the IEP model, which was run in steady state, were defined based on limited available hydrogeological data, interpreted surface water divides, and geomorphology. The surface water divide boundary was assumed to approximate the groundwater divide. However, this boundary does not account for seasonal variation in water levels and additional groundwater data that have been collected since 1990 provides better definition of groundwater divides within the Site. The groundwater divides assumed by IEP to be coincident with surface water divides are only approximately coincident with the groundwater divides determined from interpretation of more recent groundwater level measurements.

This section also provides additional discussion of hydrogeologic and hydrogeochemical conditions relevant to the conceptual site model for OU3. This includes a description of the DAPL source areas, mechanisms of chemical migration from those areas and their relationship to the three dimensional distribution of groundwater contaminants in Site groundwater. The DAPL material is not groundwater and data pertaining to DAPL are presented in tables separate from the groundwater results. Groundwater and DAPL contained and isolated within the Slurry Wall / Cap containment area is not part of the surrounding groundwater system, and those data are also presented in separate tables. Because the DAPL constitutes a source material, and is situated both within and outside of the Zone II groundwater, each DAPL area is described separately in subsection 4.3.1.

Contaminant distribution figures presented for groundwater discussion show, for each well, the average concentration over the last decade (from January 1, 1997 through the most recent sampling event). If, for a given analyte and well, there are no data from that time period, the most recent analytical result is displayed on the figure. In these figures a green symbol is used to represent the location of a detected analyte in groundwater, and the average value described above is posted along with the well identification number. The size of this symbol is logarithmically proportional to the concentration to aid the reader in recognizing patterns in the distribution and concentration of the detected analyte portrayed. A yellow cross is used for non-detect values (ND) or results equal to or below background, if available. For paired well locations, particularly in MMB, the deep groundwater characteristically has the highest analyte concentrations, followed by intermediate depth groundwater. Shallow groundwater typically is non-detect or equal to/less than background depending on the analyte. To keep the proportionally scaled symbols from being obscured for well clusters, the deep well is in the background with the shallower well couplets (smaller symbol) placed over them in the foreground. In the field, these wells were installed in individual boreholes spaced several feet apart. Not all well couplets have an intermediate depth well, and the intermediate depth is not at any prescribed depth, rather where present, it is screened between the shallow and deep wells.

The analytical results for parameters detected in groundwater and DAPL are summarized in Tables 4.3-2 through 4.3-15. A tabulation of all groundwater analytical results from January 1, 1997 to present (including non-detects) is provided as an electronic PDF file in Appendix C.

Due to the length of some of the data tables, described above (in excess of 1500 pages), statistical summaries of data for Zone II groundwater, areas outside the Zone II groundwater and bedrock groundwater area are provided as summary tables in the table section. The supporting data (i.e. detected constituents) are presented in Appendix D.

The summary tables contain summary statistics describing the detected analytes including frequency of detection, range of detected concentrations, range on non-detected concentrations (e.g., detection limits), and average of all samples. The analytical data supporting the following discussions are provided in tables and appendices as summarized below. The data summary tables indicate the frequency of detection for detected analytes, range of concentrations, and comparison to regulatory screening criteria if applicable. The data tables presented in Appendix D provide the supporting analytical results for detected analytes upon which the summary tables are based.

Table	Title
4.3-1	Summary of Groundwater Monitoring Wells
4.3-2	Screening Criteria and Background Values
4.3-3	Containment Area Groundwater Analytical Data Summary
4.3-4	DAPL Source Area Groundwater Analytical Data Summary
4.3-5	Zone II Ipswich River Watershed Groundwater Analytical Data Summary
4.3-6	Town Wells and Raw Water, Butters Row Treatment Plant Analytical Data Summary
4.3-7	Private Well Groundwater Analytical Data Summary
4.3-8	Zone II Aberjona River Watershed Groundwater Analytical Data Summary
4.3-9	Bedrock Groundwater Analytical Data Summary
4.3-10	Outside Zone II, Ipswich River Watershed Groundwater Analytical Data Summary
4.3-11	Outside Zone II, Aberjona River Watershed Groundwater Analytical Data Summary

Appendix	Title
D.3-1	Containment Area Groundwater Analytical Data
D.3-2	DAPL Source Area Analytical Data

D.3-3 Zone II Ipswich River Watershed Groundwater Analytical Data

D.3-4 Town Wells and Raw Water, Butters Row Treatment Plant Analytical Data

D.3-5 Private Well Groundwater Analytical Data

D.3-6 Zone II Aberjona River Watershed Groundwater Analytical Data

D.3-7 Bedrock Groundwater Analytical Data

D.3-8 Outside Zone II, Ipswich River Watershed Groundwater Analytical Data

D.3-9 Outside Zone II, Aberjona River Watershed Groundwater Analytical Data

4.3.1 Sources

Continuing sources to groundwater are limited to DAPL in off-Property locations, and residual material in the subsurface in the on-Property Plant B area. Each of these areas are shown on Figure 4.3-2 and described below. The former on-Property source areas that were associated with vadose zone soils have been addressed under OU1 and are no longer sources of groundwater contaminants.

DAPL related constituents migrate from DAPL to overlying groundwater by chemical diffusion, which is a slow and generally ineffective chemical transfer mechanism. Studies by Smith (Smith,1997), which are discussed in greater detail in Section 5.0, Contaminant Fate and Transport, concluded that advective movement of groundwater over DAPL is also limited, but sufficient to keep constituent concentrations in the aquifer is an apparent temporal and spatial equilibrium. In addition some constituents undergo geochemical reactions in the process of migrating from low pH DAPL to higher pH diffuse layer and overlying groundwater. The geochemical reactions primarily affect iron, manganese, aluminum, sulfate and chromium, through the precipitation of iron and manganese oxyhydroxides, hydrated aluminum-chromium sulfates, and aluminum-chromium hydroxides. These geochemical reactions are also discussed in Section 5.0. These geochemical reactions including sorption of chromium to iron oxide surfaces, cause rapid attenuation of chromium in groundwater outside the DAPL source areas. Non-reactive species including sodium, chloride and ammonia, and organic constituents such as NDMA will be act as conservative solutes.

4.3.1.1 DAPL Areas

The DAPL has been extensively characterized under previous investigations. The DAPL formed in response to release of acid process waste waters with high dissolved total solids content (ie., higher

density liquids) to unlined ponds on-Property including Lake Poly, and the East and West Acid Pits and the three Acid Pits south of the East and West Warehouses which were subsequently covered by the Lined Lagoons. This dense material then migrated by gravity through the water column settling or pooling on the bedrock surface that underlies the Site. As DAPL continued to accumulate on the bedrock surface during facility operations until the early 1970's, and it migrated down slope within the Western Bedrock Valley. Because the density of the DAPL is greater than water, migration is governed and limited by bedrock topography, and overlying glacial geology, gravity, and density gradients and not driven solely by groundwater flow directions. The advance of the DAPL down the Western Bedrock Valley was arrested by a series of bedrock saddles aligned across the valley floor, including the Jewel Drive Saddle that forms the western limit of the Upper DAPL Pool, and the Main Street Saddle which forms western limit of the Main Street DAPL Pool. As DAPL moved down the bedrock valley it over topped the Jewel Drive Saddle and formed the Main Street Pool, where the majority of DAPL material remains.

DAPL is defined by a density threshold (a specific gravity greater than 1.025) that has been statistically correlated to a specific set of indicator parameters and pH as described in Section 2. These indicator parameters include sulfate, sodium, chloride, and ammonia, and can be used to estimate fluid density based on concentrations and statistically derived correlation factors described in Section 2.0. The potential presence of DAPL-like material is also indicated by specific conductance values greater than 20,600 micro mhos/cm (µmhos/cm).

The inorganic constituents detected in DAPL in order of decreasing concentration include: sulfate; sodium; chloride; ammonia; chromium; iron; aluminum; and manganese. Organic compounds detected in DAPL, in order of decreasing concentrations include: phenol; acetone; 2-hexanone; bromoform; 2-butanone methyl ethyl ketone (MEK); BEHP; toluene; trimethylpentenes; 4-bromophenyl-phenylether; naphthalene; benzoic acid; NDMA; and NDPA.

These inorganic constituents are also detected in groundwater immediately overlying DAPL which have migrated there by chemical diffusion. This zone of groundwater, which has historically been termed the "diffuse layer" is typically several feet thick, and has a very sharp concentration gradient contact with overlying groundwater, which is generally not-affected by chemical diffusion. The diffuse layer overlies the DAPL and does not form a discrete layer in the aquifer

located downgradient of the DAPL pools. Rather, conditions in the deeper groundwater have evolved over many years into a diffuse – like material that owing to density considerations has settled into the deeper portions of the Western Bedrock Valley. This material does not have DAPL characteristics but is an important component in the distributed contaminant mass within the aquifer. In past, this groundwater has been referred to as "diffuse groundwater".

As mentioned previously, three DAPL pools have been characterized and are identified as the Upper DAPL Pool, the Main Street DAPL Pool, and the Western Bedrock Valley DAPL Pool (Figure 4.3-2). A portion of the Upper DAPL Pool is within the on-Property containment structure. The uncontained portion of the Upper DAPL Pool contains an estimated volume of approximately 8.9 million gallons of DAPL. The estimated volume of the Main Street DAPL Pool is approximately 15.7 million gallons. The volume of DAPL or DAPL like material residing in the deepest portion of the Western Bedrock Valley is considerably smaller and estimated to be on the order of 0.6 million gallons, or 3 to 4 percent of the total DAPL volume. These sources contribute some dissolved constituents by chemical diffusion to the diffuse layer. Based on the physical and chemical characteristics determined from chemical monitoring of multilevel piezometers and inductance logging of wells in the DAPL pools, the DAPL within these pools are stratified, with the densest material concentrating at the bottom of the bedrock depressions. The nature and extent of DAPL related constituents detected in groundwater is discussed further in Subsections 4.3.2 and 4.3.3. Analytical data collected from wells screened within the DAPL and overlying groundwater in the containment area is presented in Table 4.3-3. Analytical data from DAPL material in other location is presented in Table 4.3-4. The term "DAPL related" refers to constituents contained in DAPL that are present at elevated concentrations in groundwater diffuse layer and groundwater.

When the Facility was active and using the lagoons and/or unlined pits for management of process waters, the DAPL material was introduced to the environment from 1953 to the 1970s. During infiltration of these dense fluids through the water column, convective mixing with groundwater resulted in the dispersion of the site related compounds throughout the water column and increased the surface area or volume of DAPL or DAPL like material, as well as promoted localized convection of the DAPL as it migrated via gravity to the bedrock surface. This increase in the amount of convection and surface area also increased the flux of DAPL related constituents that could initially dissolve into the aquifer. Once the DAPL reached the bedrock, it continued to flow

via gravity to lower lying areas along the bedrock surface. Before the DAPL eventually settled to the present locations, the momentum from the initial release allowed some of the DAPL and DAPL like material to convectively overflow the bedrock saddles and migrate to the bottom of the WBV. The front of convective mixing associated with DAPL migration initially resulted in a broader, dispersed area of dissolved phase contamination deep within the MMBA. Although not DAPL or DAPL like material, the more highly concentrated dissolved plume has density characteristics that allowed it to occupy the deeper regions within the MMBA. Over time the DAPL stopped migrating down slope due to the presence of flow barriers (bedrock saddles) and has remained stable within the bedrock depressions. A more detailed description of each area or DAPL pool is provided below.

Upper DAPL Pool

The Upper DAPL Pool is located on the Property and adjacent properties to the west bordering Jewel Drive. Olin has contained the on-Property portion of the DAPL pool by installing a slurry wall keyed into bedrock (Figure 4.3-2). The containment structure was completed in 2001. The Upper DAPL Pool is located outside the Zone II area.

The DAPL within the Slurry Wall/Temporary Cap containment area is contained by a bedrock depression and a slurry wall and is isolated from surrounding groundwater. From surrounding borings, the overburden geology consists of a layered sequence of fine to coarse sand and mixtures of sand, gravel, and cobbles with bedrock encountered at 50 feet bgs. It has been noted in a number of borings that the gravel and cobble content increases with depth, however, the lowest sections of unconsolidated deposits in the bedrock depression are a silty glacial till. (Geomega, 2003). The DAPL, the overlying diffuse layer and impacted groundwater within the slurry wall are not in hydraulic communication with the surrounding aquifer, therefore both are treated as a former sources that have been effectively contained as a permanent source control.. Analytical data for groundwater and DAPL collected from wells installed within the containment structure are presented in Table 4.3-3.

The DAPL outside the containment structure extends off-Property to the west, as shown on Figure 4.3-2. The analytical results from multilevel piezometer MP-2 ports 1 through 4 have consistently

indicated the presence of DAPL material. Historic results indicate that MP-2 ports 5 through 9 have also exhibited DAPL like conditions. The variations in constituent concentrations in these upper ports likely represent ongoing perturbations within the DAPL pool due to density gradients that have not stabilized since the time of emplacement. The extent of the off-Property Upper DAPL Pool has been identified based on the shape of the bedrock surface and elevation measurements of the top of the DAPL surface from sampling and induction logging. The DAPL thickness over the deepest portion of the bedrock depression is approximately 30 feet. The upper DAPL surface is encountered approximately 60 feet msl with deepest bedrock encountered at approximately 30 feet msl. The geology in the vicinity of the off-Property DAPL pool is similar to that of the on-Property pool described above. The off-Property Upper DAPL Pool is outside the Zone II area. As with the other DAPL pools, the Upper DAPL Pool elevation has been stable based on induction logging data and interpreted elevation of the bedrock saddles. Groundwater flows east and toward the Upper South Ditch area within the Aberjona River Watershed.

Main Street DAPL Pool

The Main Street DAPL Pool is located within a topographic bedrock low area west of the Property. Only the western edge of the Main Street DAPL Pool is located within the Zone II area. The Main Street DAPL Pool, as its name indicates, lies below a portion of Main Street, and extends to the east towards Jewel Drive (Figure 4.3-2). At its deepest point, the Main Street DAPL Pool is approximately 22 feet thick and the top of the DAPL is encountered at 40 feet bgs. The geology in this area is similar to the Upper DAPL Pool and is described as a layered sequence of fine to coarse sand and mixtures of sand, gravel, and cobbles, with the gravel and cobble content increasing with depth. The lowest sections of unconsolidated deposits in the bedrock depression are described as a silty glacial till as expected with the glacial history and geomorphology of the area.

Western Bedrock Valley DAPL Pool

The Western Bedrock Valley DAPL Pool is within Zone II and occupies a small area based on a high degree of bedrock topographic control from geophysical investigations of the area. The Western Bedrock Valley DAPL Pool has been identified based on the analytical results from monitoring well GW-83D, where the concentration of indicator parameters of specific

conductance, sulfate, sodium, chloride, and ammonia, indicate the presence of DAPL (calculated density greater than 1.025 and specific conductance greater than 20,600 µmhos/cm). The screened interval from which these samples have been collected is at a depth from 120.7 to 110.7 feet bgs and provides vertical control on the elevation of the DAPL material. Extensive geophysical work has been conducted to define the shape of the bedrock surface within this region of the WBV. The bedrock depression where this DAPL is located is small and localized. This area is shown in plan view on Figure 4.3-2 and in the three dimensional bedrock features Figure 3.2-4 presented previously. The estimated volume of this DAPL area is approximately 600,000 gallons. Groundwater quality in this area of the Site is discussed in Subsection 4.3.2 and the fate and transport of constituents detected in DAPL is discussed in Section 5.0.

4.3.1.2 Plant B

Plant B is located in the northeastern quadrant of the Property (Figure 4.3-3) and is mostly within the Zone II Area. Historically this facility consisted of a Tank Farm, and farther to the west a Production Area. The current Plant B groundwater extraction and treatment systems and building is located adjacent to the Tank Farm Area. As noted in Section 2.0, this area has been characterized and remediation activities have been ongoing since 1981 for LNAPL in the Tank Farm Area. The LNAPL released to the environment in that area was process oil. Other chemicals including BEHP and trimethylpentenes were also released in the area and as a result the LNAPL contains BEHP. The trimethylpentenes were released to the environment primarily in vicinity of the former Plant B Production Area. Groundwater flows from the Plant B Production Area toward the Tank Farm Area. One of the analytical methods used to characterize soil and groundwater in this area was the Massachusetts' EPH/VPH method which also detects and reports the trimethylpentene compounds as a petroleum hydrocarbon. The area of trimethylpentene contamination in soil and groundwater near Plant B subsequently became known as the EPH/VPH Area. The hydrocarbons present are not related to petroleum sources. Rather, the hydrocarbons are associated with processing oils and other raw materials used in the historical chemical manufacturing at the Site. Groundwater in this area was remediated by an air sparge/soil vapor extraction (AS/SVE) system. The EPH/VPH portion of the AS/SVE system was shutdown with approval by MADEP in 2005.

The recovery of LNAPL commenced in 1981, and since then, the rate and volume of LNAPL recovered has shown and annual decline over the last seven years and has been approaching an asymptotic limit for last three years. The existing LNAPL containment and extraction system has undergone several optimization steps to increase mass removal of contaminants including nutrient injection and AS/SVE. Due to these conditions, a monitored shut down of the LNAPL recovery was proposed to EPA by Olin in the IRSWP (MACTEC, 2007).

The historic operations at Plant B primarily released a limited number of VOCs and SVOCS. The primary constituents detected in groundwater include trimethylpentenes, BEHP, ammonia, and NDPA. The distribution of these compounds is discussed further in Subsections 4.3.2 and 4.3.3.

4.3.2 Zone II Groundwater

The following subsections discuss the nature and extent of groundwater contaminants in the Zone II area which includes areas within the Ipswich River Watershed and to a lesser degree a small portion of groundwater that contributes to the Aberjona River Watershed (including groundwater below Plant B). Generally, the Zone II areas include groundwater from the northern portion of the Property and extending off-Property into Maple Meadow Brook Aquifer (Figure 3.6-3).

4.3.2.1 Source Areas Contributing to Groundwater Quality within Zone II

As discussed above there are two DAPL areas as well as the residual subsurface material associated with Plant B that contributes to groundwater quality in the Zone II Area. These DAPL areas include the Western Bedrock Valley DAPL Pool and a portion of the Main Street DAPL Pool. As mentions previously, the location of the seasonal groundwater divide in shallow groundwater fluctuates and may temporarily move across the western edge of the off-Property Upper DAPL Pool in the spring. The groundwater gradients within this zone of fluctuation are flat, (by definition), and groundwater movement within this zone is therefore negligible. Since this divide shifts in response to seasonal precipitation and shallow groundwater conditions its affect on deeper groundwater movement above DAPL area is also negligible.

4.3.2.2 Groundwater Contaminant Distribution in Zone II

Table 4.3-1 provides a summary of well locations relative to Zone II and watershed. The analytical results associated with groundwater samples collected from within the Zone II area have been compiled and summarized in Tables 4.3-5 (Zone II groundwater data within the Ipswich Watershed), and 4.3-8 (Zone II groundwater data within the Aberjona Watershed). The data that supports these summary tables are provided in Appendix D.3-6 and D.3-10 respectively. Table 4.3-6 presents data summaries and groundwater analytical data from the Town wells and raw water samples from the Butters Row Treatment Plant. All analytical data collected since January 1997 is presented in Appendix C4. The MCLs and background values for constituents detected in groundwater are presented in Table 4.3-2. The discussion that follows presents the nature and extent or distribution of the primary inorganic indicator parameters and metals, VOCs, and SVOCs n groundwater. The vertical and lateral extent of site related contaminants is defined by background concentrations for inorganic analytes and metals that occur naturally in the environment. The vertical and lateral bounds of specific site related organic contaminants is defined by non-detected values.

4.3.2.2.1 Overburden Groundwater within the Zone II Area and the Ipswich River Watershed

The overburden groundwater within the Ipswich River Watershed includes all areas northwest of the groundwater divide including the MMBA. For the most part, this also includes the areas of groundwater classified as Zone II. This area, and the groundwater divide is shown on Figure 4.3-1. The presence and distribution of site related compounds is discussed below.

Inorganics and Metals

Groundwater samples have been collected and analyzed for both unfiltered and filtered fractions to assess the total concentration as well as dissolved concentrations of constituents in groundwater.

This distribution of total and dissolved sulfates, sodium, chloride, ammonia total and dissolved chromium, total and dissolved aluminum, iron and manganese in groundwater are shown on Figures 4.3-4 through 4.3-14. The range and average concentrations of inorganic analytes and

metals detected in groundwater are presented on Table 4.3-5. Each of these constituents has been detected above background, an MCL, and/or the Region IX PRGs in Site groundwater. Groundwater samples colleted from the town wells and private wells did not contain inorganics or metals above these criteria. A summary of data collected from the Town wells and the supporting analytical data is presented on Table 4.3-7. A summary of data collected from the private wells and the supporting analytical data is presented on Table 4.3-8

The overall distribution of these compounds detected above background concentrations is consistent with the current conceptual site model that groundwater in Zone II, flows below the MMB towards the northwest. Within the Ipswich River Watershed, wells installed directly over the Main Street DAPL pool contain the highest concentrations of both total and dissolved sulfates, sodium and ammonia in groundwater. These inorganic constituents are also detected down gradient, extending to the northwest, within the Maple Meadow Brook Aquifer. Ammonia is detected in deep groundwater at high concentrations in GW-83D but at much lower concentrations in GW-38M (two order of magnitude lower) and GW-38S (three orders of magnitude lower). Ammonia is also detected at elevated concentrations in GW-84D, GW-85D, GW-86D and GW-87D and MP-5 port 3 in a direction oriented along the MMBA toward the Butters Row wells. Ammonia distribution is constrained by surrounding wells to ND or background values. The distribution of chloride and sodium is also consistent with this pattern. The distribution of sulfate is similar; however it is more widely distributed farther to the west and was detected above background in GW-63D and the Chestnut Street Wells.

Of the site-related metals detected in groundwater, the aluminum and chromium will be particularly affected by geochemical reactions along migration pathways from source areas into the aquifer. As discussed previously these species are removed from the dissolved plume by precipitation reactions forming hydrated aluminum-chromium sulfates and oxyhydroxides outside and above the areas of DAPL. In this manner the distribution of chromium and aluminum are attenuated relative to the distribution of conservative, non-reactive inorganic species such as sodium, chloride and ammonia. The distribution of both unfiltered and filtered aluminum detected at concentrations above background is generally limited to groundwater from deep wells in proximity to and within the western edge of the Main Street DAPL Pool. Chromium is also detected in GW-83D within the WBV DAPL area in the unfiltered fraction and in GW-84D, GW-

87D, and GW-88D in filtered fractions. It is important to note that chromium in either fraction is not detected in the intermediate and shallow well couplets, and is constrained to deep groundwater. Manganese in unfiltered sample fractions is distributed similarly to aluminum, but in the filtered fraction is distributed in a manner similar to ammonia. These differences are a function of the number and location of the different fractions collected and analyzed. The filtered iron fraction is the most widely detected metal above background levels in the MMBA.

Collectively, the distribution of total and dissolved fractions of these inorganics and metal define the lateral plume boundaries and the vertical limits of these constituents within the aquifer with respect to background values provided in Table 4.3-2. The distribution of iron, which is especially susceptible to oxidation and reduction reactions in shallow groundwater, may not reflect the distribution of DAPL related constituents as closely as these other analytes.

VOCs

VOCs typically associated with the DAPL source areas include acetone, 2-hexanone, bromoform, MEK, toluene, and trimethylpentenes. Of these compounds only the trimethylpentenes were detected at a frequency greater than 10 percent in OU3.

As shown on Figures 4.3-15 and 4.3-16 the distribution of 2,4,4-trimethyl-1-pentene (TMP-1) within the Zone II is similar to 2,4,4-trimethyl-2-pentene (TMP-2). TMP-2 was only detected in the GW-44D at a low concentration. TPM-1 was also detected in GW-44D and Altron B-1 and has been detected further down gradient within the MMBA at low concentrations in deep groundwater (GW-84D and GW-85D). TMP-1 was not detected in groundwater samples collected from the shallow monitoring well GW-84S, installed adjacent to GW-84D, or in intermediate and shallow wells in the MMB aquifer. In this manner the TMP vertical distribution in groundwater is similar to that of the inorganics and metals.

With the exception of the trimethylpentenes, VOCs from the DAPL source areas are not considered significant analytes in groundwater within Zone II based upon low frequency of detection. Of the remaining VOCs, acetone was only detected in 20 of the 233 samples analyzed; 2-hexanone was only detected in one of the 22 samples analyzed; bromoform was not detected in any of the 255

samples analyzed; MEK was detected in two of the 222 samples analyzed; and toluene was detected in 30 of the 235 samples analyzed. All detected values were reported at concentrations below the MCLs. Based on the frequency of detections over 10 years, as well as the low concentrations that were detected, these VOCs have minimal impact on groundwater quality within Zone II.

Several other VOCs have been detected sporadically over the past 10 years of groundwater investigations. Compounds detected at a frequency of at least 10 percent or that were detected at concentrations that exceed the MCLs are discussed below. However, because of the sporadic spatial and temporal distribution, these compounds are not the focus of this RI and are not presented individually on figures. A summary of these data are presented in Tables 4.3-5 and Appendix D.3-6 and are discussed below.

These VOCs include benzene, toluene, ethylbenzene and xylenes (BTEX) and chlorinated solvents (TCE, DCE, and DCA). BTEX compounds are frequently detected in DAPL area wells at low concentrations (see Table 4.3-4). The BTEX compounds that have historically been detected at a frequency of more than 10% in groundwater samples collected from wells within Zone II include benzene, ethyl benzene and toluene. Methyl-t-butyl ether (MTBE) has also been detected and is a known to be a common oxygenate used in motor fuels (gasoline). Of these compounds, all but toluene have also been detected at concentrations that exceed the MCLs and/or Region IX PRGs. Total xylenes, were only detected at a frequency of less than 5% and no detections exceeded MCL or Region IX PRGs. As shown in Figure 4.3-17, the distribution of BTEX detected within Zone II of the Ipswich River Watershed is similar to other site related analytes. Total BTEX detections are limited to the central portion and deeper portion of the MMBA, range from 0.009 at 12.9 to mg/L.

BTEX compounds are detected in deep wells adjacent to or overlying DAPL areas, within the Zone II area and the MMBA. Within the MMBA BTEX concentrations are highest in the deep well couplets but are typically non-detect in the intermediate and shallow well couplets.

The VOCs TCE, DCE and DCA have been detected in groundwater with TCE and DCE detected at concentrations above MCLs. TCE was detected over a range of 0.0002 to 0.46 mg/L (GW-58D) while DCE was detected over a range of 0.002 to 0.43 mg/L. The distribution of total VOCs is

shown on Figure 4.3-18. These compounds are also detected in DAPL areas (see Table 4.3-4). Within Zone II, these compounds were detected in groundwater within the MMBA and are distributed in a manner similar to the inorganic analytes. However there are only a few locations (MW35D within the slurry wall; MWB-10, MW-106 and MW-101 associated with Plant B; and GW-4 near the railroad tracks) where VOCs were detected in the on-Property wells. Chlorinated compounds are also detected in groundwater at wells located east of the Property including: GW-48D located across and on the east side of the railroad tracks, and GW-80D/S/BR, GW-49D, along the railroad tracks and East Ditch. These compounds (mainly TCE) in DAPL areas are at lower concentrations then found elsewhere on Site. These data suggests that the source of solvents in the Zone II groundwater may not be associated only with the historic operations related Olin Property but also from one or more of the adjacent or nearby industrial properties.

As noted with the inorganic and metal compounds, although site-related VOCs were detected in Zone II areas within the Ipswich River Watershed, no VOCs were detected above MCLs, MA MCLs, or Region IX PRGs in Town wells (Table 4.3-7) or in private wells (Table 4.3-8).

SVOCs

The primary SVOCs associated with the DAPL include phenol, BEHP, 4-bromophenyl-phenylether, naphthalene, benzoic acid and NDMA, and NDPA. Of these compounds, only BEHP, naphthalene, NDMA and NDPA have been consistently detected in Site groundwater.

In addition, in 2004, the EPA Environmental Chemistry Branch published results of a study (USEPA, 2004a) conducted on samples of DAPL, immediately overlying groundwater and shallow groundwater. The results were non-quantitative chemical analysis of tentatively identified compounds and fragments of. The analytical methods used included gas chromatography-high resolution mass spectrometry, matching fragments to special electronic libraries, and are not commercially available methods. The study tentatively identified 196 compounds including fragments in the DAPL and diffuse layer (groundwater immediately overlying and in contact with DAPL). The overlying groundwater contained only a few compounds at low levels. Compounds detected include phenol, dichlorobenzene, diphenyl ether, naphthalene, DEET (insect repellent), benzothiazole, and benzophenone. Distribution of these compounds is not discussed further here as

samples were only collected from 4 well locations some of which are not readily accessible (GW-93D/S, GW-84 D/S, GW-86 D/S, MP-2). These locations provided two DAPL samples, four diffuse layer groundwater samples and four samples of the overlying groundwater. At these locations these constituents were not detected in groundwater at concentrations estimated to be above regulatory criteria, if available. Benzophenone, naphthalene, and phenols are all compounds contained in the SVOC target compound list, and dichlorobenzene isomers are on the VOC target compound list.

As discussed previously, the discovery of NDMA in the MMBA occurred in early 2003. In December 2004, a comprehensive site assessment concerning the distribution of NDMA in environmental media was prepared and submitted to the MADEP (MACTEC, 2004f). This document described the distribution of NDMA in Site groundwater and other environmental media concluding that the distribution of NDMA had been well delineated. With respect to the horizontal extent of NDMA in groundwater, the report stated "the horizontal extent of NDMA in groundwater has been reasonably well established in almost all directions relative to the 51 Eames Street Property". This document also included a statistical correlation analysis of NDMA to other primary indicator parameters. NDMA is detected in DAPL, in diffuse groundwater and in overlying groundwater. The concentration ranges of detected NDMA reported in the study were similar for DAPL and diffuse groundwater and substantially lower for overlying groundwater. The calculated mean concentration for NDMA in DAPL for that study (0.011 mg/L or 11,000 ng/L) was greater that the mean concentration of NDMA in diffuse groundwater (0.0057 mg/L or 5,700 ng/L) and overlying groundwater (0.000075 mg/L or 75 ng/L).

The data set used for the statistical correlation analysis contained a smaller number of records for DAPL (11) and diffuse groundwater samples (28) than overlying groundwater (180), and consequently for the statistical correlation ultimately developed explanatory models for the entire data set. Evaluation of population distribution of NDMA and other indicator parameters within the dataset indicated that sample populations were not normally distributed, and were subsequently log transformed for correlation analysis. Several regression models were developed with different variables and demonstrated that NDMA concentrations over the entire data set were significantly correlated with dissolved calcium, manganese, magnesium, and potassium, and log transformed specific conductivity, chloride, ammonia, and sulfate and dissolved sodium. The final regression

model with the strongest explanatory power and the least number of variables was log transformed NDMA concentrations as the dependent variable correlated to log transformed ammonia and chloride concentrations as the independent variables. The importance of these correlations is indicator parameters may be used to better define and monitor the horizontal and vertical distribution in groundwater.

Consequently, the distribution of NDMA is similar to that of the primary inorganic indicator parameters discussed previously, in particular ammonia, sulfate and chloride, and has been detected in samples collected from the DAPL areas, diffuse groundwater and overlying groundwater from on-Property wells to down gradient areas within Zone II in the MMBA, and down gradient areas outside of Zone II to the south east in proximity to East Ditch.

As shown on Figure 4.3-19, NDMA has been detected in Zone II groundwater at several locations along Main Street and in down gradient locations to the northwest. The NDMA detections in groundwater extend down gradient to GW-64D near Butters Row No. 1 and GW-65D closer to Butters Row No.2. NDMA was not detected in groundwater samples collected from the shallow well pairs at both locations (GW-64 S and GW-65D). The detection of NDMA in raw water samples from the Town wells was discussed previously in Section 1. NDMA is present in deep groundwater in GW-65D is in the central portion of the WBV. GW-73D, which did not detect NDMA, is not directly downgradient of this well. NDMA was also detected in groundwater from GW-103D and GW-103BR and GW-63D near Chestnut Street No. 1A/2 and Chestnut No. 1 Wells respectively. NDMA was not detected at a detection limit of 0.002 ug/L (2 ng/L) in shallow groundwater GW-63S. Within the MMBA, NDMA was not detected in most other shallow wells at a detection limit of 0.002 ug/L including GW-84S, GW-59S, GW-61S, GW-62S, GW-67S, GW-61S, and GW-84S. These shallow well couplets bound the vertical extent of NDMA in the MMBA. The only well in the MMBA designated as a shallow well in which NDMA was detected in groundwater was GW-83S.

The NDMA plume in Zone II groundwater is bounded laterally by a large number of shallow and deep wells to non-detect values (at a detection limit of 0.002 ug/L). On the western side of the plume, from north west to southeast, these wells include GW-88D, GW-88M, GW-88S, MW-204D, MW-204M, MW-204S, MW-206D, MW206S, and GW-66D, GW-66S, GW-50D, GW-50S,

and a temporary shallow well M-25/L-05, and GW-46D. Former residential wells M-15/L-06, M-15/L-07, and M-15/L-08, were last sampled in 1991 prior to decommissioning and shallow groundwater samples from those wells did not detect NDMA at a detection limit of 10 ug/L. To the north of the Chestnut Street Wells No. 1, and 1A/2, and Butters Row Wells No. 1 and 2, the NDMA in groundwater is bounded by non-detect values to a detection limit of 0.002 ug/L at M-14/L-2B, M-14L-2C, and 56/58 Butters Row. In addition, the MMBA is bounded in overburden groundwater in this direction by the bedrock valley. To the east with Zone II, from the northern Property boundary toward the northwest, the plume is bounded by non-detect values at a 0.002 ug/L detection limit at GW-31D and GW-31S, GW-57D and M38-L1, GW-61D and GW-61S, GW-73D, and GW-73S. NDMA was not detected in shallow groundwater in GW-61S or GW-67S, although NDMA was detected at concentrations just above the detection limit in deep groundwater in the deep paired wells GW-61D, GW-67D. These deep wells confirm the edge of the NDMA plume at concentrations below the 0.010 ug/L guideline for NDMA. To the northeast the MMBA is bounded by a bedrock ridge on the northeast side of the MMB wetland between Town Park and GW-61D/S. The strength of this lateral delineation in groundwater is reinforced by the distribution of ammonia and sulfate, which has been previously discussed and is strongly correlated to NDMA. Where NDMA has been detected across well clusters, the higher concentrations are associated with the deeper wells, supporting earlier assessments of contaminant distribution (MACTEC, 2004f). Analytical data are summarized in Tables 4.3-5 and is presented in Appendix D.3-3.

NDPA has not been detected in wells within the Ipswich River Watershed within the Zone II area. The distribution of NDPA associated with Aberjona River Watershed is discussed below in Subsections 4.3.2.2 and 4.3.3. For comparison, the distribution of NDPA is presented on Figure 4.3-20.

The other SVOC that has been consistently detected in the Zone II groundwater is BEHP. BEHP is associated with DAPL as well as the LNAPL at Plant B. BEHP has also been detected in groundwater from wells installed within the Slurry Wall, and from wells bordering former Lake Poly. The distribution of BEHP in groundwater is shown on Figure 4.3-21. Within the Zone II area in the Ipswich River Watershed, BEHP is detected within the MMBA in locations predominantly along the WBV.BEHP has also been detected at a low concentration in groundwater at Chestnut Street 1A/2 well. The lateral and vertical extent of BEHP is delineated laterally by

existing monitoring wells. Average concentrations of BEHP are generally slightly higher in the deep groundwater wells when compared to average concentrations of reported for the shallow groundwater wells.

As noted above, several other SVOCs, such as (phenol, 4-bromophenyl-phenylether and benzoic acid) have been associated with DAPL source areas but are not contributing to groundwater quality impacts within the Zone II area. Phenol has only been detected in 21 of 217 samples and although there are no published MCL for phenol, no detections exceeded the Region IX screening criteria. The compound 4-bromophenyl-phenylether was not detected in any of the 219 groundwater samples analyzed, benzoic acid was only detected in 6 of the 192 groundwater samples, and similar to phenols, there are no published MCLs, and all detections were below the Region IX screening criteria.

The distribution of naphthalene is similar to BTEX and is shown on Figure 4.3-21, the detections within the Ipswich River Watershed are limited to deep wells near DAPL sources, and it has not been detected in groundwater from shallow or intermediate depth groundwater wells. Finally, several PAHs have also been detected at frequencies greater than 20% of samples analyzed for EPH. Although PAHs are common in industrialize areas, the pattern of site related constituent in the deeper groundwater monitoring wells suggests PAHs in the Zone II area are site-related.

Pesticides and PCBs

Several pesticides have been detected at low levels in soils associated with OU1 and are also shallow groundwater monitoring wells along Main Street and Eames Street (MW-44S, MW-59S, GW-60S, GW-67S, and GW-70S). These pesticide detected concentration are below EPA MCLs. The distribution of total pesticide concentration is shown in Figure 4.3-25.

The pesticides at these locations are associated with the shallow groundwater and are most likely attributed to local applications and not from on-Property sources. Detected pesticides include:

- aldrin
- endrin

- heptachlor

4.3.2.2.2 Overburden Groundwater in Zone II area and the Aberjona River Watershed (Areas Around Plant B)

The overburden groundwater within the Aberjona River Watershed includes the small portion of the Zone II Area around and north east of Plant B. A groundwater extraction and treatment system has operated at plant since the early 1980's to contain and collect LNAPL (See Figure 4.3-1).

The source area at Plant B is limited to the LNAPL area and includes dissolved phase ammonia TMP, BEHP, and NDPA. The limited impacts from metals are more related to the geochemistry, and localized conditions and past disposal practices. A discussion of the extent and distribution of chemicals in the Zone II areas, within the Aberjona River Watershed are presented below. Groundwater data supporting these discussions are presented in Tables 4.3-9 and Appendix D.3-10. All Site analytical data is presented in Appendix C4..

Inorganics and Metals

Of the indicator inorganics and metals associated with the rest of the Facility, only total sulfate, ammonia and dissolved iron have been detected at concentrations above background conditions in the Plant B area. However; each of these the detections are sporadic and at concentrations that are generally less than five times background values published for the Industriplex Site. The distribution of inorganics in groundwater was presented previously in Figures 4.3-4 through 4.3-14.

Total chromium was detected in groundwater from monitoring well GW-31D, at a concentration slightly above the MCL. . However, total chromium was only analyzed once in 1991. Dissolved chromium has not been detected in groundwater from this well. There are no other chromium detections in Zone II groundwater in on-Property monitoring wells.

VOCs

TMP-1 and TMP-2 are both associated with the LNAPL releases associated with Plant B. As noted above, groundwater from this area is captured by an extraction well to contain and mechanically

recover LNAPL. The extent of impacted groundwater on with Zone II on-Property is restricted to the immediate area around Plant B (Figures 4.3-15 and 4.3-16).

BTEX compounds have also been detected in the wells associated with Plant B (Figure 4.3-17) and the former EPH/VPH area. Compounds detected above the MCLs or Region IX PRGs include ethyl benzene, toluene, and benzene.

Only one chlorinated solvent, TCE, has been detected in groundwater in the vicinity of Plant B. TCE has been detected in 5 of the 93 samples; however the highest concentration was reported in the groundwater sample collected from GW-048D at 0.005 mg/L, equal to the MCL criteria. (Figure 4.3-18). This monitoring well (GW-48D), is located off-Property, east of the railroad tracks and the MADEP has concurred that the source of TCE is not associated with the Olin Property.

Lower concentrations of 1,1,1-TCA, 1,1-DCE have also been detected, however most of these detections were from wells located on-Property with the reported concentrations well below the corresponding MCLs.

SVOCs

Similar to the SVOCs detected within the Zone II portions of the Ipswich River Watershed noted above, NDMA and NDPA, have both been detected in groundwater from wells in the Plant B area as well as up gradient areas (NDMA was detected in groundwater from GW32S and GW32D and NDPA was detected in groundwater from GW-31D and GW-32D). The distributions of NDMA and NDPA in groundwater are shown on Figure 4.3-19 and 4.3-20.

BEHP has also been detected in all groundwater wells located associated with the Plant B and former VPH/EPH areas. The distribution of BEHP within this portion of Zone II groundwater has been defined and is shown on Figure 4.3-21. Naphthalene and phenol have also been detected at several locations in this area, but not at the same frequency as BEHP. The distribution of naphthalene and phenol are show on Figures 4.3-22 and 4.3-23, respectively.

Pesticides and PCBs

Pesticides (aldrin, endrin, endrin aldehyde, and heptachlor) were detected in the Plant B extraction well IW-11 in 1997 but at concentrations below MCLs, for those compounds with MCLs (heptachlor). The distribution of total pesticides concentrations in groundwater is shown on Figure 4.3-25.

No PCBs have been detected in groundwater samples collected from wells installed within the Zone II area within the Aberjona River Watershed (Figure 4.3-26).

4.3.2.2.3 Bedrock Groundwater within the Zone II Area

Six deep bedrock groundwater monitoring wells (GW-61BR, GW-62BR, GW-51BRD, GW-65BR, GW-103BR) were installed and have been monitored within the Zone II area. In addition, one private bedrock well (M-24/L-117) has been included in the discussions below. Each of these locations is within the Ipswich River Watershed. The location of each of the bedrock wells is shown on Figure 4.3-27. Analytical data are summarized in Tables 4.3-9 and the supporting data are presented in Appendix D.3-7 and on Figures 4.3-4 through 4.3-26.

Inorganics and Metals

The primary indicator compounds including inorganics and metals are not consistently detected within samples collected from monitoring wells or private wells screened within the bedrock. Sulfate, dissolved sodium, chloride and iron were detected above the reported background conditions in GW-62BRD and the deeper zones of MP-4 which are in bedrock down gradient of the Main Street DAPL Pool. The background levels cited were established based on data collected from overburden wells, and are also used for bedrock water quality comparisons. Chromium was not detected above background values in bedrock groundwater in any of the wells, nor was ammonia. The specific conductance of groundwater in GW-62BRD, was reported to values above 10,000 umhos/cm. High specific conductance values have also been measured in groundwater samples from bedrock zones within MP-4.

No inorganics or metals were detected above background conditions in any private wells sampled (see Table 4.3-7).

VOCs

TMP-1 and TMP-2 were not detected in groundwater samples from bedrock wells within the Zone II area. Low concentrations of benzene, ethylbenzene, and toluene have been detected, however the data was collected in 1992 and these estimated concentrations were only slightly above the detection limit at that time.

Low concentrations of chlorinated solvents have also been detected in groundwater at MW-103BR, located near the Chestnut Street MWSWs, and in MW-62BR. Similar to the benzene, ethylbenzene and toluene concentrations were reported at values close to the reporting limit.

SVOCs

NDMA was detected in bedrock groundwater samples at monitoring wells GW-61BR (in 2005) and at GW-103BR (in both 2003 and 2004). NDPA was not detected in bedrock groundwater. BEHP was detected at a low estimated concentration in groundwater at GW-62BR only.

Pesticides and PCBS

No pesticides or PCBs were detected in samples collected from bedrock monitoring wells within the Zone II Area.

4.3.2.3 Summary of Zone II Groundwater Quality and Data Gap Assessment.

Groundwater within Zone II areas of the Site flows and discharges predominantly to the Ipswich River Watershed. Analytes detetced with the DAPL (sulfate, ammonia, chloride, calcium, sodium, iron, chromium, aluminum, TMP-1, phenols and NDMA) are present within the MMB aquifer. The area of impacted groundwater is confined to the WBV and groundwater flow generally follows the axis of the MMB valley, extending to the northwest of the Property then turning north northeast following the direction of MMB. The detected analytes concentrations are characteristically highest is deep groundwater, and attenuate rapidly vertically, such that shallow groundwater is not impacted. The vertical and lateral extent of NDMA in Zone II groundwater has been bounded. The lateral extent of groundwater in which NDMA is detected is depicted on Figure 4.3-28. NDMA is miscible in water, has a low vapor pressure and a low organic carbon and octanol/water

partitioning coefficient (WHO, 2004) and consequently will not sorb onto aquifer materials or volatilize to any great extent. NDMA will be transported as a conservative solute. This boundary is the maximum lateral extent of detected analytes in groundwater associated with the Olin Property.

Groundwater collected from wells screened in deeper portions of the aquifer tend to have higher concentrations of these constituents, with progressively lower concentrations in intermediate elevation in the aquifer (M designated wells), and are non-detect or at background in shallow groundwater (S designated wells in well couplets). These relationships are particularly noted in the distribution of both ammonia and NDMA. Based on the distribution of indicator parameters, in particular ammonia, and chloride to which NDMA has been strongly correlated (MACTEC 2004f), the lateral extent of overburden groundwater in Zone II (eastern, western, and northern boundaries) affected by releases from the Facility are defined and has been bounded based on comparison of indicator parameters to background, where available, and to non-detect values for NDMA. The widest lateral dimension of the groundwater impact within the MMBA is indicated by the NDMA distribution. Although it would appear from figures presented in this section that the northern limit of overburden groundwater affected by releases from the Facility has not been bounded, this in not an appropriate conclusion as the bedrock valley on that side of the Site rises to ground surface, limiting the lateral extent of the overburden aquifer, which then becomes the northern boundary of Site-related impacts to overburden Zone II groundwater.

It is important to note that the distribution of chromium is very limited compared to other analytes. As discussed previously, chromium is affected by geochemical reactions during transport, and precipitates as Cr-Al sulfates Al-Cr hydroxide and sorption to iron hydroxide species outside the edges of the DAPL sources due to changes in pH conditions and stability fields (solubility) of corresponding sulfate and hydroxide minerals. Once precipitated the Cr-Al sulfates and hydroxides will remain stable due to pH of the aquifer in which it precipitates. These processes that affect contaminant fate and transport are discussed in greater detail in Section 5.0.

The data presented in this Section also demonstrated the consistent nature of the vertical change in solute concentrations within well couplets installed within the MMBA inside the boundaries of the MMB wetland for all analytes. The primary compound of regulatory concern within the aquifer is

NDMA. The vertical distribution of NDMA has been adequately characterized to make estimates of mass and distribution. NDMA is typically non-detect in groundwater from shallow well couplets indicating that its transfer vertically in the aquifer is limited by diffusion rates. The weak (very small) vertical gradients in the aquifer are typically downward. NDMA has not been positively detected in MMB or Sawmill Brook surface water. Based on the hydrologic setting of the MMBA, the extensive vertical monitoring well network within the wetland and within the core of the groundwater plume, the vertical extent of solutes in the MMBA has also been well characterized.

NDMA was detected in GW-65D at low concentrations, and as such the extent of groundwater contamination has not been bounded to non-detect values to the north northeast along the WBV under the MMB along the course of the brook. Although GW-73D and GW-73S near the Town Park well are non-detect, this location is not necessarily downgradient of GW-65D. GW-73D provides a lateral delineation to the south of MMB in this area of the Site.

Since the Wilmington MWSWs wells are not currently pumping, the volume of water flowing through the aquifer area has decreased, which would require that a larger proportion of shallow groundwater discharge to surface water. Since cessation of pumping, solute concentrations within certain portions of the aquifer have been readjusting to these new hydraulic conditions. Statistical changes in aquifer solute concentrations are evaluated and discussed in Section 5.0.

4.3.3 Groundwater Outside the Zone II Area

Groundwater outside the Zone II area also includes some areas within the Ipswich River Watershed but to a greater degree, includes areas within the Aberjona River Watershed. Generally, areas outside the Zone II include groundwater from below the properties located along Jewel Drive, below most of the Property, and areas downgradient of the Property located to the southeast. As noted previously, a portion of Plant B is located in Zone II with the remaining portion of the Property, including most of the other buildings, are located outside the Zone II area (Figure 4.3-1). These distinctions are based on the location of the October groundwater divide and the direction of groundwater flow relative to the Zone II boundary.

Under the NCP, the MCP and related State Superfund Laws would be considered in determining applicable relevant and appropriate requirements (ARARs) for risk evaluation in the RI/FS process. The area of the Site outside Zone II does not contain municipal water supplies or private supplies to which the Federal MCLs are directly applicable. Based on demonstrated non-detections of site-related contamination in private water supplies, the area within the Site boundary does not contain current or future private water supplies, and water use is and can be placed under institutional controls. Therefore the primary receptors of groundwater in areas outside Zones II are surface water, and humans (via inhalation) by potential vapor intrusion into buildings. Under the MCP three risk methods may be used in the risk evaluation process. Method 1 uses numerical standards, Methods 2 allows modification of these numerical standards based on site- specific information, and Method 3 allows risk characterization to be performed using site-specific data and risk assessment methods.

Method 1 risk standards include three categories for groundwater based on exposure route and receptor (GW-1, GW-2, and GW-3). GW-1 standards apply to ingestion exposures to groundwater and apply to the downgradient portion of the Site within the zone of contribution of a municipal water supply, but would also apply to buffer areas surrounding private potable water supplies. GW-2 standards consider human exposure through vapor migration and inhalation. GW-3 standards consider environmental risk to surface water. Under the MCP, groundwater quality outside the Zone II area would normally be evaluated using GW-2 and GW-3 standards by the published criteria (Method 1) or by site specific Risk Assessments (Method 3). Areas outside Zone II and within the Site are not anticipated to be used as a future municipal water supply or private water supplies, although there are residences outside the Zone II area that used groundwater for potable water supply. In lieu of using Method 1 published criteria, both human health and ecological risk assessments have been conducted to evaluate GW-2 and GW-3 pathways for potential impacts to Site receptors for groundwater. A summary of this previous work is discussed in Section 2.0 and the results of the risk assessment are discussed in Section 6.0. Therefore, evaluation of groundwater outside of the Zone II does not require consideration of Federal MCLs, or State Method 1 numerical standards for GW-1, GW-2 or GW-3.

The remainder of this subsection discusses the nature and extent of site-related constituents in groundwater outside the Zone II area. Summary tables provide summary statistics in comparison to background values for analytes for which they are available.

4.3.3.1 Sources

The DAPL source areas located within the Zone II groundwater include the off-Property Upper DAPL Pool and the eastern portion of the Main Street DAPL Pool. The Plant B LNAPL source is within Zone II. This area downgradient of Plant B is outside the Zone II area.

Excavation activities documented in Section 2.0 and remaining soil in on-Property Areas described in Section 4, no longer constitute sources of contamination to groundwater. Areas of impacted groundwater that existed outside the Slurry Wall/Temporary Cap containment area, at the time the containment area was constructed remain as a source of ammonia chromium, aluminum, sulfate, and other solutes to surface water in South Ditch. The DAPL and overlying groundwater isolated within the containment area are no longer a source of contamination.

4.3.3.2 Groundwater Contaminant Distribution Outside the Zone II Area

The analytical results associated with groundwater samples collected outside the Zone II area have been compiled and summarized. The discussion that follows identifies the indicator parameters identified within the source areas and presents the nature and extent or distribution of these indicator parameters within groundwater. Analytical data for detected analytes for outside of Zone II areas within the Ipswich River Watershed are summarized in Tables 4.3-13 and supporting data is contained within Appendix D.3-14. Analytical data for detected analytes for outside of Zone II areas within the Aberjona River Watershed are summarized in Tables 4.3-15 and supporting data is contained within Appendix D.3-15. All data, including non-detected analytes is presented in Appendix C4. As with discussions associated Zone II groundwater, the distribution of site-related constituents is shown on Figure 4.3-4 through 4.3-26.

4.3.3.2.1 Overburden Groundwater Outside the Zone II Area Within the Ipswich River Watershed

The overburden groundwater within the Ipswich River Watershed and outside the Zone II area includes areas west of the Property, between the seasonal groundwater divide and the Zone II boundary. Wells within this region of groundwater include GW-45S, GW-69D, Altron B3, M-24/L-33A and M-24/L-72A, and GW-64S. The divide is sensitive to small fluctuations in groundwater elevation and therefore the divide location fluctuates seasonally. The divide used in this evaluation is the October divide from 2004, as it is believed to be most representative of average seasonal conditions. The groundwater gradients in this area are very subdued (flat) and therefore the flux of groundwater through this area is expected to be low.

As discussed above, sources that may contribute to groundwater quality include historical releases that occurred on-Property, and the chemical diffusion from the DAPL pools. The nature and distribution of site related compounds is discussed below.

Inorganics and Metals

Source areas contributing inorganic metals to groundwater outside the Zone II areas but within the Ipswich River Watershed include the western edge of the off-Property Upper DAPL Pool and the eastern side of the Main Street DAPL Pool. As with the Zone II areas, groundwater data from monitoring wells GW-45S and GW-69D show impacts from sulfate, sodium, chromium, chloride, ammonia, and iron and have elevated specific conductance. Aluminum was also detected at MW45D at concentrations above background conditions. Monitoring well GW-45D is installed within the DAPL and therefore data from this location is excluded in this discussion for it represents source material and not groundwater conditions.

In addition to the inorganics listed above, GW-46D , (located to the south of well Altron B3) also contained total (unfiltered) chromium above background concentrations, however the analyses of the filtered samples or for dissolve chromium was non-detect. As will be noted in subsequent sections this well did not detect NDMA and is outside the Site groundwater contamination boundary.

The wells located to the south of GW-46D do not show any impacts from site related compounds. Hydrogeologically, these locations are up or cross gradient from the source areas and have not been impacted by releases from the Property.

Groundwater impacts from inorganics and metals in groundwater outside the Zone II area and within the Ipswich River Watershed have been delineated.

VOCs

The only VOCs detected in groundwater samples collected from outside the Zone II area and within the Ipswich River Watershed include TMP-1, MTBE, and chlorinated solvents. These constituents were detected one in November 1997 at the well Altron B3. Three subsequent rounds of data were collected from this location through 1999, with all results for TMP-1 and TMP-2 reported non-detect. MTBE and two chlorinated solvents were also detected during this round. However, the presence of these constituents is not related to former on-Property facility operations, and Sanmina has addressed the identification of these constituents with the MADEP.

Low concentrations of VOCs were detected in samples collected from shallow groundwater monitoring wells; however, as discussed in Section 2.0 and Section 6.0, risk assessments have been completed to demonstrate that there is no risk posed to indoor air quality from potential volatilization of site-related constituents due to migration from groundwater to soil gas.

SVOCs

NDMA was detected in groundwater in GW-45S and Altron B3, which are both screened above the Main Street DAPL pool. BEHP was also detected in groundwater within the Altron B3 well, however, like the VOCs detected at this location, BEHP may also be contributed from Sanmina operations. BEHP is not detected in water samples from the other DAPL wells in this DAPL pool or the Upper DAPL Pool. No other SVOCs were detected in groundwater wells located within this area outside Zone II and within the Ipswich River Watershed.

Pesticides and PCBs

No pesticides or PCBs were detected in groundwater from wells within the area outside Zone II and within the Ipswich River Watershed.

4.3.3.2.2 Overburden Groundwater Outside the Zone II Area and Within the Aberjona River Watershed

The area outside Zone II overburden groundwater and within the Aberjona River Watershed includes most of the groundwater on-Property, and downgradient and to the southwest of the Property.

As discussed above, sources that may have historically contributed to groundwater quality include former facility operations, and to a limited degree, chemical diffusion from the DAPL pools. For groundwater within the on-Property areas, much of the shallow overburden groundwater discharges to the surface water bodies, thereby constraining and defining the downgradient plume boundaries.

A limited amount of overburden groundwater discharges to the off-Property West Ditch, as groundwater discharge has been suppressed by increased surface water elevations behind the weir. Groundwater actively discharges for several hundred feet down stream of the weir, after which point South Ditch is typically neither characteristically a losing or gaining stream, and vertical head potentials between surface water and underlying shallow groundwater vary up or down depending on seasonal groundwater fluctuations and precipitation events. Farther downstream the South Ditch becomes a predominantly gaining stream below the confluence of the Ephemeral Drainage. A more detailed discussion of groundwater and surface water interaction is presented in Section 5.4.

The nature and distribution of site related compounds is discussed below.

Groundwater analytical data is summarized on Tables 4.3-11 and the supporting data which includes the results of detected analytes is provided in Appendix D.3-6. All groundwater data is presented in Appendix C4. The distribution of site related constituents is presented on Figures 4.3-4 through 4.3-28.

Inorganics and Metals

Inorganics and metals detected in groundwater primarily include sodium, sulfate, chromium, ammonia, manganese, and iron. Elevated specific conductance and low pH are also characteristics of certain areas within groundwater, although these parameters are not represented on figures. As shown on Figures 4.3-4 through 4.3-14, detection of inorganic analytes above background values is generally associated with on-Property overburden groundwater, and within this data set, the detections of these parameters has been delineated vertically and horizontally as described below.

Sulfate has been detected at concentrations above background conditions, in groundwater within the Slurry Wall containment area as well as in down in gradient locations south of and along the South Ditch and Ephemeral Drainage. This pattern is generally consistent for other metals and inorganics; however, chromium, iron, and aluminum were also detected above background concentrations east of the East Ditch at GW-80S. Although ammonia was detected in groundwater east of the Property along off-Property South Ditch in GW-5, it was not detected in groundwater farther down gradient in the GW-80, GW-49, or the GW-74 well clusters. Sulfate is present at higher concentrations in deep groundwater compared to shallow groundwater in both the off-Property West Ditch Area over the Upper DAPL Pool as indicated in well pairs GW-42D/S and GW-43D/S, as well as in the overburden groundwater surrounding the South Ditch and Ephemeral Drainage area as indicated in well pairs GW-202D/S, GW-55D/S, and GW-50D/S. Although inorganics and metals concentrations are elevated in GW-202 D and GW-55D, the concentrations do not indicate the presence of DAPL in these wells. The calculated density of this groundwater is greater than unity and would suggest that this groundwater will preferentially remain along the bottom of the aquifer under this portion of the Property. Sulfate is also prevalent in groundwater located east of the containment area.

The distribution of ammonia is less uniform than sulfate, and its distribution suggests that it is discharging to surface water within the Upper South Ditch Area, and in the vicinity of GW-79S near Central Pond and then farther downgradient near the property boundary. The distribution of ammonia in deep and shallow well pairs in vicinity of the Upper DAPL Pool, South Ditch and Ephemeral Drainage, is similar to that of sulfate described previously. Ammonia is generally not

present in groundwater in other on-Property areas, except downgradient of Plant B, and at low concentrations in deep well groundwater east of the containment area.

The distribution of chromium (filtered and unfiltered) is similar to that of ammonia, in that it is present in wells adjoining the Upper South Ditch and near Central Pond, but differs in that it is not detected in groundwater farther down gradient to the Property boundary. Chromium was detected in the unfiltered fraction in GW-80S, off-Property east of the East Ditch, and its presence there would not appear to be related to the Olin Site, given the number of intervening wells that are non-detect. This distribution of chromium in groundwater indicates that the origin of chromium bearing floc in South Ditch is limited to the Upper South Ditch.

Sulfates, chromium, ammonia, and dissolved iron were also detected in groundwater samples collected from on- Property wells outside the Zone II area, located from approximately 100 to 200 feet south of Plant B. These wells included GW-52D, GW-15, and GW-98. Total chromium was detected in GW-98, and filtered or dissolved chromium was detected at GW-15 at low concentrations.

Sulfate, sodium, and calcium in addition to chromium have been detected in shallow groundwater in monitoring wells surrounding the Calcium Sulfate landfill and data from those wells are presented for completeness. The Calcium Sulfate Landfill is being closed under State Solid Waste regulations. A closure certification and a long term monitoring plan have been submitted to the State and are currently under review. In 1999 Olin conducted a geochemical assessment of the groundwater data at the CSL to discriminate between groundwater related to the CSL and other potential sources of groundwater impacts such as the Woburn Sanitary Landfill (WSL) which abuts the (Geomega, 1999b). Since the CSL is a monofill of calcium sulfate mineral precipitates (gypsum), general water quality impacts should be primarily soluble calcium and sulfate in a stochiometric ratio consistent with mineral chemical composition, and solubility and should approach the theoretical stochiometric ratio of 0.4 : 1.0 expected from the leaching of gypsum. Evaluation of calcium to sulfate ratios from groundwater samples surrounding the CSL indicates that CSL impacted groundwater is limited to the immediate vicinity of the CSL. When both calcium concentrations and calcium to sulfate ratios are included in this evaluation, the clearly impacted wells include SL-5, SL-6, and GW-40D. This study also indicated that the sulfate to

alkalinity ratio can be used to discern CSL impacted groundwater from that of the WSL. In the vicinity of the CSL this ratio ranges from 5.6 to 24, while within the WSL the ratio is 0.1 to 0.3. The sulfate to alkalinity ratio also suggests groundwater from the CSL extends to GW-40D, and have some influence on MW-5 (with ratio of 2.6).

At the CSL, total chromium was reported in 1989 in groundwater from monitoring wells SL-1S and SL-2 and in 1991 from monitoring wells SL-5 and GW-40D (see Figure 4.3-9). Ammonia was also detected in groundwater at concentrations above background in SL-5, SL-1S and SL-2 (see Figure 4.3-8).

VOCs

TMPs have been detected in groundwater samples collected from monitoring wells outside Zone II in the Aberjona River Watershed in on-Property wells mostly within the northern areas, near Plant B and the north of the former office building. TMPs have also been detected in groundwater from off-Property wells: both TMP-1 and TMP 2 were detected at GW-69D and GW-43S/D; TMP-1 was also detected at GW-68D; and TMP-2 was detected at GW-42D. Each of these wells is located off-Property, to the north and/or west. These detections are associated with groundwater immediately overlying the Upper DAPL Pool, in the off-Property West Ditch Area.

TMPs have also been detected in groundwater samples from wells installed within the Slurry Wall; however this groundwater is not in hydraulic communication with the surrounding aquifer and therefore does not contribute to groundwater quality within this watershed. No TMP-1 or TMP-2 has been detected in wells located to the south or east of these areas (i.e. in groundwater from wells near the South Ditch, Ephemeral Ditch, and the southern portion of the Eastern Ditch). In 1991, low estimated concentrations of TMP1 and TMP2 were detected in groundwater from GW-40D located near the southwest corner of the CSL.

Finally, no BTEX and/or solvents have been detected in on-Property wells outside the Zone II area (with the exception of low detections within the Slurry Wall; see Figures 4.3-17 and 4.3-18).

Although low concentrations of VOCs have been reported in groundwater samples collected from shallow wells, data are below the volatilization criteria. This data is supported by the risk

assessments that were completed to evaluate potential impacts to indoor air and concluded there is not an unacceptable risk to indoor air quality from migration of VOCs via soil gas. A summary of the risk assessment is presented in Section 6.0 of this report.

SVOCs

As discussed previously, the discovery of NDMA in the MMBA occurred in early 2003. In December 2004, a comprehensive site assessment concerning the distribution of NDMA in environmental media was prepared and submitted to the MADEP. (MACTEC, 2004f). Conclusions presented to this comprehensive site assessment were summarized previously in Section 4.3.2.2.1. NDMA has been detected in on- and off-Property groundwater and is distributed within the northern two thirds of the Property. Higher concentrations of NDMA are reported in deep groundwater from well locations northwest of the Property and containment area within the off-Property Upper DAPL Pool and the Main Street DAPL Pool. NDMA concentrations in groundwater underlying and along South Ditch, the central and eastern side of the Property (see Figure 4.3-19) are lower and tend to be more uniform. NDMA concentrations in deep groundwater collected from GW-50D adjacent to lower South Ditch are higher than in the corresponding shallow groundwater well GW-50S, consistent with other areas of the Site discussed previously. The reported concentrations of NDMA were also slightly higher in groundwater east of Former Plant D in GW-307 and GW-308 compared to other on-Property wells outside the containment area. NDMA is present in groundwater downgradient, along the Lower South Ditch, continuing along the East Ditch. NDMA was also detected in groundwater from GW-80D and GW-80BR. NDMA was not detected farther to the east in GW-74Dand GW-74S. The elevation of surface water in North Pond near GW-74S is higher than surface water in East Ditch and groundwater is believed to flow toward East Ditch based on the November 2004 potentiometric groundwater surface. Based on the number of wells present in this areas of the Site, it cannot be determined if the GW-74 well couplet is directly down gradient of the GW-80 well couplet. Therefore the lack of detection of NDMA and ammonia in groundwater from GW-74D and GW-74S may not conclusively bound groundwater impacts downgradient of GW-80.

The southern lateral boundary of NDMA is bounded by non-detect values to a detection limit of 0.002 ug/L in GW-46D, GW-48D, and GW-20. The eastern lateral extent of NDMA that is known

is the property boundary. Based on topography and expected groundwater flow conditions, groundwater east of the property should also flow toward East Ditch, and East Ditch should be a flow divide and the approximate lateral boundary of NDMA and related site constituents in the overburden groundwater system.

NDPA has been only been detected in wells located within or adjacent to the northern end or developed portion of the Property. As shown on Figure 4.3-20, detections of NDPA are limited to areas of historic operations and the extent of this constituent in groundwater is delineated.

The remaining SVOCs associated with the DAPL and Plant B sources include BEHP, naphthalene, phenols, and bromoform. Each of these constituents have also been detected in groundwater within the Slurry Wall, but as noted previously groundwater within this contained area is not in communication with the surrounding aquifer and therefore these data do not represent groundwater conditions. Detections of these SVOCs outside the slurry wall are sporadic and do not indicated a continuing on-Property source. The distribution of these SVOCs is shown on Figures 4.3-21 and 4.3-24.

Pesticides and PCBs

Pesticides have been detected in groundwater outside the Zone II Area. As summarized on Table 4.3-15 and on Table 4.3-16 (Appendix D3) and on Figures 4.3-25, these pesticides have been detected in groundwater from wells located within the northern and central portion of the on-Property areas. Two additional locations, SL-1D (Calcium Sulfate Landfill) and GW 49D also reported pesticides in groundwater samples. As with the SVOCs, pesticides are detected in groundwater from wells inside the Slurry/Wall, but these locations do not reflect groundwater conditions.

PCBs were only detected at two locations, GW-10D and GW-54S. No other locations sampled reported detections of PCBs in groundwater (See Figure 4.3-26).

In summary, the lateral extent of solutes in groundwater outside the Zone II area have largely been delineated and bounded along a southern boundary and along a northern boundary. The eastern

boundary of the of site related contaminants in groundwater has not been verified by a sufficient number of wells on the eastern side of the East Ditch, although based on the hydrology of the area, groundwater is expected to flow in the direction of the East Ditch, to the south east. Therefore GW-80 and GW-74 well clusters are appropriately located as down gradient monitoring locations. Based on the results of analysis for ammonia and NDMA and other analytes, it is believed that the likely down gradient extent of site-related groundwater contaminants is known.

4.3.3.2.3 Bedrock Groundwater

There are 13 groundwater wells in the bedrock aquifer within the Aberjona River Water Shed that have been sampled and include residential wells and monitoring wells (Figure 4.2-27).

The distribution of constituents in groundwater samples collected from bedrock wells outside the Zone II area is discussed below. Analytical data is summarized on Tables 4.3-9 and Appendix D.3-7. All data are presented in Appendix C4. The distribution of constituents in groundwater is presented in Figures 4.3-4 through 4.3-26.

Inorganics and Metals

Groundwater samples collection from 11 of the 13 bedrock groundwater monitoring wells did not contain inorganics or metals above background conditions. Two wells GW-68BR and GW-80BR contained one or more of the following compounds above background conditions: sulfate; total chromium, total iron, and total aluminum. The filtered or dissolved groundwater fraction collected from these wells was consistent with background conditions. The elevated metals therefore may be due to the bedrock geochemistry and well installation, and not from site-related sources.

VOCs

No VOCs were detected in samples from 12 of the 13 groundwater monitoring wells outside the Zone II Area. Low concentrations of toluene, ethyl benzene, and m, p-xylene as well acetone, chlorobenzene, chloroform, methylene chloride, and tetrahydrofuran were detected in groundwater at GW-80BR, which is located in a heavily industrial area. However, because these compounds were not detected in up gradient locations, their presence in groundwater may be associated with a separate off-Property source (i.e. not related to the operations at the Olin Property).

SVOCs

No SVOCs were detected in samples collected from 12 of the 13 groundwater monitoring wells outside the Zone II area. At the last location, GW-80BR, only NDMA was detected in bedrock groundwater but at a concentration less than that reported for GW-80D, installed in the overburden at the same location.

Pesticides and PCBs

No pesticides were detected in 12 of the 13 groundwater monitoring wells outside the Zone II. The pesticides, beta-BHC and heptachlor were detected at estimated concentrations at GW-80BR. Pesticides were not detected in up gradient groundwater and are not considered to be related to historic on-Property operations.

No PCBs were detected in wells installed in the bedrock aquifer.

4.3.3.3 Summary of Groundwater Quality Outside the Zone II Area and Data Gap Assessment

The nature and distribution of site-related constituents in groundwater, outside the Zone II area, has been delineated (Figure 4.3-28). Impacted groundwater has been detected in on-Property wells; however the extent of downgradient groundwater has been limited by groundwater discharge to the surface water bodies including upper South Ditch.

Because the interaction between shallow groundwater and surface water in the on-Property groundwater outside Zone II affects distribution of site-related constituents, efforts have been completed to better understand the interaction between surface water and groundwater. An assessment of water quality data in the South Ditch and East Ditch was presented in Sections 4.1 and 4.2. Shallow groundwater wells located in Upper South Ditch, and near Central Pond, have detected concentrations of site-related solutes or parameters.

Concentrations of DAPL related constituents and specific conductance values in shallow wells which monitor up gradient shallow groundwater in the central portion of the Off-Property West Ditch Study Area are lower than shallow wells in proximity to the Upper South Ditch. Thus

shallow groundwater impacts to Upper South Ditch result from discharge of groundwater located immediately adjacent to or directly under South Ditch. Ammonia concentrations in shallow groundwater within the off-Property West Ditch Study Area (GW-25, GW-24S, GW-42S and GW-43S) are less than observed in the South Ditch surface water.

NDMA has been detected at low concentrations in groundwater samples collected from monitoring wells GW-80D and GW-80BR down gradient of the Property to the southeast. BEHP has been detected in groundwater samples collected from monitoring well GW-74S, but the presence of BEHP at this location was attributed to another upgradient source (GEI, 2002f, GEI, 2003e). Chlorinated solvents have also been detected at low concentrations in GW-80D, GW-80S and GW-80BR, and GW-74D and GW-74S that are not present at the Olin Site and are unrelated to the Olin Site. BTEX and naphthalene were also detected in groundwater samples from GW-80D, and BTEX was detected in groundwater samples from GW-80S and GW-80BR. Based on distribution of these compounds, they are also unrelated to the Olin Site and are attributed to immediately upgradient and adjacent industrial properties.

Finally, as noted above, the screening criteria used to assess groundwater quality for areas outside Zone II is determined by an evaluation of risks to potential receptors and not by listed screening criteria. An extensive risk assessment has been completed for this Site and a summary of these risk assessment findings are presented in Section 6.0 and should be considered relative to final evaluation of data gaps and uncertainties with respect to risk associated with groundwater risk to surface water.

5.0 CONTAMINANT FATE AND TRANSPORT/CONCEPTUAL SITE MODEL

This section discusses the environmental fate and transport of the principal site – related chemical constituents and potential routes of migration within site media, including groundwater, soils, surface waters, and sediment. The discussion of contaminant fate is placed in context with discussions of sources and migration pathways to establish the basis for the Conceptual Site Model. A separate Conceptual Site Model Section is not presented.

The fate and transport of the site- related contaminants, considers in general terms, the chemical and physical properties of the contaminants, how those properties affect the ability of the contaminants to interact with the environment and how those interactions influence the ability of the contaminants to migrate or be retained in the media. The degree of interaction of the contaminant with the environment determines its fate in the environment and to what extent it is transformed through chemical reactions, biological or abiotic degradation, retained by sorption and other attenuative mechanisms. The nature of these interactions also influences contaminant transport which considers migration within a specific medium (e.g., surface water or groundwater) or migration across media boundaries (e.g. from soil to groundwater, surface water, or air, or from water to air).

The conceptual site model relates the sources of contaminants, their fate and transport, and migration pathways to the environmental setting to provide an understanding of the current distribution of contaminants in the environment. The conceptual site model is a dynamic model that is expected to evolve and be updated as new site data are collected.

The following subsections describe contaminant fate and transport by operational unit, (OU1, OU2 and OU3), as well as groundwater-surface water interaction and routes of migration.

5.1 OU1

OU1 is comprised of on-Property soil, surface water, and sediment. As discussed in Sections 1 and 2, OU1 encompasses the primary release areas of contaminants to soil which have been extensively investigated and remediated. Actions to date have been completed to remove contaminant source

areas and contain remaining contaminant source areas. The surface water bodies within OU1 include the on-Property West Ditch, the on-Property South Ditch, and the Ephemeral Drainage. The on-Property West Ditch is primarily a wetland area in its headwater. It has a culvert which extends the entire length adjacent to the Slurry Wall and terminates in a broad crested weir outlet structure. There is no known contaminant migration issues associated with this ditch, as it carries only Plant B treated effluent and storm water and therefore is not discussed further in this section.

The DAPL and overlying groundwater within the on-Property portion of the Upper DAPL Pool has been enclosed by the Slurry Wall containment structure with a temporary cap. The structure provides an effective and permanent source control that is monitored and is functioning per design. The mobile LNAPL in the vicinity of Plant B has been hydraulically contained and physically removed to the extent that allows a shut down test for the Plant B groundwater extraction and treatment system to be proposed (MACTEC, 2007). An area of trimethylpentenes in soil located to the west of Plant B (the VPH/EPH Area) has been remediated by AS/SVE and the system has been removed with consent and approval of the MADEP.

5.1.1 Potential Routes of Migration

The past releases to soil occurred decades ago and residual soil contaminants identified to date have been removed by excavation, AS/SVE and bioremediation. Potential routes of migration include:

- Leaching of constituents in, or sorbed to, soil and immobile LNAPL to groundwater (OU3) by infiltrating precipitation
- Leaching of constituents from immobile LNAPL within the saturated zone by groundwater
- Discharge of impacted groundwater (OU3) to on-Property surface water (OU1) within South Ditch, Ephemeral Drainage and East Ditch
- Migration of surface water, flocculent, and sediment within on-Property South Ditch (OU1) to off-Property South Ditch and off-Property East Ditch (OU2)
- Diffusion of DAPL related constituents to groundwater from DAPL or DAPL-like material located in areas west and adjacent to and upgradient of the contained portion of the on-Property DAPL, and

- Migration of DAPL-related constituents in groundwater (principally, ammonia, NDMA and chromium) and discharge of groundwater to surface water in OU1 (South Ditch)

Migration of volatile organic constituents from soil and groundwater to air in vicinity of Plant B, (which, based on site data, had the greatest potential for such a migration route), has been investigated and is no longer considered a potential route of migration. The results of this evaluation are contained in Appendix F (Risk Evaluation of Indoor Air Quality at Plant B) of the most recent Plant B IRA Status Report (MACTEC, 2006c).

5.1.2 Contaminant Persistence

Most Site-related contaminants are inorganics, such as ammonia, chloride and sulfate and metals, including both cation and anion species, such as iron, manganese, calcium, sodium, aluminum, and chromium (III). Organic compounds include both VOCs, primarily trimethylpentenes, and SVOCs, primarily NDMA, BEHP and NDPA. The Site was listed by EPA solely on the basis of the presence of NDMA in groundwater. The principal contaminants remaining at the Site that have potential to pose a risk to human health and ecological receptors have been evaluated in numerous risk assessments and associated studies, and for OU1 include:

- Chromium in soil, flocculent and sediment
- Ammonia in surface water
- BEHP in Zone II groundwater (currently captured by Plant B)

The processes that affect the fate of these contaminants, and their resulting nature, extent and concentration at this and the other OUs include:

- Sorption to soil, sediment, and aquifer materials
- Biodegradation occurring in all media (but primarily in groundwater or surface water)
- Volatilization
- Geochemical reactions occurring in groundwater and surface water
- Diffusion, and
- Hydrodynamic dispersion and diffusion within groundwater.

Contaminants will be affected by these processes to varying degrees depending on their respective physical and chemical properties and geochemical or biological conditions to which they are subjected.

The degree to which an organic compound sorbs or partitions to a soil surface, either above or below the groundwater table, can be estimated by its partitioning coefficient to organic carbon matter (Koc), its concentration, and the solubility of the contaminant in water. Organic compounds with low Koc values such as NDMA (8.29 L/kg [ORNL Risk Assessment Information System]) will not tend to strongly sorb to organic material within soil, and such compounds will retain a high degree of mobility. On the other hand, a compound such as NDPA that has a relatively higher Koc (1290 L/kg ORNL Risk Assessment Information System and USEPA Soil Screening Guidance, 1996]), will be more strongly sorbed to organic matter and will be less mobile. Metals typically are not strongly sorbed to organic matter; however, they are exchanged and held to charged mineral or clay surfaces, and oxide surfaces on soil particles, or can be retained in clay minerals by substitution with other elements in the mineral structure. The ability of an element or inorganic compound to interact with such charged surfaces is dependent on pH and competition with other cations in solution for available exchange sites and the ionic strength of the solution, as well as its own characteristics or form (e.g., the hexavalent or trivalent form of chromium).

Hydrolyzed or dissolved metal species, such as chromium, aluminum, iron, calcium, and manganese are elements and are persistent in the environment. However, biologically mediated processes and resultant changes to oxidation and reduction conditions within the specific media can affect the form and mobility of some of metals, in particular iron, manganese, aluminum and chromium. Certain organic chemicals are susceptible to biological degradation, provided appropriate geochemical conditions, including the presence of nutrients and oxygen for aerobic microorganisms, and the presence of oxidation-reduction couples and electron receptor species for anaerobic microorganisms. Other organic chemicals are recalcitrant to biological degradation. For example, phthalates such as BEHP are susceptible to biological degradation and chlorinated solvents undergo sequential dechlorination when acting as electron acceptors for other biologically mediated chemical reactions. The biological degradation of NDMA was studied at groundwater recharge facilities in California where treated waste waster is applied to recharge beds (Bradley et

al, 2005). The chlorination of wastewater results in formation of NDMA and this study concluded that NDMA was biodegraded under both aerobic and anaerobic conditions in soil prior to recharging groundwater.

Other biologically mediated processes, such as nitrification/denitrification, have the ability to alter the available forms of nitrogen in the nitrogen cycle and result in the transformation of ammonia (NH_3) to nitrite (NO_2^{-1}) and ultimately nitrate (NO_3^{-1}). Ammonia can be taken up directly by aquatic plants and may be oxidized by nitrifying bacteria to nitrite, and subsequently nitrate that can then be utilized by the plant. Nitrates in soil or sediment may then undergo denitrification by anaerobic bacteria to nitrogen gas that is released back to the atmosphere. Ammonia released to water acts as a weak base as it ionizes and is partially converted to ammonium (NH_4^+) which is less harmful to fish and other forms of aquatic life. The equilibrium constant for ammonia-ammonium ($[NH_4^+] / [NH_3] [H^+]$) is 5.89×10^{-10}. The negative log of this constant is the pKa (9.2) represents the pH at which ammonia and ammonium concentrations are equal. For each decrease of one pH unit, the ratio changes by a factor of 10 favoring the predominance of ammonium at the lower pH.

Volatilization is the process of a solid or liquid converting to a gas phase and is commonly affected by change in pressure or temperature. Henry's Law constants are measure of the relative volatility of a compound, and hence its ability or propensity to transfer from to dissolved to gaseous phases. For example, NDMA, as a SVOC, has a relatively low Henry's Law constant (1.99×10^{-6} atm-m^3/mol [CA EPA, 2006]) and will not be readily transferred from liquid to air phases. Trimethylpentenes were successfully removed from groundwater underlying OU1 in the VPH/EPH area by a combination of air sparging and soil vapor extraction due to their higher volatility. The Henry's law constant for ammonia is approximately 1.6×10^{-5} atm-m^3/mol at 25 degrees C [ASTR, http://www.atsdr.cdc.gov/toxprofiles/tp126-c4] and volatility of ammonia increases with pH, though it is only moderately volatile.

Although the majority of DAPL in OU-1 has been contained on-Property, DAPL is present, adjacent to the west side of the Slurry Wall, extending westward into the off-Property West Ditch and Jewel Drive area. The DAPL is overlain by groundwater, which within shallow groundwater shows little to no impact from the DAPL. Movement of solutes from DAPL to overlying groundwater is controlled by diffusion processes which are described by Fick's Law where the flux

of a chemical is the product of a diffusion coefficient and the concentration gradient. Since the diffusion coefficient is a constant (albeit temperature dependent), the rate of diffusion or flux is proportional to the concentration gradient. Diffusion coefficients for sodium, calcium and chloride in aqueous solution were reported by Smith from Freeze and Cherry, (1979) to be in the range of $1x10^{-5}$ to $1x10^{-6}$ cm2/sec. These values are similar to those reported for NDMA from literature $1.24\ x10^{-5}$ cm^2/sec (ASTR Risk Assessment Information System). Therefore, the rate of diffusion of most DAPL constituents should be similar, though not identical. In porous media, the diffusion coefficient is moderated by the increased length of the pathway. The moderating factor is termed tortuosity (often taken as a default value of 0.5), and the moderated constant is referred to as the effective diffusion coefficient.

Due to the large difference in contaminant concentrations between the DAPL and overlying groundwater, a concentration gradient is present that allows diffusion of contaminants from the DAPL into the overlying water column. The concentration of a specific compound can be theoretically estimated at a specific distance and time from this interface by a one-dimensional diffusion equation involving the error function. This equation may also be used to derive or estimate site-specific effective diffusion coefficients given appropriate site data. Smith (1997) evaluated effective diffusion coefficients based on measurements of solute concentrations above the DAPL. Most importantly, in absence of a groundwater flux above the diffusion interface, diffusion is a slow process that is not effective at transferring a large flux of contaminants out of the DAPL. As groundwater moves above the DAPL some of the diffused material is removed by the advective groundwater process; contaminated groundwater at the downgradient end of the pool is replaced by clean groundwater at the upgradient end of the pool, which approaches equilibrium concentrations as it slowly moves across the DAPL interface. Thus the flux of contaminants from DAPL becomes relatively constant as groundwater flows over the DAPL pools. Since this rate of groundwater movement under ambient conditions is slow, the rate of DAPL diffusion and diffuse layer advection is also extremely slow. Due to the slow rates of mass transfer, the contaminant concentration in the aquifer, which is a reflection of the mass loading rate, is not expected to vary appreciably with time.

Thus the layer of higher concentration solutes immediately above the DAPL pools, which has historically been referred to a as a diffuse layer, should remain fairly constant in thickness and

concentration. Above this layer, the vertical concentration gradients that drive diffusion rapidly diminish, and overlying groundwater rapidly decreases in dissolved solute concentration from DAPL. As the immediately overlying diffuse groundwater slowly moves past the downgradient edge of a DAPL pool, further reductions in solute concentrations will result from hydrodynamic dispersion, including advective and dispersive transport.

In horizontal and the vertical directions, the pH and oxidation-reduction conditions will change within this diffuse groundwater horizon. These changes in geochemical conditions lead to chemical reaction of the diffusing solutes with the surrounding aquifer materials. These chemical reactions and chemical diffusion processes have been well documented at the Site (Smith, 1997)

Geochemical transformations are also important processes that can control the fate and transport of specific inorganic species within both the groundwater and surface water systems. The groundwater contamination associated with the DAPL source is principally comprised of dissolved chloride, sodium, sulfate, ammonia, aluminum, calcium, iron, and manganese, and to a lesser degree chromium, NDMA and other organic compounds. Dissolved chloride, sodium and ammonia, are relatively conservative ions and do not readily undergo chemical reactions that would greatly diminish their mobility or alter their solubility through changes in speciation. On the other hand, the solubility of most of the other constituents can be modified by changes in geochemical conditions (such as pH, oxidation-reduction potential, or aquifer cation exchange capacity) and subsequent reactions with other elements and compounds in the system.

As metal ions diffuse away from the DAPL interface, pH increases in the aquifer promoting formation of metal oxyhydroxides of iron and manganese and chromium, which have a greater affinity to sorb or precipitate within the aquifer matrix, or remain as soluble forms such as ferric iron, which can be reduced to ferrous iron in the presence of sulfate reducing bacteria with additional production of acidity. Results of geochemical modeling and analysis of aquifer solids identified chromium hydroxides in amorphous precipitated solids within the aquifer matrix, which above a pH of 5.8 should limit trivalent chromium (chromium (III)) solubility below the MCL. XRF and EMPA analysis of aquifer material from MP-2 from 10 samples collected from depth of 8.5 to 33 feet to evaluate geochemical partitioning mechanism for chromium vertically within the aquifer above DAPL (Smith, 1997). Sorption studies to determine site-specific partitioning

coefficients (K_d) for chromium were also conducted. This work was further supported by geochemical modeling using MINTEQ (Smith, 1997). Chromium (III) is the dominant hydrolyzed chromium species as demonstrated by the lack of hexavalent chromium detections in groundwater. As pH increases, the surface charge on the aquifer matrix becomes progressively more negative, increasing the cation exchange capacity for positively charged hydrolyzed cations. In addition, as pH increases (typically above 4 to 5 pH units), aluminum, and chromium, in competition with calcium, in the presence of excess sulfate will precipitate as stable metal sulfates. The presence of complex aluminum sulfates was verified and aluminum-chromium sulfates were identified in microphotographs by Geomega (Smith, 1997; Geomega, 2004f) in columns studies involving DAPL displacement by overlying groundwater, indicating this precipitation mechanism does occur. In addition, iron and manganese oxyhydroxides and aluminum oxyhydroxides are also abundant precipitates on silicate surfaces in the aquifer matrix. EMPA identified iron –aluminum hydroxides that contained up to 3.9 % by weight chromium. Collectively, these precipitation reactions attenuate chromium in the aquifer, which is supported by data presented in Section 4.3 that indicates a very limited distribution for chromium compared to other analytes.

Flocculants (floc) that have precipitated in the off-Property West Ditch, and to a greater extent currently precipitate in the Upper South Ditch down stream of the weir, are doing so in response to mixing of discharging groundwater and surface water. The groundwater contains higher concentrations of dissolved calcium, aluminum, chromium, iron, sulfate, and ammonia, and precipitation reactions occur in response to increases in pH as mixing occurs with the receiving waters, including treated effluent from Plant B.

The floc thus formed includes a red floc and a white floc, with some observations suggesting that the white floc is preferentially formed farther down stream. The floc composition and mineralogy has been investigated by chemical analysis and electron microscopy (Geomega, 1996). The reddish floc, identified as Redingtonite is a chromium bearing iron-aluminum sulfate, which is stable in pH environments above 4.5 to 5 pH units. The whitish floc is predominantly gibbsite, (an aluminum hydroxide clay ($Al(OH)_3$)). As pH increases above 4, soluble aluminum gives way to aluminum oxyhydroxides which are the predominant aluminum species until a pH near 6.5 where a charge-neutral gibbsite becomes the dominant species. Gibbsite remains the dominant species until a pH of approximately 7.5, which is generally above the pH of most natural water systems. Thus,

under the natural pH conditions of South Ditch, chromium is precipitated as an amorphous floc with aluminum and iron sulfates or aluminum oxides and hydroxides, which are stable and not biologically available under normal stream pH conditions.

Ammonia nitrogen discharged to the stream is predominantly in the form of ammonium ion under normal pH conditions. The ammonia is expected to contribute to the nitrogen uptake of plants and algae, but is transported rapidly through the system due to stream flow velocities. Ammonia is not susceptible to volatilization at pH conditions in the natural stream environment.

5.1.3 Contaminant Migration

Media associated with OU1 includes on-Property soil, surface water, and sediment. As described in Sections 2 and 4.1, the soils and sediment have been extensively characterized to support multiple remedial actions involving AS/SVE, bioremediation and excavation and off-site disposal of contaminated soil and sediment. This work was conducted in conformance to requirements of work plans approved by the MADEP. The area of on-Property DAPL has been isolated and contained by construction of the Slurry Wall containment system so that the DAPL is no longer a continuing source of contamination to Site groundwater some of which discharges to surface water. The extent of LNAPL associated with Plant B has been substantially depleted by combined efforts of LNAPL recovery, AS/SVE and nutrient injections. AS/SVE has also effectively addressed an area of TMP contamination in soil and immediately underlying groundwater in the adjoining EPH/VPH area. The AS/SVE remedial system was successfully terminated and removed with approval from MADEP. Site-related contaminants, principally the inorganics aluminum, chromium, ammonia, chloride, sodium, and calcium remain elevated in deeper groundwater above bedrock underlying the vicinity of South Ditch and Ephemeral drainage. Solute concentrations decrease vertically and rapidly within shallow groundwater that is in communication with the surface water system. Some of this groundwater discharges to surface water, primarily in the upper reaches of South Ditch, from immediately downstream of the weir. The degree of groundwater discharge to the middle and lower sections of South Ditch varies seasonally. Some groundwater also discharges, but to a substantially lesser degree, since construction of the current and predecessor weirs, to the off-Property West Ditch which flows into on-Property South Ditch. Discharge of groundwater results in the detected concentrations of ammonia, chromium, chloride

and sulfate and other inorganics, organics, and metals in surface water, and the observed formation of chromium enriched phases of aluminum –sulfate and aluminum hydroxide floc.

Groundwater over other portions of the former facility area contains these primary indicator parameters (inorganics and metals) in addition to NDMA, NDPA, TMPs, and BEHP in vicinity of Plant B. The remaining source of BEHP, TMP and NDPA is associated residual material in soil within the eastern side of the Plant B Area. Groundwater in vicinity of Plant B is currently being captured. Groundwater to the south of Plant B that is outside of the Plant B capture zone flows toward East Ditch, eventually discharging to East Ditch along its course. The East Ditch is a railroad drainage ditch and does not offer beneficial aquatic habitat. East Ditch is part of OU2 and is discussed further in Section 5.2.

The ground surface over the facility is well vegetated or covered by relatively impervious surfaces including pavement and concrete. Thus direct run-off from precipitation does not contribute to erosion and transport sediment from on-Property areas to the on-Property Ditch system.

Migration of contamination within OU1 media (soils, surface water and sediment), is primarily restricted to dissolved inorganics in surface water, precipitated floc and sediment in South Ditch. Volatilization of organic contaminants is not a significant migration pathway due to the low volatility of these specific contaminants and or low concentrations present in soil and underlying groundwater.

Ammonia discharging to South Ditch is not volatile and the uptake of nitrogen by plants too limited to substantially attenuate ammonia concentrations in surface water as it flows down stream. Ammonia concentrations vary seasonally and depending on related near term precipitation, run-off, stream stage, groundwater recharge and groundwater discharge conditions. Ammonia concentrations in surface water increase downstream of the weir and typically remain uniform until the bend in the stream channel by Central Pond, where seasonally a slight increase in ammonia concentration has occasionally been measured. From this point to the property boundary, ammonia concentrations are consistent to the property boundary.

Current upstream water levels, maintained by the weir, have substantially mitigated floc formation in the off-Property West Ditch. As groundwater discharges below or downstream of behind the weir, it mixes with surface water causing an increase in pH and initiating precipitation of both red and white floc. Floc that precipitates behind the weir is mostly deposited in the quiescent waters in the backwater behind the weir. Some floc is entrained in surface water and is carried farther downstream before it is able to settle out. Most of Upper South Ditch is a mineral bottom channel, due to the sediment removal action. Floc will tend to settle in small pools and eddies behind riffles, and become trapped by leaf litter along the substrate bottom and edges of the banking. As water velocities further slow in the South Ditch wetland, additional floc can settle and be trapped by the thick vegetation in summer and within the root mass and decaying vegetation in winter.

5.2 OU2

OU2 is comprised of off-Property surface water, and sediment. The surface water bodies included in OU2 are the MMB and Sawmill Brooks, off-Property West Ditch, off-Property South Ditch, East Ditch and areas down stream along the New Boston Drainway. At the time of the sediment excavation in South Ditch, accumulated floc was also removed from within the off-Property West Ditch system. The sediments in the on-Property portions of South Ditch and off-Property West Ditch have also been remediated to remove floc and other material accumulated from former facility operations, and these materials are no longer present as inputs to the down stream off-Property ditch system.

In 2004, a surface water monitoring program was initiated in the MMB wetland and groundwater monitoring continued to evaluate if conditions were changing in the aquifer and surface water after the MWSWs use was suspended. An updated statistical evaluation of groundwater and surface water trends is provided in section 5.3.3. As discussed in detail in Section 4.2, NDMA was reported at low concentrations in MMB and Sawmill Brook surface water samples was qualified NJ during data validation and these locations are depicted in Figure 4.2-16. These reported results are considered to be false positive results meaning that NDMA is not believed to be not present in those samples. By convention, these results, though suspect, have not been qualified as non-detect and the values have therefore been posted to the distribution Figure 4.2-16. Other than these

reported NJ qualified results, there are no site related impacts to surface water and sediment in the MMB wetland.

The following sections describe current potential routes of migration, contaminant persistence and migration for OU2 and pertain to the off-Property and on-Property Ditch system within the Aberjona Watershed.

5.2.1 Potential Routes of Migration

The surface water systems within the Site are hydraulically connected to shallow groundwater, and most streams receive some inputs from groundwater over at least portions of their reaches. The potential routes of migration therefore include:

- Migration of contaminants to surface water from groundwater discharge,
- Movement of dissolved contaminants within surface water to down gradient stream segments,
- Recharge of surface water to groundwater in certain stream reaches seasonally, as groundwater levels decline below the stream bottom elevation,
- Transport of floc deposited within on-Property South Ditch to the off-Property ditch system

5.2.2 Contaminant Persistence

The principal contaminants that have been identified within OU2 and that have potential to pose a risk to human health and ecological receptors have been evaluated in several risk assessments and associated studies, and for OU2 include:

- Chromium in flocculent, sediment and floodplain soil
- Ammonia in surface water within off-Property South Ditch

NDMA is also detected in surface water, but after evaluation in human health and ecological risk assessments was determined to not pose any unacceptable risk.

The mechanisms that affect the fate and mobility of inorganics, metals, and organic contaminants, were discussed previously in Section 5.1.2. The flocculants that have been studied on several occasions (Geomega, 1996, Geomega, 1998b) to evaluate morphology and composition, and chemical stability and later to evaluate bioavailability. These studies concluded that "the floc was thermodynamically stable under the neutral oxidizing conditions of the stream environment, and that it is unlikely to represent an ecological risk due to the low solubility and bioavailability.

Ammonia in off-Property South Ditch surface water will interchange nitrogen with aquatic plant and algae, which can convert and fix the nitrogen for growth, eventually recycling the nitrogen back into the atmosphere. Under current hydraulic conditions, volatilization of ammonia or ammonium is not expected to transfer a significant flux of ammonia to the atmosphere where it can be oxidized by sunlight. These mechanisms are not expected to appreciably attenuate ammonia/ ammonium concentrations in surface water. The most important attenuation mechanism is likely to be dilution by other surface water as the surface water progressively flows downstream.

NDMA is expected to persist in surface water, being attenuated principally by dilution and mixing, and by UV oxidation from sunlight. Although the UV oxidation half life rates are relatively fast, the effectiveness of this destructive mechanism is dependent on time and intensity of sunlight exposure, water turbidity and water depth, which limit light penetration into the surface water. Biological degradation of NDMA in surface water is not expected to be an important attenuation mechanism although it does occur (WHO, 2006).

5.2.3 Contaminant Migration

Chromium migration will occur as dissolved chromium in surface water and as precipitated floc. As indicated previously in Section 5.2.1, the floc is both geochemically and thermodynamically stable. Chromium migration in the surface water system will occur in response to scour erosion and deposition of floc in response to increases in stream flow. Some floc material may be trapped within organic litter material and is likely to be incorporated in organic sediment in lower reaches of the ditch system and associated floodplain areas. The chromium will accumulate in depositional

areas in this manner so long as floc forms in the on-Property Ditch system and is transported down stream.

Ammonia will migrate within surface water and continue to be attenuated by biological oxidation and denitrification, and dilution. Ammonia is also produced naturally in wetlands and other aquatic environments. Therefore the Site is not the only source of ammonia in surface water.

The MMB wetland is a large groundwater discharge area that also receives surface water run-off from surrounding upland areas. The wetland and surface waters therefore receive water inputs from shallow recharging groundwater, and through vertical upward movement of deeper groundwater which mixes with and is diluted by the shallow groundwater. An extensive number of surface water and sediment monitoring programs have been implemented at the Site to evaluate surface water quality over many years (see section 2.1.4). Surface water monitoring in the MMB and Sawmill Brook systems has not detected solutes that can be unequivocally attributed to migration and discharge of contaminated groundwater underlying the MMB wetland within the MMB aquifer. Many of the primary indicator parameters for groundwater impacts (calcium, sodium, chloride, aluminum sulfate and ammonia) are naturally occurring and present in surface water in MMB. Seasonal variations in ammonia and chloride in surface water reflect the addition of ammonia during growing season within the wetland and addition of road salt contained in run-off the during winter season. Seasonal variations in both ammonia and chloride observed in MMB and Sawmill Brook are also apparent in upstream monitoring locations that are up gradient of any Site-related impacted groundwater. Thus seasonal increases in ammonia and chloride in MMB likely reflect biological activity in the wetland and anthropogenic inputs and not changes or impacts from discharging groundwater.

NDMA will act as a conservative solute during transport in surface water, and is not expected to be attenuated by sorption to sediment, soil particles, or natural organic material or precipitation mechanisms. Attenuation will principally be by dilution and mixing, and by UV oxidation from sunlight. NDMA will be transported as a dissolved species and not as a component of sediment.

5.3 OU3

OU3 is comprised of off-Property and on-Property overburden groundwater and bedrock groundwater. Based on hydrogeologic measurements (Smith, 1977, Geomega, 2001d), and results of groundwater modeling (Geomega, 2001a[310]), the contribution of flow from the bedrock groundwater to the hydrologic system is not significant. Groundwater from on-Property areas flows primarily to the south and southeast within the Aberjona River water shed. Groundwaters from off-Property areas southeast of the seasonal groundwater divide also flows within the Aberjona River water shed. Groundwater off-Property located north and west of the seasonal water divide flows within the Ipswich River water shed. Some Site groundwater within the Ipswich River water shed discharges to MMB wetlands and Sawmill Brook. Some Site groundwater within the Aberjona River water shed discharges to the ditch system including the on- and off-Property West Ditch, the on-and off- Property South Ditch, the Ephemeral Drainage or the East Ditch.

In 2003 and 2004, Olin initiated a comprehensive testing program for NDMA in groundwater, including numerous private wells surrounding the area. NDMA was not detected in any private wells in use. In 2004, a surface water monitoring program was initiated and groundwater monitoring continued to evaluate if conditions were changing in the aquifer after the MWSWs use was suspended. An updated statistical evaluation of groundwater trends is provided in section 5.3.3.

The DAPL pools, which have been studied extensively, are residual sources of contamination, but are not groundwater. The primary contaminants in off-Property groundwater within the Ipswich River water shed, for which primary drinking water standards or advisories exist, include NDMA and chromium (III). Shallow groundwater underlying surface water in MMB and Sawmill Brook does not have elevated concentrations of site-related contaminants, and therefore surface water quality has not been impacted in these surface water systems.

The results of off-Property groundwater assessments indicate the primary contaminants in off-Property groundwater within the Ipswich River watershed, for which primary drinking water standards or advisories exist, include NDMA and chromium (III). Other impacts to deep and moderate depth groundwater include ammonia, chloride, calcium, sodium, and iron. Shallow

groundwater underlying surface water in MMB and Sawmill Brook does not have elevated concentrations of site-related contaminants, and therefore surface water quality has not been impacted in these surface water systems.

Results of on-Property groundwater assessments indicate that shallow groundwater adjacent to and immediately underlying the Upper South Ditch has detected aluminum, sulfate, calcium, chloride, chromium (III), ammonia and NDMA. Groundwater underlying the Plant B area and adjacent to the East Ditch contains BEHP, NDPA, ammonia and trimethylpentenes, and NDMA.

Chlorinated solvents, BTEX, MTBE, and pesticides are detected in groundwater in certain areas of the Site which are not related to contamination from former Facility operations on the Olin Property, and are not discussed further in this section.

5.3.1 Potential Routes of Migration

The groundwater studies at the Site identified specific contaminants and source areas present on-Property and off-Property area, and investigated the relationships between shallow groundwater and surface water. Vapor migration pathways have been evaluated and have been determined to be incomplete pathways both on-and off-Property due to the physical properties and locations of the contaminants and depth of sources. The potential routes of migration therefore include:

- Continued vertical transfer of soluble DAPL constituents by diffusion to a limited thickness of groundwater immediately overlying the DAPL pools
- Downgradient migration of dissolved groundwater contaminants (solutes) within the deeper and intermediate hydrostratigraphic units of the MMBA until some distance is reached where natural attenuation processes cause solute concentrations to attain a stable horizontal and vertical concentration profile
- Downgradient migration of solutes originating from the eastern Main Street DAPL Pool and off-Property portion of the Upper DAPL pool toward discharge locations along the South Ditch (OU1), and to a far lesser degree, Ephemeral Drainage.
- Vertical migration of solutes immediately surrounding and underlying the Upper South Ditch to Upper South Ditch surface water (OU1)

- Down gradient migration of solutes in groundwater along the eastern side of the Property toward, then along, and eventually discharging to some East Ditch surface water (OU2).

5.3.2 Contaminant Persistence

As discussed previously in Section 5.1.2, NDMA, ammonia, chloride and sulfate are expected to be the most persistent contaminants as solutes in groundwater. NDMA and ammonia do not readily sorb to the aquifer material and will not readily volatilize, though NDMA may be attenuated to a limited extent by biological processes under aerobic conditions. The primary mechanisms for attenuation of NDMA and ammonia in groundwater are hydrodynamic advection and dispersion. Chloride is a very conservative anion, often used for tracer studies, and will be attenuated primarily by hydrodynamic advection and dispersion. Sulfate, in the presence of saturated solution of calcium, aluminum and other metals such as chromium and iron, will precipitate a variety of sulfate minerals under mildly acidic conditions. These precipitation reactions will lessen sulfate concentrations in groundwater; however, as cation concentrations decline, these reaction mechanisms will become less prevalent, and remaining sulfate will be attenuated primarily by hydrodynamic advection and dispersion.

The role of iron in groundwater is important as it will compete with hydrolyzed chromium (III) and aluminum for sorption sites on aquifer materials, but where present in high concentration will also precipitate iron oxyhydroxides to which both aluminum and chromium are strongly sorbed. As more dissolved iron precipitates as oxyhydroxides along the groundwater flow path, more sorption sites become available to competing species such as chromium (III). Thus as solutes move away from DAPL source areas, both vertically and horizontally, chromium(III) concentrations in groundwater will be strongly attenuated by precipitation as sulfates and hydroxides, sorption to precipitated iron hydroxides and eventually sorption of hydrolyzed chromium species directly onto aquifer materials. The K_d, or partition coefficient for chromium increases several orders of magnitude with increasing pH above 4, which was verified experimentally for site waters and source materials (Smith, 1997). Therefore, sorption of chromium (III) will be favored farther along the groundwater flow path, and as pH increases within the aquifer.

BEHP and NDPA will be moderately attenuated by sorption to aquifer materials, and the dissolved concentrations of these compounds in addition to trimethylpentenes, will also be moderated through biotic processes, in addition to hydrodynamic advection and dispersion.

5.3.3 Contaminant Migration

Contaminant migration is specific to the hydrogeologic and geochemical conditions within each groundwater system and proximity to, and the nature of contaminant sources. The conditions within the Western Bedrock Valley in the MMBA within the Ipswich River watershed are substantially different that of the overburden groundwater migrating within the thinner aquifer underlying on-Property areas within the Aberjona River watershed, aligned along the Eastern Bedrock Valley, which is relatively shallow and dissipates east of the Property under East Ditch. These areas are discussed separately.

5.3.3.1 Site Groundwater Within the Aberjona River Watershed

Shallow groundwater located south and east of the groundwater divide and west of the Property flows southeasterly to discharge points along the ditch system, primarily Upper South Ditch. Some groundwater flow that occurs around the northern side of the Slurry Wall is also captured by the South Ditch as groundwater flow paths turn southerly along the eastern side of the Slurry Wall. Groundwater within interior of the Property is captured either by Plant B, or flows toward and then parallel to the off-Property East Ditch system and down stream surface waters. Some of this shallow groundwater may discharge to East Ditch.

BEHP is primarily associated with the Plant B area. Trimethylpentenes and NDPA, while also associated with the Plant B area are also present in groundwater at low concentrations at the north eastern end of the property, within the vicinity of former Lake Poly and along the western side (outside) of the Slurry Wall. BEHP, NDPA and trimethylpentenes are not detected in groundwater surrounding South Ditch or in the east central portion of the Property bordering East Ditch, and therefore are not being transported by groundwater to surface waters.

Unfiltered chromium has a similar distribution as filtered chromium in groundwater and is also detected in deep groundwater above DAPL in off-Property wells in vicinity of Jewel Drive. Chromium is also detected in groundwater immediately adjacent to Upper South Ditch and in deep groundwater underlying Ephemeral Ditch. Chromium is generally not detected farther downgradient, with the exception of GW-80S, located off-Property in a heavily industrialized area. Based on the distribution of chromium in groundwater, the migration of chromium is limited, and it is discharged to surface water is within the Upper South Ditch system. As discussed in Section 2.3, chromium precipitates as a floc in surface water with aluminum and iron in oxyhydroxides species and as complex sulfates. This floc is thermodynamically stable in the range of naturally occurring surface water conditions.

Ammonia is present in DAPL and diffuse groundwater. Within the groundwater system, ammonia is present at higher concentrations in deeper groundwater and at lower concentrations in shallow groundwater. The reported concentrations of ammonia in shallow groundwater near Upper South Ditch are higher than the acute and chronic surface water quality criteria for ammonia. Groundwater discharge contributes nitrogen reported as ammonia in surface water in Upper South Ditch at concentrations above AWQCs for ammonia. Due to the prevailing pH conditions in groundwater and surface water, the ammonium ion will predominate over the ammonia ion by a factor ranging from 1,000 to 10,000. The ammonium has significantly lower toxicity to aquatic receptors and semi-aquatic receptors such as amphibians.

NDMA is present in DAPL and diffuse groundwater. Within the groundwater system NDMA is present at higher concentrations in deeper groundwater and substantially lower concentrations in shallow groundwater. NDMA is present in shallow and deep groundwater along the eastern side of the Property, adjacent to South Ditch, and is present in South Ditch surface water. NDMA will migrate with groundwater which flows eastwardly across the Property, and under the South Ditch/ Ephemeral Drainage and then southwesterly parallel to the East Ditch. Some groundwater discharges to surface water when and where appropriate hydrogeologic conditions prevail. The discharge concentration of NDMA is not expected to increase, and based on site-specific risk evaluations, does not pose a risk to human health or ecological. The sources of NDMA and other groundwater contaminants that have not been removed or isolated have been present for decades in

the groundwater system and it is therefore reasonable that the overall system has attained a temporally stable vertical and horizontal contaminant distribution.

5.3.3.2 Site Groundwater Within the Ipswich River Watershed

Groundwater located north and west of the groundwater divide and west of the Property flows northwesterly to the MMBA and shallow groundwater discharge points along MMB and Sawmill Brook. Within the MMBA, underlying the MMB wetland both deep and shallow groundwater flow veers to the north and eventually northeast, following the Western Bedrock Valley and surface water course of MMB.

Unfiltered and filtered chromium is detected in deep wells in proximity to DAPL sources, and is only sparingly detected in deep groundwater within downgradient regions of the MMBA, and was not detected in raw water of Town wells. Based on the geochemical constraints ion chromium migration, further migration of chromium is not expected. Filtered and unfiltered aluminum and manganese have similar distributions as chromium. Iron is more widely distributed, in part due its higher concentration in DAPL, but also it's more prevalent natural presence in groundwater.

Trimethylpentenes have only been detected in a few deep wells within MMBA and at very low concentrations. The distribution of TMP is not expected to change within the aquifer.

Ammonia and chloride are present at higher concentrations in deeper groundwater within the MMBA, but their distribution at concentrations above background is limited. Ammonia and chloride are not present in shallow groundwater above background concentrations. Given current hydrogeologic conditions, the distribution of ammonia is not expected to change substantially, although concentrations of ammonia continue to stabilize in some wells (e.g., GW-64 D GW-103 BR, etc) in the post pumping conditions within the MMBA.

The distribution of sodium is similar to that of ammonia and chloride, with the exception that sodium was detected at higher relative concentrations closer to Town wells at Butters Row and was detected above the secondary water quality guidelines for groundwater aesthetics in raw water samples. The distribution of sulfate is similar to that of sodium, except that it was more widely

detected above a background concentration, and was detected in both Chestnut 1 and Butter Row 1 wells slightly above background concentrations. The presence of higher concentrations of sulfate and ammonia is expected within this large wetland complex due to the nature of reduced conditions and extensive biological activity in a swamp environment.

The distribution of NDMA is similar to that of sulfate, both in horizontal and vertical extent. The NDMA data set was established starting in 2003/2004 as part of a very comprehensive sampling program using low level detection methods (detection limit of (0.002 ug/L or 2 ng/L).

In 2003, the Town suspended use of the MWSWs in the MMBA due to the detection of NDMA in raw water samples as discussed in Section 1. In 2004/2005 a quarterly sampling program of groundwater and surface water was implemented to evaluate if changes would occur in solute distribution and concentration as the aquifer relaxed after cessation of pumping. A statistical analysis of groundwater analytical data collected during that time frame has been conducted to for presentation in this Focused RI report to provide insights into potential changes which may have occurred or maybe occurring in the distribution of contaminants in portions of the MMBA influenced past by groundwater removal. This assessment is described in the following subsection.

5.3.4 Post Pumping Groundwater Conditions in the MMB Area

The most significant change in Site hydraulic conditions has been cessation of pumping of the Town MWSWs in 2002, and in 2003. An understanding of the fate and transport of site related contaminants in the MMBA must incorporate some understanding of temporal and spatial changes of solute concentrations in the aquifer. The following paragraphs provide a summary of statistical assessments to quantify changes in the MMBA which have been prepared for this report.

Building upon previous statistical assessments (Geomega 2002d, 2005b) the latest evaluation considered both groundwater and surface water conditions in MMBA, with the inclusion of additional water chemistry data collected through second quarter 2006 (the most recent data available). The more recent data were collected after the MWSWs were shut down in late 2002 and early 2003, and so reflect the transition to post-pumping conditions in MMBA. The monitoring locations and indicator parameters included in this assessment were based upon the Olin MMBA-

WBV Sentinel monitoring program as of fourth quarter 2005. Key indicator parameters used in this evaluation included: sodium, chloride, calcium, sulfate, ammonia, and specific conductance. NDMA could not be considered for quantitative analyses due to insufficient time series data. This assessment included the evaluation for statistically significant trends and changes in indicator parameter concentrations in MMBA groundwater and MMB and SMB surface water. Complete results of these analyses are presented in Appendix E.

5.3.4.1 MMBA Groundwater (OU3)

The statistical evaluation of groundwater chemistry data in the statistical assessment presented here and in Appendix E involved updates to previously developed statistical control limits (Shewhart-CUSUM) and the application of quantitative trend analyses. New statistical limits were established by adjusting the background time period used to calculate the control limits to represent post-pumping conditions within MMBA. Groundwater sampling results collected during the fourth quarter 2005 and second quarter 2006 were compared to these revised limits. Fourth quarter 2005 results indicated five wells (GW-65D, GW-83D, GW-85D, GW-85M, and GW-86S) exceeded the new control limits for at least one parameter (Appendix E, Table 4a). Second quarter 2006 results indicated that two wells, GW-87D and GW-65D, exceeded their control limits for two and three parameters, respectively (Appendix E, Table 4b). At least some of these exceedances were attributed, in part, to the new background time period, which has a limited number of data points compared with the previous background period. (With fewer data points, the revised background data set does not capture the inherent data variability as well as the longer data set.).

Analyses for statistically significant differences in concentrations between the pumping and post-pumping time periods were based upon a statistical comparison of median values. A dominant change was defined as any well with more than three of the six indicator parameters indicating a statistically significant change (increase or decrease) in median concentration values between the two time periods. Results indicated dominant increases in analyte concentrations in ten wells (Appendix E, Table 7), five of which are generally located in the central part of the MMB wetland and have top-of-well-screen elevations in the range from 41 to 63 feet amsl (wells GW86S, GW-63D, GW-62M, GW-103D, and GW-83S).

In addition, three wells indicated dominant decreases in median concentrations in the post-pumping period (wells GW-103BR, GW-64D, and GW-85M). In particular, well GW-103BR appeared to be responding to the cessation of MWSWs' pumping, with steady declines in concentrations for several indicator parameters. This contrasts with the dominant increases in median concentrations identified for well GW-103D. The 50-foot difference in the top of well screen elevations in wells GW-103BR (-0.8 ft msl) and GW-103D (50 ft msl), together with the apparently divergent trends, indicates that the transition and stabilization to post-pumping conditions within MMBA can vary greatly with depth, particularly in close proximity to the MWSWs..

Determinations of concentration trends were also calculated for the post-pumping period. Any well with more than three of the six indicator parameters presenting a positive or negative trend in concentrations was determined to have a dominant change in trend. Twelve wells indicated dominant increasing trends during the post-pumping time period and twelve wells indicated dominant decreasing trends during the period (Appendix E, Table 6).

Collectively, these results suggest that five wells (GW-62D, GW-65D, GW-65S, GW-83M, and GW-83S) were experiencing the greatest statistically significant changes (increasing concentrations and trends) following the cessation of MWSW pumping. In contrast, well GW-103BR was the only well to exhibit dominant decreases in median concentrations and declining concentration trends during the post-pumping time period. Less dominant but notable changes and trends in other wells and indicator parameters were also identified.

5.3.4.2 MMB/SMB Surface Water (OU2)

Changes and trends in surface water quality chemistry were also evaluated, and included the additional sampling data through second quarter 2006. Key indicator parameters in this evaluation were: sodium, chloride, calcium, sulfate, ammonia, and specific conductance. Iron (dissolved total) was also considered as a secondary parameter, as needed. Although quarterly data were available for most sample locations beginning in November 2003, there were an insufficient number of serial samples (three seasons) to perform robust quantitative analyses of seasonality effects on surface water chemistry results. In addition, as most sampling data were collected

following the cessation of MWSW's pumping (late 2002 and early 2003), pre- versus post-pumping condition comparisons were not possible.

Statistical limits (Shewhart-CUSUM) were developed using a background time period through third quarter 2005. Sampling data from the fourth quarter 2005 and second quarter 2006 were compared to these calculated limits. No exceedences of these statistical limits were identified.

Concentration trends exclusive of MMB discharge considerations were also examined. Results indicated that most of the indicator parameter concentrations have declined over time. However, positive trends were noted for sulfate (at five stations), ammonia (at six stations) and sodium (at five stations). Sulfate and ammonia are sensitive to redox conditions within aquatic environments and sodium is directly related to runoff of road deicing salts. Notably, the May 2006 sampling event occurred during much higher than normal stream flows corresponding to a period of above-normal precipitation. Anomalous stream flow conditions (high and low) can have a profound influence on analyte concentrations in natural waters, particularly within a wetlands environment.

The effects of dilution by stream discharge on surface water concentrations were also considered. However, due to the lack of measured stream flows within MMB and SMB coincident with the collection of surface water samples, and uncertainties in estimating those flows in the absence of recent data, the results were inconclusive and of limited confidence.

In addition, a qualitative comparison of indicator parameter concentrations in groundwater relative to surface water near the confluence of MMB and SMB indicated significant differences between groundwater and surface water chemistry profiles, with pronounced stratification (increasing concentrations) with increasing depth. Apparent effects of runoff contributions from road deicing salts were also indicated.

Conclusions

The additional data included in these analyses supported previous determinations that indicator solute concentrations in selected wells continue to stabilize following the cessation of MWSWs pumping. These data were further indicative of a continuing post-pumping transition. Under such

transitory conditions, statistically-indicated changes in solute concentrations must be carefully considered in the context of other Site information, so they are not misinterpreted to indicate significant mobilization of Site-related constituents.

There was no indication that surface waters in MMB or SMB were impacted since the MWSWs shut down by contamination originating from the Property. The surface water quality sampling results from MMB and SMB continued to be dominated by temporal (seasonal and event-based) and spatial variability in certain indicator parameter concentrations. This variability was consistent with the dynamic hydrologic conditions and complex natural chemical processes in wetland environments. In addition, surface water quality impacts from deicing road-salt runoff were evident.

5.4 GROUNDWATER/SURFACE WATER INTERACTION

This section summarizes investigations pertaining to the hydrology of groundwater and surface water interaction within the ditch system and the MMB wetland complex. Several surface water bodies have been instrumented with hand driven piezometers screened directly below stream/ditch bottom to allow collection and comparison of groundwater and surface water elevations. These piezometers are located in the off-Property West Ditch and the on-Property South Ditch.

The off-Property West Ditch and the on-Property South Ditch are instrumented with piezometers with steel or stainless steel slotted screens. The screens are typically positioned one foot to two feet below the stream bed. Figure 5.4-1 shows the locations of these piezometers and Table 5.4-1 presents the computed elevation of surface water and groundwater measured at these locations. These measurements are from the time period since the weir was installed at its current location. The table lists measurements as inside (I) or outside (O) of the piezometer indicating the groundwater elevation inside the piezometer and surface water elevation outside the piezometer. Values from I/O measurement pairs are bolded for upward vertical head potentials (vertical gradients), and are not bolded for neutral or downward vertical head potentials (downward gradients)

As described in Section 3.4 the MMB wetland is acknowledged to be a large groundwater discharge area with a significant surface water outflow. Over much of the year the area is inundated making clear distinction of water course channels difficult. The bottom is comprised of organic debris and litter, muck and silt. The wetland is generally underlain by a thick section of organic peat. This environment is not suitable for installation of shallow piezometers and none have therefore been installed.

As described in Section 3.4 the East Ditch is part of the active MBTA railroad and is annually maintained by mechanical clearing of all vegetation and debris, and grading of ballast where required. Access to the MBTA commuter rail line is restricted and piezometers have not been installed as they would be destroyed by railroad maintenance activities.

5.4.1 On – Property Ditch System

The hydrology of the ditch system was investigated and described by Smith (Smith, 1997) and conclusions from that study have changed little, although the hydrology has been modified slightly. These modifications include excavation of organic sediment from on-Property South Ditch and portions of off-Property West Ditch, remediating, moving and culverting the on-Property West Ditch, and construction of the current weir, which replaced an earlier weir, similarly situated. A number of stream flow measurements from South Ditch were taken using stainless steel flumes. It was concluded that such measurements were difficult, and often not as reliable during summer months due to the low flow levels in the ditch. In 2005, as part of the Upper South Ditch Supplemental Investigation stream flow measurements were also attempted across three established sections with similar results. The successful measurements were summarized in Section 3.4 and are discussed further below. In general, the following observations are supported and current piezometric measurements:

- The weir provides a backwater condition in the off-Property West Ditch that suppresses groundwater discharge and mitigates floc formation in that ditch system
- The Upper South Ditch is generally a gaining stream reach, and is a consistent groundwater discharge area behind the weir, and fore several hundred feel down stream
- The middle South Ditch varies between gaining and losing conditions seasonally, and

- The lower South Ditch turns into a gaining stream reach near the Property boundary

As discussed below, these observations are supported by piezometric measurements conducted since 2002, after the existing weir was installed.

5.4.1.1 Off-Property West Ditch

Table 5.4-1 lists piezometers from top to bottom in accordance with upstream to down stream locations. Piezometers PZ-11, PZ-12, PZ-13, and PZ-14 are within the off-Property West Ditch. These piezometers were installed in 1995 (Smith, 1997) and most recently surveyed in June of 2003. The ditch bottom is composed of organic sediment and leaf litter and has a lower conductance for water than Upper South Ditch which has been remediated is largely a mineral bottom interface. After remediation of the South Ditch a 'wetland soil' was placed to replace the sediment that had been removed.

Data presented in Table 5.4-1 indicates that these piezometers vary between upward and downward vertical head potentials, but that the upward potentials have extremely small gradients. Upward head potentials are more frequently observed in the spring and winter months, although this case does not always hold true. Due to the silty nature of the substrate, these weak head potentials are not likely to represent a significant flux or exchange of groundwater and surface water within the ditch system. For this reason, the installation of the weir appears to have greatly suppressed floc formation in the off-Property West Ditch.

5.4.1.2 On-Property South Ditch

From upstream to downstream, piezometers in the on-Property South Ditch include PZ-18R, PZ-20, PZ-17R, PZ-17RR, PZ-21, PZ-22, PZ-16R, PZ16RR, PZ-23, and PZ-15. Piezometer PZ-15 was installed in 1995. Piezometers PZ-20, PZ-21, PZ-22, PZ-23 were installed in 2005. Piezometers PZ-17RR and PZ-16RR were installed in 2005 at former PZ-17R and PZ-16R locations, as the former piezometers (installed in 2001) had been damaged by ice. The "R" designates replacement. The suffix "RR" signifies that the piezometer has been replaced twice over its history. The original piezometers PZ-17 and PZ-16 were installed in 1995 (Smith, 1997).

PZ-18R is located in the middle of the backwater channel upstream of the weir. PZ-20 is installed near the edge of the bank in the ponded area immediately downstream of the weir. The other piezometers are installed in the middle of channel down the ditch at the locations shown.

Water level measurements presented in Table 5.4-1 indicate the vertical head potentials in PZ-18R varies between upward and downward directions, with very small gradients, in a manner similar to piezometers in the off-Property West Ditch.

Vertical head potentials in PZ-20, located in the side of the South Ditch indicate that head potential are downward at the edge of the surface water / groundwater system. This reflects groundwater moving around the weir structure, but also may be a normal condition for the gradients at the edge of the stream/ditch bank. The degree of floc formation behind the weir indicates discharging conditions in the center of the stream, the difference in heads in PZ-20 shows that the reversal of head directions is abrupt and occurs immediately under the center of the ditch. Immediately downstream, the vertical head potentials in PZ-17R/PZ-17RR are consistently and strongly upward. Farther downstream at locations PZ-21, PZ-22, and PZ-16R/PZ-16RR the vertical head potentials fluctuate between upward and downward directions, with smaller gradients and upward potentials prevailing in winter and spring and downward potentials in the summer and fall. These findings are consistent with the findings concerning the middle section of the ditch (Smith, 1977). A little farther down stream past Central Pond, head potentials in PZ-23 are dominantly downward. At PZ-15 vertical head potentials return to a positive or upward direction over most of the year.

Estimated annual groundwater inflows to the South Ditch are on the order of 1.6 million cubic feet per year (Smith, 1997) which is equal to approximately 9.1 gpm. Based on results of surface water flow measurement between flumes 1 and 2, (located near PZ-17 and PZ-16), (Smith, 1997) a range of inflow was estimated from -0.9 to +8.7 gpm, with an average of +1.1 gpm from five of six measurement events in winter and spring. Over the same periods, gains were estimated ranging from 27.5 gpm to 60.6 gpm (average of 45.8 gpm) between flumes 4 and 5, which were located over a short reach between PZ-15 and the confluence of South Ditch and Ephemeral Drainage, which is below Central Wetland, which contributes to the stream flow.

The upper and lower reach of the on-Property South Ditch receives discharge from groundwater, with the majority of this flow contributed just prior to the confluence of Ephemeral Drainage. On an average annual basis, the water balance of the central portion of South Ditch is typically neither losing nor gaining, although the stream may go dry in summer months.

5.4.1.3 Ephemeral Drainage

As its name implies, the Ephemeral Drainage is a low lying seasonal wetland discharge area. When groundwater elevations are sufficiently high, groundwater discharges to surface water and flows to South Ditch both in a channel near GW-55 and through the eastern end of the drainage. Periodic flows from the drainage are also related to surface water run-off and overland flow during precipitation events. The groundwater contribution to surface water flow has not been quantified. The Ephemeral Drainage is separated from the South Ditch by a low lying hill of till and bedrock, which constricts groundwater underflow from South Ditch to the Ephemeral Drainage Area. Groundwater underlying the Ephemeral Drainage is contributed from areas located to the west, southwest and south.

5.4.1.4 Off-Property East Ditch

As discussed previously, the East Ditch is a railroad drainage feature that borders both sides of the tracks on the MBTA line. Based on observations, and other recent investigations, the East Ditch is a perennial groundwater discharge location, that also receives surface run-off over a large area, and surface water flows from South Ditch.

5.4.2 Maple Meadow Brook Wetland Complex

As discussed previously, the MMBW contains two principal drainages including MMB and Sawmill Brook. The hydrologic water budget in the MMB wetland (i.e., water inflows and outflows) have been quantified through modeling (Geomega, 2001a). As a means of checking the computed water balance of the model, stream flow measurements were completed and compared at Maple Meadow Brook at Route 38, as well as at East Ditch. Stream gauging stations were also monitored at Sawmill Brook at Chestnut Street and within MMB near a gravel pit. The simulated

and measured surface water flows were within 2%. The computed flows for MMB range from 50 to 130 times the flows of South Ditch as measured by Smith.

The model water balance, which included pumping from the Town MWSWs, concluded that of the net outflows in the model for the MMB (50% of the water balance), 14% were contributed by discharge to streams, 33% by pumping wells, and 3% as subsurface flow. With cessation of pumping, it is expected that the net infiltration will decrease since the shallow groundwater is not being pumped, and that as a percentage of water balance outflows, discharge to streams will have increased, and that subsurface flow within the aquifer will also be larger proportional component of the water balance outflow in MMBA.

6.0 RISK ASSESSMENT

6.1 HUMAN HEALTH RISK ASSESSMENT

The Site has been the subject of many human health risk assessments. The list of human health risk assessments conducted for the site is in Table 6.1-1, and full summaries for each of the risk assessments are included in Appendix F.1.

Human exposures to analytical parameters detected in the soil, surface water, sediment, floc, air and groundwater have been assessed using various receptor scenarios. The receptors evaluated include industrial/commercial workers (both on-property and off-property) construction workers, utility workers, trespassers, and neighborhood residents. The overall Conceptual Site Model related to the summarized human health risk assessments is shown in Figure 6.1-1. There are three major human health risk assessments that have provided comprehensive information concerning human health risks associated with the Site.

A comprehensive human health risk assessment (HHRA) was completed for the entire Site in 1997 as part of the Supplemental Phase II Report submitted to MADEP in June 1997 (Smith, 1997). In 2000, a Focused Risk Assessment (FRA) was conducted. The 2000 FRA demonstrated that the construction and operation of a warehousing facility on the property would be associated with a condition of no significant risk as defined by the MCP. In 2004, another FRA was completed. The 2004 FRA demonstrated that the construction and operation of a rail trans-loading facility would be associated with a condition of no significant risk.

6.1.1 Human Health Risk Assessment (Supplemental Phase II Report), June 1997

The 1997 HHRA was conducted to assess human health risks associated with current and reasonably foreseeable land uses and activities at the facility and in the surrounding areas within the Site boundaries. The results of the HHRA were intended for use in determining the need for remedial activities as required by the MCP. The HHRA was submitted to MADEP as a component of the Supplemental Phase II Report (Smith, 1997). The HHRA was conducted in a

manner consistent with a scope of work conditionally approved by MADEP in a letter dated May 16, 1996 (MADEP, 1996b). The Human Health Risk Assessment Scope of Work had been submitted to MADEP in April 1996 (ABB-ES, 1996c). The Conditional Approval required that background levels be established in accordance with the definition of background in the MCP. The conditions of the approval were addressed by additional sampling and analysis of soils at the Site as described in Section 2.0.

This HHRA evaluated exposures to surface and subsurface soil, surface water, sediment and floc material within the ditch system and groundwater (including potential vapor intrusion). The current and reasonably foreseeable land use and activities for the facility were identified as industrial/commercial. The HHRA assumed an institutional control would maintain the former manufacturing portion of the Property as industrial/commercial use. Current land conditions were evaluated for the on-property worker and utility worker potentially exposed to soils, surface water and sediment within the fenced perimeter of the property. Neighborhood residents were evaluated for exposures to surface water and sediment outside the fenced perimeter of the property. No receptor would be exposed to untreated water; therefore, exposure to groundwater was evaluated by analyzing the finished water from Butters Row Treatment Plant and the Altron wells. The sampling data from the Altron wells (industrial wells at One Jewel Drive) were used to evaluate exposures for the off-site worker.

The 1997 HHRA was conducted in consideration of the following points:

- The Facility was evaluated for industrial/commercial use
- Current conditions – facility is completely fenced and site is secure – there are no trespassers – only access by neighborhood residents to impacted media is to surface water and sediment of the East Ditch and Off-Property West Ditch (but it is fenced)
- Future conditions assumed that perimeter fencing could be removed and that trespassers could access the ditch system and surface soils on-Property
- There is no current or expected future use of groundwater at the facility

The following receptors and exposure pathways were evaluated in the 1997 HHRA:

- Facility Workers
  - Surface soils direct contact
  - Surface water in ditch system
  - Sediment in the ditch system
  - Vapor intrusion from groundwater
  - Drinking water – finished water from Butters Row Treatment Plant
- Off-property Workers
  - Vapor intrusion from groundwater
  - Industrial use of groundwater (One Jewel Drive)
  - Drinking water – finished water from Butters Row Treatment Plant
- Neighborhood Residents – Current conditions
  - Drinking water – finished water from Butters Row treatment Plant (no private wells in use within Site boundaries)
  - Drinking water – finished water from Butters Row Treatment Plant
  - Direct contact with surface water and sediment and floc in East Ditch or Off-PWD
  - Vapor intrusion from groundwater
- Neighborhood residents/trespasser – hypothetical future conditions
  - Drinking water – finished water from Butters Row Treatment Plant
  - Direct contact with surface water and sediment and floc in East Ditch or Off-PWD and South Ditch and on-Property West Ditch
  - Vapor intrusion from groundwater
  - Direct contact with surface soils at the Facility
  - Fugitive dust, vapors from construction activity on Facility
- Construction worker and Utility Worker
  - Surface and subsurface soil direct contact
  - Inhalation of dust, vapors

The cumulative receptor cancer and non-cancer risks associated with current land use conditions and future land use conditions were below the corresponding MCP Cumulative Receptor Cancer Risk Limit ($1x10^{-5}$) and the Cumulative Receptor Non-Cancer Risk Limit (HI=1). These results indicated that the cancer and non-cancer risks for current and reasonably foreseeable land uses and activities are consistent with a condition of no significant risk as defined by the MCP.

The MCP requires that a public health risk assessment include a comparison of Site conditions to applicable or suitably analogous public health standards. Drinking water standards are considered to be applicable standards at any wells (including monitoring wells) located within groundwater areas designated as category GW-1 groundwater. For this Site, the designated zone of contribution to the municipal water supply wells (the Zone II areas) is designated as category GW-1 groundwater. Concentrations of certain analytes were above corresponding drinking water standards (MCLs) in at least one monitoring well (but not in water supply wells) within the GW-1 areas. As a result, although calculated risks were below the risk limits and there were no exceedances of MCLs in the water supply wells, it could not be concluded that there is a condition of no significant risk to health as defined by the MCP.

The 1997 risk assessment concluded, because of the potential danger of fire or explosion associated with future excavation in the drum areas, that a condition of no significant risk of harm to safety did not exist. Subsequent to the 1997 risk assessment, the materials in the drum areas were excavated and disposed off-site in 2000. During the remediation of the drum areas, it was determined the materials were not an explosion or fire hazard. The materials thought to pose a hazard were removed, and the potential hazard no longer exists.

Because some concentrations of some detected parameters at one or more locations in groundwater in the non-Zone II dense layer hot spot, in the Plant B groundwater hot spot, and in Zone II groundwater exceed the groundwater UCLs, a condition of no significant risk of harm to public welfare did not exist as defined by the MCP. These areas were defined as hot spots pursuant to the MCP in effect at that time.

6.1.2 Focused Risk Assessment Report, Volume I & II, April 5, 2000

The 2000 FRA was completed to support the proposed construction of a large warehousing facility on the site. The FRA evaluated human health risks for both the construction phase and the subsequent operation of the redeveloped property, and it provided an update to the 1997 risk assessment. This FRA also evaluated another potential future site redevelopment without a specific building plan (unspecified industrial/commercial redevelopment). The FRA was

submitted to MADEP as a component of Part I of the C-RAM Plan (GEI, 2000a). The Part 1 of the C-RAM Plan was submitted to MADEP on April 6, 2000 (GEI, 2000a) and was conditionally approved by MADEP on June 26, 2000 (MADEP, 2000a). Part 1 of the C-RAM Plan contained a Focused Site Characterization (FSC), FRA, and Focused Feasibility Study (FFS) consistent with the MADEP's Policy No. WSC-00-425, Construction of Buildings in Contaminated Areas (MADEP, 2000b). Part 1 of the C-RAM Plan was submitted to support the proposed redevelopment of the property and its use as a warehouse facility. The FRA concluded that the human health risks associated with the construction and operation of the warehousing facility were within the MCP risk limits. That proposed redevelopment plan was not implemented at that time.

Soil, surface water, sediment and groundwater were evaluated in this FRA. The groundwater data were categorized as being within the zone of contribution to the Wilmington water supply (Zone II groundwater) and non-Zone II groundwater. Each category of groundwater was evaluated separately.

The following receptors were evaluated for the planned redevelopment scenario:

- the adolescent trespassers (soil, sediment, surface water and groundwater),
- redevelopment construction worker (soil),
- building occupant (VOCs in soil and groundwater),
- offsite downwind residents (soil and groundwater) and
- the utility worker (soil).

The following receptors were evaluated for the unspecified future industrial/commercial redevelopment scenario:

- the adolescent trespassers (soil and groundwater),
- construction worker (soil) and
- on-Property worker (soil and VOCs in soil and groundwater).

Since a minimal amount of surface water and sediment quality data for the ditch system had been collected between the publication of the 1997 Supplemental Phase II report (Smith, 1997), it was assumed that the 1997 risk assessment results for surface water and sediment were still applicable. Therefore, exposures and associated human health risks for surface water and sediment were not re-calculated in this FRA.

In addition to evaluating the risks associated with the planned redevelopment (warehousing), the 2000 FRA provided a qualitative update of the 1997 risk assessment for soil, surface water, sediment and indoor air for on-property receptors based on additional data collected since the 1997 report was published and revisions made to the MCP. Additional investigations had been conducted to address 1998 MADEP comments on the 1997 HHRA. The 2000 FRA presented the results of those investigations and identified how the results of those investigations impacted the results and conclusions of the 1997 human health risk assessment.

The 2000 FRA concluded, with respect to the planned warehousing facility, as well as the unspecified industrial/commercial redevelopment scenario for the property, that:

- A condition of no significant risk or harm to health did exist for those receptors evaluated in association with the planned property redevelopment. In other words, the human health risks associated with property redevelopment meet MCP limits.
- Although there were concentrations of Site constituents in groundwater and soil that are above MCP UCLs, the proposed redevelopment would not interfere with future redevelopment or any potential remedial actions that might be required.

The 2000 FRA concluded, with respect to the human health, safety, and public welfare risks for the entire Site (an update to the 1997 risk assessment), that:

- The assessment of risk of harm to human health indicated that for current land use and current site conditions, the cancer and non-cancer risks remained below the associated MCP limits.
- Risks associated with exposures to potable groundwater were below MCP limits. A condition of no significant risk of harm to health existed for those receptors, including potential exposures via the consumption of Town water. There were no private wells in service within the boundaries of the Site. This condition of no significant risk would be maintained by an Activity and Use Limitation.

- Risks associated with potential vapor migration from groundwater to indoor air remained below MCP limits.
- The Drum Removal RAM was completed in 2000. A potential explosion hazard previously identified in the earlier Immediate Response Action activities in this area was eliminated. During the remediation of the drum areas, it was determined the materials were not an explosion or fire hazard. The materials thought to pose a hazard were removed, and the potential hazard no longer exists
- At MADEP's request, human health risks were calculated for drinking water exposures using analytical data from untreated groundwater samples collected at each of the five MWSWs and from eleven locations within the distribution system of the water supply. No person would consume untreated groundwater from one or more of those wells (either currently or in the future), since the water from the wells is treated at the Butters Row Treatment Plant (for parameters other than the Site-related parameters) prior to the water being distributed to the public.
    - Screening non-cancer Hazard Index values for the untreated groundwater samples from the MWSWs were above one, due to the concentrations of manganese in the untreated water. The Butters Row Treatment Plant routinely removes iron and manganese from the groundwater prior to additional treatment and chlorination. The iron and manganese in the groundwater is a natural condition. Cancer risks were below the MCP limits.
    - Cancer and non-cancer risks associated with the drinking water scenario for eleven samples collected from the water distribution system were below the corresponding MCP risk limits.
- Because detected site concentrations of some Site constituents at specific locations exceeded Massachusetts UCLs in groundwater and soil and there was measured non-aqueous phase liquid in a well in the Plant B area, a condition of no significant risk to public welfare does not exist. These conditions did not affect the health risks for the planned redevelopment.
- Additional investigations were conducted to address MADEP comments on the 1997 HHRA. The results of the investigations have been incorporated into the 2000 FRA.
    - Background arsenic concentrations in soil were further characterized by sampling and analysis in response to MADEP comments on the 1997 HHRA (discussed in Section 2.0). Arsenic concentrations in Site soil samples were determined to be consistent with background conditions. Arsenic, therefore, was not selected as a chemical of potential concern in the HHRA.
    - Additional sampling of soil was conducted at soil sample locations SWMU-27 and SWMU-33 to further delineate the specific locations of suspected hot spots (as defined by the MCP). The additional sampling and analysis did not confirm the presence of hot spots in those areas. The area of SWMU-27 was subsequently excavated during remedial actions in the former Lake Poly area
    - Additional samples of surface and subsurface soils were collected from the Lake Poly area and analyzed for total chromium and hexavalent chromium to

determine if soil concentrations of hexavalent chromium were present above the MADEP action level for accessible soils (200 mg/kg). The action level addresses the potential for allergic contact dermatitis. All concentrations in these samples were below 200 mg/kg (most were below 10 mg/kg). It was concluded that the potential health effects of hexavalent chromium in soil do not warrant further investigation at the Site.

- One soil sample (RSO-6) had been reported to contain 100 mg/kg of cadmium. This result appeared to be anomalous, since cadmium had not been detected at similar concentrations in soil at the Site. Nonetheless, soils from the area of RSO-6 were excavated during the C-RAM activities. The RSO-6 excavation was 12 feet wide, 14 feet long, and 8 feet deep. Four confirmatory sidewall samples (RSO-06-N, RSO-06-E, RSO-06-S, RSO-06-W) and one bottom of excavation sample (RSO-06-B) were collected and submitted for analysis of SVOCs, pesticides, cadmium, chromium, and lead. The confirmatory sample results indicated that the concentrations of cadmium at RSO-6 had been reduced to below applicable MCP Method 1 soil standards. The excavations were backfilled with imported clean granular fill. The excavated soil was stockpiled and tested for off-site disposal. The stockpiled soil from both excavations was subsequently shipped off-site for disposal.

The MCP requires that the public health risk assessment include a comparison of Site conditions to applicable or suitably analogous public health standards. Drinking water standards are considered to be applicable standards at any wells (including monitoring wells) located within groundwater areas designated as category GW-1 groundwater. For this Site, the designated zone of contribution to the municipal water supply wells (the Zone II areas) is designated as category GW-1 groundwater. Concentrations of certain analytes were above corresponding drinking water standards (MCLs) in at least one monitoring well (but not in water supply wells) within the GW-1 areas. As a result, although calculated risks are below the risk limits and there are no exceedances of MCLs in the water supply wells, it could not be concluded that there is a condition of no significant risk to health as defined by the MCP for the GW-1 areas (Zone II). This conclusion did not affect the conclusion that the human health risks associated with the proposed warehousing redevelopment were within the MCP risk limits and therefore could be constructed and operated.

6.1.3 Focused Site Characterization and Focused Risk Assessment, October 4, 2004

The 2004 Site Characterization and FRA (MACTEC, 2004j) were prepared for a proposed Site redevelopment that included a rail trans-loading facility to be located at the portion of the property that is located to the north of the South Ditch. The Site Characterization and FRA were submitted to MADEP on October 13, 2004. On November 19, 2004, the Construction Related Release Abatement Measure (RAM) Plan, Former Olin Facility, 51 Eames Street, Wilmington, MA, RTN 3-0471 was submitted to MADEP. The C-RAM Plan contained a Focused Feasibility Study (FFS). The combined submittal of the Site Characterization and FRA and the C-RAM Plan (including the FFS) fulfilled the requirements for a C-RAM Plan as described in MADEP's Policy No. WSC-00-425, Construction of Buildings in Contaminated Areas (MADEP, 2000b). The FRA concluded that the human health risks associated with the construction and operation of the rail trans-loading facility were within the MCP risk limits.

The FRA evaluated potential exposures and health risks, associated with the construction phase and the subsequent operation of the proposed facility. As proposed, the entire development area will be covered with structures, pavement, concrete, or crushed stone and includes rail lines, parking/loading areas and a structure for loading and off-loading rail cars. After construction of the facility, little soil on the northern portion of the property would be accessible, and the soil outside of the redevelopment area, principally to the west and south, will remain unpaved and potentially accessible. The area of the property located south of the South Ditch will remain undeveloped, has a conservation restriction, and was not evaluated in this FRA. There were no known previous industrial activities conducted at that portion of the Property.

The receptors evaluated in this FRA include the construction worker (soil), off-site downwind resident (soil), facility employee (soil) and utility worker (soil). The construction worker risk estimates were considered to be conservative estimates for the utility worker based on exposure duration.

The C-RAM Plan indicated that, upon completion of redevelopment activities, the redevelopment area wouldl be subject to the terms of a Notice of Environmental Land Use Restriction and Easement Agreement. Further, the plan indicated that upon completion of MCP response actions,

it was anticipated that the Notice would be amended and recorded as an Activity and Use Limitation (AUL) which is the MCP term for an institutional control. The C-RAM Plan indicated that the Notice would stipulate that private groundwater supply wells may not be installed, and groundwater may not be used for non-potable or potable purposes. Additionally, future buildings would be either elevated above ground with an open crawl space or would be constructed with a vapor barrier and/or mitigation system. The groundwater exposure pathway was not complete for the redevelopment scenario, and therefore was not included in the risk calculations.

The assessment of risk of harm to human health indicated that for the current and foreseeable land use, cancer and non-cancer risks for the receptors that might be exposed to OHM associated with the property did not exceed the corresponding MCP Cumulative Receptor Cancer and Non-Cancer Risk Limits. A condition of no significant risk of harm to human health exists for those receptors and that condition would be maintained by an Activity and Use Limitation or other mechanism of institutional control.

The 2004 FRA concluded, with respect to the planned rail trans-loading facility, that:

- A condition of no significant risk or harm to health exists for those receptors evaluated in association with the planned property redevelopment. In other words, the human health risks associated with property redevelopment meet MCP limits.
- Although there are some concentrations of Site constituents in groundwater and soil that are above MCP UCLs, the proposed redevelopment would not interfere with future remedial actions that might be required to address the UCL exceedances. Such a finding is important to the Focused Feasibility Study that is also a component of the C-RAM.
- A condition of no significant risk of harm to safety exists at the Property.

The MCP, as a component of the public health risk assessment, also includes a comparison of Site conditions to applicable or suitably analogous public health standards. Drinking water standards are considered to be applicable standards at any wells (including monitoring wells) located within groundwater areas designated as category GW-1 groundwater. For this Site, the designated zone of contribution to the municipal water supply wells (the Zone II areas) is designated as category GW-1 groundwater. Concentrations of several analytes were above corresponding drinking water

standards (MCLs) in at least one monitoring well (but not in water supply wells) within the GW-1 areas. As a result, although calculated risks are below the risk limits and there are no exceedances of MCLs in the water supply wells, there is not a condition of no significant risk to health as defined by the MCP for the GW-1 areas (Zone II). This conclusion did not affect the conclusion that the human health risks associated with the proposed rail trans-loading facility were within the MCP risk limits and therefore could be constructed and operated.

Because detected site concentrations of some Site constituents at specific locations exceeded Massachusetts UCLs in groundwater and soil and there was measured non-aqueous phase liquid in a well in the Plant B area, a condition of no significant risk to public welfare did not exist. These conditions did not affect the health risks for the planned redevelopment.

6.1.4 Assessment of Health Risks Associated With NDMA In Environmental Media

NDMA tends to partition to aqueous media and because it is highly soluble (miscible) in water, does, has a low organic carbon partitioning coefficient and will not readily sorb to soil or sediment. It degrades when exposed to sunlight. Although NDMA has been evaluated for vapor migration from groundwater, it has low volatility and a low Henry's Law Constant and would not be of concern with respect to vapor migration from groundwater.

Soil, surface water, sediment and groundwater at the site have all been analyzed for NDMA. NDMA was only detected in surface water (Figure 4.2-16) and groundwater, and there were no detections of NDMA in groundwater samples collected from within the BRTP, within the distribution system or the Town Park water supply well. Additionally, NDMA has not been identified in any private wells.

In August 2004, a preliminary HHRA was completed to evaluate NDMA in the groundwater from the two industrial supply wells located on the Sanmina property. The HHRA evaluated potential exposures to workers at the Sanmina facility from the potential vapor migration from process water to indoor air.

An IRA for NDMA was completed in December 2004 which evaluated potential exposures to NDMA in air at the Site from the Plant B AS/SVE system, treated effluent from the Plant B Groundwater Treatment system, vapor migration from groundwater, groundwater from wells within the estimated boundary of the Olin site and on-property and off-property surface water (GEI, 2004f).

As part of the IRA, an Imminent Hazard Evaluation (IHE) was completed. No Imminent Hazard to health or the environment was identified in the IHE. Specifically, the following are conclusions:

- The estimated lifetime cancer risks and non-cancer hazard index valued for the IHEs for employees at the 51 Eames Street facility, neighborhood residents, and employees and visitors of down-gradient commercial/industrial properties are all below the Imminent Hazard cancer risk limit of one in one-hundred thousand and are below the Imminent Hazard non-cancer risk (hazard index) of ten.
- The concentrations of NDMA in surface water from the Off-Property West Ditch and in the Plant B effluent reported to date were well below the lowest documented aquatic life threshold effect concentration for NDMA.
- No conditions associated with of the presence of NDMA in groundwater or surface water that represent a threat of physical harm or bodily injury has been identified.
- The NDMA concentrations in groundwater and surface water samples collected in the South Ditch, did not pose an Imminent Hazard as defined by the MCP for employees of the 51 Eames Street Site facility.
- The NDMA concentrations in groundwater and surface water samples collected in the East Ditch did not pose an Imminent Hazard as defined by the MCP for, the surrounding neighborhood residents who might trespass at the East Ditch.
- NDMA was not detected in the groundwater collected from the private wells sampled and therefore does not pose an imminent hazard nor a significant risk to human health as defined by the MCP
- The concentrations of NDMA in surface water samples collected from the East Ditch and South Ditch are well below the lowest documented aquatic life threshold effect concentration for NDMA. Therefore, the NDMA in surface water samples did not pose an imminent hazard nor a significant risk to aquatic life.

6.1.5 Conclusions

Human health risk assessments conducted to date have lead to the following conclusions:

- The 51 Eames Street Property is suitable for industrial/commercial use.
- No off-Property human exposure potential for impacted soil has been identified.
- There are currently no private drinking water wells within the boundaries of the Site. A comprehensive testing program has been conducted for private wells in the area of the Site and in areas adjacent to the Site.
- The human health risks associated with the use of two industrial supply wells (at One Jewel Drive) were below MCP risk limits. MCP risk limits are cancer risk of one in one hundred thousand and non-cancer hazard index of one. The facility and wells are currently inactive. These industrial wells are subject to a Water Management Plan.
- The five MWSWs located in the MMB aquifer were not in service at the time of the NDMA assessments. Risk assessments based on long-term monitoring of the town Wells and water distribution system previously concluded that health risks associate with use of the water were below the MCP risk limits and that no Primary MCLs had been exceeded in water samples from the MWSWs or the distribution system.
- Health risks associated with the potential exposures to off-Property surface water and sediment (East Ditch, Off-PWD, MMB Wetland) are below MCP limits and are minimal.
- Potential vapor intrusion from groundwater into off-Property occupied buildings has been evaluated and no risks above the MCP limits have been identified.
- NDMA was detected in groundwater samples collected from four of the five MWSWs after the wells had been essentially taken out of service. MADEP developed a drinking water guideline for NDMA after the NDMA was detected. The pumping of the MWSWs has been suspended by the Town of Wilmington even though the action level for NDMA that was developed by MADEP was not exceeded in any of the MWSWs. The suspension of pumping for all five MWSWs has continued to date. These MWSWs have not provided potable water since the discovery of NDMA in the samples from the MWSWs.
- A comprehensive investigation of the nature and extent of NDMA in groundwater (including private wells), surface water, sediment, and soil has been conducted. NDMA was not detected in sediment or soil. Risk assessments based on the results of the investigation have concluded that there is currently minimal potential for human exposure to NDMA, and NDMA in groundwater and surface water does not currently pose an unacceptable health risk.
- There are concentrations of Site-related constituents in DAPL and groundwater samples collected from monitoring wells located within the category GW-1 area (Zone II) that are above drinking water standards. No one is currently exposed to

groundwater from those monitoring wells, and there is no expectation that anyone could be exposed to groundwater from those monitoring wells in the future. In the context of the MCP, drinking water standards are considered applicable public health standards within category GW-1 areas.

6.2 ECOLOGICAL RISK ASSESSMENT

The Site has been the subject of twelve ecological risk assessments. The list of ecological risk assessments conducted for the site is presented in Table 6.2-1, and full summaries for each of the risk assessments are included in Appendix F.2.

Ecological exposures to analytical parameters detected in surface water, soil, sediment, floc, and groundwater have been assessed for terrestrial and aquatic receptors including red fox (terrestrial mammal), woodcock (terrestrial bird), earthworms (terrestrial invertebrate), green heron (semi-aquatic bird), amphibians, the benthic macroinvertebrate community (aquatic invertebrate), aquatic plants, terrestrial plants, and fish (where they are suspected to occur). Data used to evaluate potential risk have included analytical chemistry, soil and sediment toxicity testing, analysis of plant, benthic invertebrate, amphibian, and small mammal tissue obtained from specimens captured on-site, benthic macroinvertebrate community surveys, amphibian calling and population surveys, habitat surveys (including weekly inspections of the ditch system from 1997 to 2005). Assessment endpoints generally consisted of protection and maintenance of receptor populations, typically stated in terms of growth, survival, and reproduction.

Four major risk assessments area summarized in this section.. A comprehensive ecological risk characterization (ERC) was completed for the entire Site in 1997 as part of the Supplemental Phase II Report submitted to MADEP in June 1997 (Smith, 1997). In 2000, a Focused Risk Assessment (FRA) was conducted to demonstrate that the construction and operation of a warehousing facility on the property would be associated with a condition of no significant risk as defined by the MCP. The proposed warehousing facility project was not implemented. In 2002, a modified Stage I Environmental Screening was completed at Maple Meadow Brook to determine whether the seasonal discharge of groundwater containing OHMPCs attributable to the Site might represent a significant risk of harm to ecological receptors that occur within the Maple Meadow Brook wetland complex. In 2004, a Focused Ecological Risk Characterization (ERC)

was conducted to characterize risk in surface water and sediment in the East Ditch and New Boston Street Drainway.

6.2.1 Ecological Risk Characterization (Supplemental Phase II Report), June 1997

The 1997 Stage II ERC was conducted to assess risk to ecological receptors associated with the current and reasonably foreseeable land uses and activities at the facility and in the surrounding areas within the Site boundaries. The results of the ERC were intended for use in determining the need for remedial activities as required by the MCP. The ERC was submitted to MADEP as a component of the Supplemental Phase II Report (Smith, 1997). The Ecological Risk Assessment Scope of Work was submitted to MADEP in June 1996 (AB-ES. 1996d).

The 1997 Stage II ERC builds upon the information presented in the 1993 Stage I screening level environmental risk assessment (SLERA) (ABB-ES, 1993) and incorporates additional information collected subsequent to the SLERA, including background concentrations, additional data collected from facility surface soil, sediment, and surface water, and includes evaluation of site-specific biological tissue and toxicity data, and toxicity tests.

The 1997 Stage II ERC evaluated surface soils from on-facility locations which constituted habitat suitable for terrestrial wildlife. Samples which were collected from paved or developed portions of the site were excluded from the 1997 Stage II ERC. Background soil samples were also collected. Soil samples were collected to support earthworm toxicity testing. Biological samples were collected at the facility in October 1996 to obtain site-specific information regarding chemical concentrations in prey tissue. Small mammals, herbaceous plants, benthic macroinvertebrates, and amphibians inhabiting the site were captured and sacrificed, and their tissue analyzed for OHMPC. Additionally, laboratory-reared earthworms were exposed to surface soils collected at the facility and measured for OHMPC at the end of a 28-day bioaccumulation period. Biological tissue samples were analyzed as whole body fractions.

The 1997 Stage II ERC also evaluated surface water and sediment data from on-facility locations. East Ditch locations evaluated in the SLERA were not evaluated in the 1997 Stage II ERC

because they lacked significant aquatic habitat. Surface water and sediment background locations were also evaluated for the 1997 Stage II ERC.

Analytes which were consistent with background determined using statistical comparisons prescribed by MADEP (MADEP, 1995a) for surface water and sediment, and comparison to MADEP published soil background concentrations were eliminated from further evaluation. Analytes with low detection frequency, low concentration and no history of past or current use at the site as defined in the MCP and MADEP risk assessment guidance (MADEP, 1995a) were also eliminated. All analytes detected in biological tissue samples were considered OHMPCs in terrestrial and aquatic food chains

The 1997 Stage II ERC then identified ecological habitats, exposure areas, receptors, and exposure pathways. Terrestrial habitat consists of a mix of open field, forested upland, and wetland areas and was limited to portions of the site which are not developed and not heavily maintained. The aquatic habitat associated with the facility consisted primarily of some shallow pond habitat and a network of shallow, man-made ditches which do not support a diverse aquatic community. Aquatic fauna associated with the ditches and the pond are not numerous but include taxa such as crayfish, dragonfly nymphs, amphipods, mosquito larvae, and frogs (leopard frogs, bullfrogs, and green frogs). No fish species have been observed. Fish and sensitive macroinvertebrate taxa (such as mayflies or stone flies) are unlikely to occur, even in the absence of the existing OHMPC, because ditches are ephemeral in nature, physically degraded, and of insufficient depth to support such populations. Aquatic habitat was divided into six exposure areas: off-Property West Ditch, on-Property West Ditch, South Ditch, Ephemeral Drainage Ditch, Central Pond, and Background.

Exposure point concentrations (EPCs) for surface water, sediment, and soil OHMPCs were then derived by calculating average (arithmetic mean) concentrations for each exposure area. Soil EPC were weighted by area.

Assessment and measurement endpoints were:

Reduction in resident terrestrial invertebrate population size

- Use subchronic toxicity tests with growth and mortality endpoints to measure impacts to earthworms in study area and reference soil samples.
- Using toxicity test results, run a population model to determine if adverse effects might result in more than a 25% decrease in earthworm abundance.
- Compare of soil EPCs to published earthworm TRVs.

Reduction in resident amphibian population size

- Use FETAX tests with mortality and malformation to measure impacts to amphibians (green frog, Rana clamitans) in study area and reference sediment samples.
- Perform dilution study to derive LC-50, EC-50, IC-50, IC-25, and ANOEC to develop concentration-response curves.
- Using toxicity test results, run a population model to determine if adverse effects might result in more than a 25% decrease in green frog abundance.
- Compare surface water EPCs to published amphibian TRVs.

Reduction in semi-aquatic receptor subpopulation size

- Quantify the average daily exposures to OHMPC in green heron (*Butorides striatus*) through food chain modeling using measured prey tissue concentrations (i.e. small mammal, crayfish, and frog) and compare modeled exposures to published values indicative of potential impairment using HQs and HIs.
- Use frog population model to determine if decrease in prey abundance (greater than 50%) might indirectly affect semi-aquatic receptor populations.

Reduction in terrestrial bird subpopulation size

- Quantify the average daily exposure to OHMPC in woodcock (*Scolopax minor*) through food chain modeling using measured prey tissue concentrations (i.e. plant and earthworms) and compare modeled exposures to published TRVs indicative of potential impairment using HQs and HIs.
- Use earthworm population model to determine if decreases in prey abundance (greater than 50%) might indirectly affect terrestrial bird populations.

Reduction in mammal subpopulation size

- Quantify the average daily exposure to OHMPC in red fox (Vulpes through food chain modeling using measured prey tissue concentrations (small mammal, bird, plant, earthworm, and amphibian) and compare modeled exposures to published TRVs indicative of potential impairment using HQs and HIs.

A weight-of-evidence approach was used to characterize risk for assessment endpoints. The 1997 Stage II ERC concluded there was no significant risk of harm from soil OHMPC to terrestrial receptors (red fox, woodcock) from either direct toxicity via the food chain or indirect effects from reduced prey abundance (earthworms). Toxicity tests indicated no significant risk to terrestrial invertebrates.

The 1997 Stage II ERC also supported a finding of no significant risk of harm from surface water and sediment OHMPC to semi-aquatic receptors (green heron) from either direct toxicity via the food chain or indirect effects from reduced prey abundance (frogs).

The 1997 Stage II ERC could not support a finding of no significant risk of harm from surface water OHMPCs to amphibians (green frog) at any of the aquatic exposure areas, particularly Off-Property West Ditch sediment, and South Ditch and Ephemeral Drainage Ditch surface water. Risk calculated using historical data was higher than risk calculated using more recent data. Ammonia, chromium, and di-n-octyl-phthalate were the primary risk contributors. Aluminum and iron were also identified as potential risk contributors. This assessment was completed before the 2000 ditch remediation.

6.2.2 Focused Risk Assessment, April 5, 2000

The 2000 Focused Risk Assessment (FRA) was completed to support the proposed construction of a large warehousing facility on the site. The FRA evaluated ecological risks for habitat remaining after the proposed development, and also provided an update to the 1997 ERC. The FRA was submitted to MADEP as a component of Part I of the C-RAM Plan (GEI, 2000a). Part I of the C-RAM Plan was submitted to MADEP on April 6, 2000 and was conditionally approved by MADEP on June 26, 2000 (MADEP, 2000a. Part I of the C-RAM Plan contained a Focused site Characterization (FSC), FRA, Focused Feasibility Study (FFS), consistent with the

MADEP's Policy No. WSX-00-425, Construction of Buildings in Contaminated Areas (MADEP, 2000b). Part I of the C-RAM Plan was submitted to support the proposed redevelopment of the property and its use as a warehouse facility. The FRA supported a conclusion of no significant risk of harm to terrestrial wildlife or semi-aquatic wildlife at the property under the proposed conditions.

The 2000 FRA consists of two elements. The first element addresses MADEP's written comments to the 1997 Stage II ERC. Responses to MADEP comments fell into three categories: clarification regarding 1) the development of the various toxicity benchmarks and toxicity reference values (TRVs) employed in the ERC, 2) the estimation of potential direct exposures to amphibians and indirect exposures to wildlife, and 3) the characterization of environmental risks. Responses to comments did not change the overall conclusions of the 1997 Stage II ERC.

The second element is a focused risk assessment which evaluated risk to ecological receptors from surface soil and sediment if the site were to be remediated and redeveloped with a warehouse; the warehouse footprint would have reduced terrestrial habitat evaluated in the 1997 Stage II ERC.

The 2000 FRA evaluated surface water, sediment, and soil data which were collected in 1997 Stage II ERC but excluded data from portions of the site that would be affected by the proposed redevelopment or remediation. The 2000 FRA also included additional surface soil and sediment data collected after completion of the 1997 Stage II ERC. Sediment samples were grouped into either the South Ditch/floc or the Ephemeral Drainage Ditch. Surface water data were not reevaluated in the focused risk assessment because no new data were collected since completion of the Stage II ERC.

Exposure point concentrations (EPCs) were calculated following the same methods used in the 1997 Stage II ERC. Assessment and measurements endpoints considered a subset of those from the 1997 Stage II ERC associated with soil and sediment:

Reduction in green heron subpopulation

- Estimated by comparing published avian ingestion toxicity data to predicted dietary exposures based on measured prey (i.e. small mammal, crayfish and frog) tissue concentrations
- Indirect effects from potential decrease in prey populated based on frog population modeling and measured laboratory toxicity tests

Reduction in woodcock subpopulation

- Estimated by comparing published avian ingestion toxicity data to predicted dietary exposures based on measured prey (i.e., earthworms) tissue concentrations
- Indirect effects from potential decrease in prey populated based on earthworm (*Eisenia foetida*) population modeling and measured laboratory toxicity tests.

Reduction in red fox subpopulation size

- Estimated by comparing published mammalian ingestion toxicity data to predicted dietary exposures based on measured prey (i.e., small mammals) tissue concentrations.

Analytes were eliminated from further evaluation if they were comparable to background concentrations or invertebrate toxicity reference values (TRVs). Food chain models for woodcock, red fox, and green heron were run following methods used in the 1997 Stage II ERC, except that TRVs were normalized to body weight (which was not done in the 1997 Stage II ERC). Site forage frequency for fox was also eliminated to address MADEP comments.

The result of the 2000 FRA supported a conclusion of no significant risk of harm to terrestrial wildlife or semi-aquatic wildlife at the property.

6.2.3 Maple Meadow Brook Stage I Environmental Screening

The Maple Meadow Brook (MMB) Stage I ES (MACTEC, 2002b) presents results of a Method 3 Stage I Environmental Screening (ES) conducted under the Massachusetts Contingency Plan (MCP). The Scope of Work for the ES was submitted to MADEP on May 14, 2001 (GEI, 2001r). The MMB Stage I ES was submitted to MA DEP in November 2002.

The 2002 Maple Meadow Brook (MMB) ES was performed to determine whether the seasonal discharge of groundwater containing OHMPCs attributable to the Site might represent a significant risk of harm to ecological receptors that occur within the wetland complex associated with Maple Meadow Brook and Sawmill Brook drainages.

The conceptual model for the assessment area consisted of the following components: historical source areas associated with the Site, migration of dissolved OHMPC in shallow groundwater, and potential seasonal discharge to the MMB/SB WC. Potential aquatic receptors included fish, amphibians, aquatic invertebrate, and aquatic plants.

The 2002 MMB ES evaluated sediment and surface water sample data. Co-located surface water and sediment samples were situated in the stream channels of Maple Meadow Brook and Sawmill Brook and were based on groundwater modeling (Geomega, 2001b). Analytical parameters were selected based on historical groundwater sampling results from monitoring wells located within the groundwater discharge area between 1992 and 2002 (Harding ESE, 2001). Concentrations of analytes detected in surface water and sediment from the assessment area were compared to local conditions following MADEP guidance. OHMPC consistent with local conditions were eliminated from further evaluation

The 2002 MMB ES also evaluated for potential groundwater impacts using data collected during previous investigations. Concentration of analytes from 31 shallow monitoring wells in the assessment area were summarized and the average (arithmetic mean) concentrations were calculated. Also, groundwater data from deep, medium, and shallow depth wells from across the entire MMB/SB WC were summarized for a hot spot evaluation.

Exposure point concentrations (EPCs) were calculated for maximum detected concentrations and average (arithmetic mean) concentrations for surface water and sediment analytes which remained after the local conditions comparison, and for analytes detected in groundwater.

Assessment and measurement endpoints evaluated in the 2002 MMB ES are summarized below:

Sustainability (survival, growth, reproduction) of local populations of benthic macroinvertebrates in sediment.

- Comparison of sediment concentrations to sediment quality benchmarks.

Sustainability (survival, growth, reproduction) of local populations of aquatic organisms (e.g. aquatic plants, macroinvertebrates, fish) in surface water.

- Comparison of surface water concentrations to surface water quality benchmarks.
- Comparison of shallow groundwater concentrations to groundwater UCLs and surface water criteria.
- Identification of groundwater hot-spots at all well depths and comparison of concentrations to UCLs.

A weight of evidence approach was used to characterize risk for assessment endpoints. Complete exposure pathways were identified for aquatic and benthic receptors in the assessment area but the effects-based screening evaluation demonstrated that no significant risk exists for receptors in surface water and sediment. Shallow groundwater concentrations potentially discharging to surface water would not result in the exceedance of surface water quality standards; the fact that shallow groundwater quality meets the meaningful groundwater UCLs further supports the conclusion of the effects-based screening of surface water that there a condition of no significant risk for surface water and sediment in the MMB/SB WC.

A weight of evidence approach was used to characterize risk for assessment endpoints. Complete exposure pathways were identified for aquatic and benthic receptors in the assessment area but the effects-based screening evaluation demonstrated that no significant risk exists for receptors in surface water and sediment. Shallow groundwater concentrations potentially discharging to surface water would not result in the exceedance of surface water quality standards; the fact that shallow groundwater quality meets the meaningful groundwater UCLs further supports the conclusion of the effects-based screening of surface water that there a condition of no significant risk for surface water and sediment in the MMB/SB WC.

However, a condition of no significant risk of harm to the environmental does not exist with respect to deep groundwater; average concentrations of calcium, chloride, sodium, sulfate, and

ammonia in hot spots exceed corresponding groundwater UCLs. This conclusion confirms the findings of the 1997 risk assessment that a condition of no significant risk to the environment does not exist for deep groundwater. Investigations have concluded that the deep groundwater is the bottom layer of a stratified system. Deep groundwater does not have a direct impact on surface water quality.

6.2.4 2004 Focused ERC East Ditch

The 2004 Focused Environmental Risk Characterization (ERC) was prepared to evaluate the East Ditch and portions of the New Boston Street Drainway (NBSD). The 2004 Focused ERC provided additional and updated information to supplement previous investigations conduced as Phase II Comprehensive Site Assessment (CSA) requirements under the Massachusetts Contingency Plan (MCP). The ERC was prepared in accordance with MADEP conditional approval dated February 1, 2002 (MADEP, 2002d) for the Scope of Work entitled "Additional Phase II Investigation of East Ditch" (GEI, 2001o). The 2004 Focused ERC was submitted in August 2004. The 2004 Focused ERC characterized exposures to oil and hazardous materials (OHM) in surface water and sediment in East Ditch and the New Boston Street Drainway which are man-made surface water drainage ditches located downgradient of the Site. The East Ditch is subject to regular maintenance activities associated with maintaining the adjacent railroad, and the NBSD was remediated as part of the Industri-Plex remedial activities.

The 2004 Focused ERC evaluated surface water and sediment samples collected in June 2003 and April 2004. Historical data collected in 1993 were not evaluated because there had been extensive changes to the drainage system since then and were no longer representative of existing site conditions.

Surface water and sediment exposure point concentrations (EPCs) were derived for each exposure area based on maximum and average concentrations. The 2004 Focused ERC also incorporated the results of the laboratory floc study (Geomega, 2004c) which determined that the metals would be expected to have low bioavailability to aquatic receptors.

The exposure pathways of primary concern included ingestion and direct contact of ditch surface water and sediment by aquatic invertebrates and amphibians and ingestion of contaminated aquatic biota by amphibians. Assessment endpoints for this ERC are summarized below:

Protection and maintenance of aquatic invertebrate communities

- Compare OHMPC exposure point concentrations (EPCs) to screening benchmarks for surface water and sediment
- Conduct quantitative benthic community survey

Protection and maintenance of aquatic invertebrate communities

- Compare OHMPC EPCs to screening benchmarks for surface water and sediment.
- Compare sediment concentrations to effects concentrations derived using 1997 ERC FETAX studies (mortality or developmental effects).
- Qualitative amphibian survey (site vs. background)

Protection and maintenance of amphibian population

- Compare OHMPC EPCs to screening benchmarks for surface water and sediment.
- Compare sediment concentrations to effects concentrations derived using 1997 ERC FETAX studies (mortality or developmental effects).
- Qualitative amphibian survey (site vs. background)

Protection and maintenance of fish and aquatic plant populations

- Qualitatively evaluated by comparing average detected concentrations of OHMPC in sediment and surface water to screening benchmarks.

Protection and maintenance of wildlife populations

- Qualitatively evaluated by comparing the sediment chemistry in the Lower NBSD to sediment chemistry in the South Ditch where results of the 1997 ERC supported a conclusion of no significant risk to wildlife

A weight-of-evidence approach was used to integrate multiple measurement endpoints and make conclusions about the risks to the selected indicator organisms. The 2004 Focused ERC concluded that there was no significant risk of harm to the aquatic macroinvertebrate community

or amphibian community throughout the East Ditch, Upper NBSD, and Lower NBSD. The qualitative risk assessment for fish and aquatic plants in the Lower NBSD, and wildlife exposures throughout the East Ditch, Upper NBSD and Lower NBSD also concluded that exposure would be unlikely to have significant population level impacts to those receptors. However, because surface water concentrations of ammonia and various metals (including aluminum, copper, and iron) detected in the East Ditch, Upper NBSD, and Lower NBSD exceeded ASAS (i.e. AWQC), a condition of no significant risk can not be declared under the MCP. Although these ASAS were intended to be protective of sensitive cold water fish species, only warm-water fish species would be likely to occur in the Lower NBSD due to habitat limitations. Consequently, the ASASs are overly conservative when applied to the East Ditch, Upper NBSD, and Lower NBSD.

6.2.5 Ammonia in Surface Water

Among Site indicator parameters, ammonia has most often been identified as having potential risk to aquatic receptors in the on-Property and off-Property ditches. In most cases, identified ecological risks from ammonia have been based on comparison of surface water concentrations to AWQC, which were derived to be protective of sensitive cold water fish species. No fish have ever been observed in any of the on-Property ditches (such as South Ditch), and in off-Property ditches (such as the East Ditch or NBSD). Consequently, the screening benchmark that is the basis for much of the potential ecological risk from ammonia is based is not consistent with observed field conditions.

Additionally, in the Site-related ditches, pH conditions are acidic (pH <5) to near neutral, indicating that ammonium ion (NH4+), rather than ammonia (NH3), is the predominant form in surface water. Ammonium is less toxic than ammonia, thus surface water toxicity may be mitigated by the low and near-neutral pH.

6.2.6 Conclusions

The ecological risk assessments have conducted to date have lead to the following conclusions:

- A condition of no significant risk of harm to the environment exists for the soil at the 51 Eames street Property
- Based on Site-specific risk assessments and sediment remedial activities in the on-Property West Ditch Wetland and the Upper South Ditch, as well as the sediment removal and culverting of the on-Property West Ditch, there is negligible risk associated with sediments within most of the ditch system, including the East Ditch and New Boston Street Drainway. The lower South Ditch sediments require further risk evaluation. The Site-specific risk assessments conducted to date have not documented significant impacts to aquatic life associated with surface water quality. However, the assessments conducted per the MCP require that Massachusetts Ambient Water Quality Criteria (AWQC) be considered applicable environmental standards. Since there have been concentrations of inorganics and metals in surface water above corresponding AWQC, the MCP risk assessments could not conclude that a condition of no significant risk to the environment exists with respect to surface water in the ditch system. These AWQC are overly conservative for site habitat conditions and therefore do not accurately reflect site specific ecological risks.
- Within the ditch system, ammonia concentrations have consistently exceeded screening benchmarks. In some of the earlier risk assessments, chromium, aluminum, and other miscellaneous inorganics have also exceeded surface water risk thresholds, but ammonia is clearly the parameter that most consistently been above surface water criteria. Despite that, stress to aquatic receptors has not been observed within the ditch system. Risk associated with ammonia based on comparison to generic criteria is likely overestimated.
- In Maple Meadow Brook, there is no ecological risk associated with aquatic and benthic exposure areas; however, groundwater hotspots in deep (greater than 60 feet below ground surface) prevent a determination of No Significant Risk to the entire site.
- NDMA has never been identified as a driver for ecological risk in any of the aquatic or benthic exposure areas, either on-property or off-property.

7.0 SUMMARY AND CONCLUSIONS

7.1 SUMMARY

The following subsections summarize the site conditions, and the nature and extent of contamination by media and OU. This discussion is followed by conclusions and discussion of data limitations with recommendations for future work.

7.1.1 Nature and Extent of Contamination

7.1.1.1 OU1 Soil – Nature and Extent

The nature and extent of contamination in surface soil and subsurface soil at the former facility is closely related to the historical manufacturing and waste disposal activities, particularly those Site features that have been identified as sources or potential sources of chemicals to the environment. A number of sources at the Site have previously been discussed in Sections 1.0 and 2.0. Those sources that have the greatest potential to impact soil at the facility include Drum Area A, Drum Area B, the Buried Debris Area, Lake Poly, the East and West Pits, the Acid Pits, the Plant B LNAPL area, and the Plant B EPH/VPH area (former Plant B location).

A number of remedial actions have been conducted to address several of these major sources as well as some other areas of localized contamination that had been identified during the Site investigations. These actions resulted in removal of impacted soils, waste materials, and volatiles from soils and had a positive impact with respect to nature and extent of soil contamination at the Facility. In particular, the following actions were conducted and as a result removed impacted soil from the Facility:

- Lake Poly Soil and Waste Material Removals during the C-RAM;
- Drum Areas A and B and Buried Debris Area Soil and Waste Material Removal during the D-RAM;
- Backfilling and regarding of the area within the footprint of the slurry wall containment structure and cap;

- Removal of the soil hot spot at locations RSO-6 and A8-CW-1;
- Removal of oil-impacted soils from the banks of Central Pond during the C-RAM;
- Removal of soil from most of SWMU-27 during excavation activities in the West Ditch Wetland (C-RAM);
- Removal of trimethylpentenes from subsurface soils by air sparging/soil vapor extraction at the EPH/VPH area at Plant B.

7.1.1.1.1 Soil Background Conditions

Site-specific background conditions for soil were characterized prior to the 1997 Phase II Report. That investigation focused on specific indicator parameters that were not addressed by the Massachusetts soil background characterization published by MADEP (MADEP, 1995). Background conditions for inorganics and metals in soils have been characterized by a combination of the site-specific background investigation and documents concerning soil background conditions published by MADEP in 1995 and 2002. The 2002 document (MADEP, 2002) included background concentrations for PAH compounds in addition to the inorganics and metals. To date, background soil conditions for VOCs, pesticides PCBs, and SVOCs other than PAHs were considered to be "not detected". Separate background investigation and assessment was conducted for arsenic in soils. A comparison of Site soil arsenic concentrations to the MADEP background data set for arsenic and to the site-specific background data set concluded that on-Property surface and subsurface soil arsenic concentrations were not significantly different statistically from background conditions (HLA, 1999).

7.1.1.1.2 Surface Soil – Current Conditions

The nature and extent of contamination at the property has been characterized by numerous investigation events and programs. The investigations have been focused on the property because the physical characteristics of the Property and the surrounding area, as well as the history of the Facility. The facility is (and has been historically) bounded to the north by Eames Street and other industrial properties; to the east by the commuter rail line; to the south by the Woburn landfill and higher elevation land; and to the west by the Guilford rail line (higher elevation land than the Facility). Overland migration of soil contaminants and deposition on soils at adjacent

properties is prevented because there are physical barriers (higher land elevation and structures such as roads and rail lines) that would inhibit such migration. Potential migration of impacted soil material via erosion and/or storm water drainage has been addressed by investigations of the ditch systems.

Soil sample locations that are representative of current on-Property surface soil conditions are presented on Figure 2.1-4. Three hundred twenty four surface soil samples have been identified as representative of current, post-remedial conditions at the Site. These samples are a combination of both investigation samples and post-remedial confirmatory surface soil samples.

- The following Site-related inorganics or metals have surface soil sample concentrations that were above background conditions: chromium (total), calcium, potassium, sodium, ammonia, and sulfate. Among detected inorganics and metals only arsenic and chromium had at least one reported concentration greater than the corresponding published MADEP natural soil background concentration and the Region IX Industrial Soil PRG. A July 1999 submittal to MADEP demonstrated that the distribution of arsenic concentrations in surface soil is consistent with Massachusetts background conditions rather than with a release of arsenic to soil. Region IX PRGs are not available for several detected inorganics and metals including calcium, magnesium, mercury; potassium; sodium; chloride, ammonia, and sulfate. Although these screening values are not available, the previously conducted risk assessments have evaluated risks associated with these constituents.

- Total chromium concentrations in surface soil in the developed portion of the Property are generally below the Region IX Industrial/Commercial Preliminary Remediation Goal of 450 mg/kg (Figure 4.1-1). It should be noted the Region IX PRG for total chromium assumes a 1:6 ratio of hexavalent chromium:trivalent chromium. The PRG for trivalent chromium is 100,000 mg/kg while the PRG for hexavalent chromium is 64 mg/kg. A study conducted to determine the speciation of chromium in soils at the Site concluded that trivalent chromium (100,000 mg/kg) is by far the predominant form of chromium in soil. Therefore, the PRG for trivalent chromium is a more appropriate value to use for evaluating total chromium results for soil at the Site. Total chromium concentrations in surface soil in the floodplain immediately adjacent to the Lower South Ditch (downstream of the Property boundary and upstream of the East Ditch) are higher than the concentrations in surface soil samples collected from locations at slightly higher elevations to the north and the south of the Lower South Ditch which were consistent with background. The area of chromium-impacted soil is limited to the floodplain area which is depositional environment. This suggests that the elevated chromium concentrations in soil may be associated with floc deposited there during high water events.

Speciation of chromium can be an important factor in risk assessments due to the differences in toxicity among species. Investigations were conducted to determine speciation of chromium in surface soils at the former Lake Poly area. Hexavalaent chromium was not detected at concentrations approaching or above the MADEP's threshold level for allergic contact dermatitis and the data indicates that trivalent chromium is the predominant form of chromium in Site soils.

- The VOC compounds formaldehyde, hydrazine, and methylene chloride were detected in at least 10% of the surface soil samples analyzed. None of the detected VOCs in surface soil samples had any concentration greater than the corresponding Region IX Industrial Soil PRG.

- Trimethylpentenes compounds are indicator compounds for the Facility, but were detected only at low frequency in surface soil (approximately 5%). With the exception of trimethylpentenes; VOCs are not a characteristic contaminant at the Site.

Only the SVOCs benzo(b)fluoranthene, benzoic acid, BEHP, chrysene, di-n-butyl phthalate, fluoranthene, NDPA, phenanthrene, and pyrene were detected in at least 10% of surface soil samples. BEHP, NDPA, and di-n-butyl phthalate are associated with historical chemical processing at the Facility. BEHP was detected most frequently among SVOCs (72.5%) in surface soil samples. Among SVOCs, only BEHP and benzo(a)pyrene were detected above the corresponding Region IX Industrial soil PRGs. BEHP in surface soil is distributed throughout the Facility. Residual BEHP is present in confirmatory surface soil samples from excavations of the on-Property West Ditch South Ditch, Central Pond, Drum Areas A and B, and Lake Poly. BEHP was detected at concentrations above the Region IX Industrial PRG in some of these surface soil samples in the on-Property West Ditch, and the South Ditch. NDPA was reported in surficial soil samples at a frequency lower than that of BEHP. The residual NDPA in surface soil was detected, consistent with BEHP, in the confirmatory soil samples associated with former source areas and the excavated ditches. NDMA was not detected in any of the nine surface soil samples from the Facility that were tested specifically for NDMA.

- Benzo(a)pyrene, a PAH, was detected at low frequency and only one surface soil sample had a concentration greater than the published MADEP soil background concentration. PAHs were detected sporadically throughout the Facility, with a somewhat higher frequency of detection in the Central Pond drainage area and the floodplain soils of the Lower South Ditch. PAHs are not associated with disposal activities at the Property.

- Seven pesticides including DDD, DDE, DDT, alpha-chlordane, gamma-chlordane, gamma-chlordane, and hexachlorobenzene were detected in at least 10% of the surface soil samples. None of the pesticides were detected at concentrations greater than the corresponding Region IX Industrial Soil PRGs. Pesticides were detected at low levels in the Facility surface soils, with the highest total pesticide concentrations of less than 1 mg/kg. The distribution of total pesticides and their low concentrations indicate they are residuals from their intended use rather than a release of pesticides from a manufacturing operation or a pesticide mixing or staging area. The only PCB detected, Aroclor-1016, was detected in only one surface soil sample at 0.98 mg/kg. PCBs and pesticides are not site-related contaminants of concern.

- The hydrocarbons present are not related to petroleum sources. Rather, the hydrocarbons are associated with processing oils and other raw materials used in the historical chemical manufacturing at the Site. Petroleum hydrocarbons were characterized using the MADEP's EPH and VPH analytical methods that were developed to support the MCP. Three VPH fractions were each detected in one of six surface soil samples at concentrations well below MCP soil standards. The total VPH concentration (the sum of concentrations of C5-C8 Aliphatics, C9-C12 Aliphatics, and C9-C10 Aromatics) detected in that one surface soil sample was only 38 mg/kg. The three EPH fractions were each detected in more than 10% of the surface soil samples analyzed for EPH. The MCP soil standards for category S-2 soil (industrial/commercial) in non-drinking water areas for C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) are 2,500 mg/kg, 5,000 mg/kg, and 2,000 mg/kg respectively. The EPH petroleum fractions in surface soil have been reported in the area of the former Lake Poly (soil has been excavated), adjacent to the Central Pond (sediments and oily soils have been removed), and in the floodplain of the lower South Ditch (between the Property line and the East Ditch). Concentrations of EPH fractions in surface soil were above corresponding MCP S-2 soil standards only in the floodplain of the lower South Ditch. Petroleum hydrocarbons impacts to surface soil are limited.

7.1.1.1.3 Subsurface Soil-Current Conditions

Soil sample locations that are representative of current on-Property subsurface soil conditions are presented on Figure 2.1-5. More than four hundred subsurface soil samples have been identified as representative of current, post-remedial conditions at the Site. These samples are a mix of investigation samples as well as post-remedial confirmatory surface soil samples. The following bullets summarize the major findings concerning subsurface soil.

Among inorganics and metals detected in subsurface soils, only arsenic and chromium had at least one reported concentration greater than the corresponding published MADEP natural soil background concentration and the Region IX Industrial Soil PRG (if available). Only one arsenic concentration reported in 119 subsurface soil samples analyzed for arsenic was above the MADEP published background concentration of 20 mg/kg. The mean subsurface soil arsenic concentration in 129 samples was 4.77 mg/kg. Subsurface soils have not been impacted by releases of arsenic. Chromium concentrations in subsurface soil samples ranged from 3.5 mg/kg to 7,900 mg/kg. Virtually all of the remaining subsurface soil sample locations with total chromium concentrations greater than the Region IX Industrial soil PRG of 450 mg/kg are located in the former Lake Poly area. Calcium, potassium, sodium, ammonia, and sulfate had at least one concentration in a subsurface soil sample that was above the site-specific soil background concentration, but no PRGs are available for those parameters. Magnesium, chloride, nitrate, and urea were detected in subsurface soil samples but neither a background concentration nor a PRG is available for those parameters. The implications of the concentrations of these parameters in subsurface soils are addressed in the risk assessments conducted for the Site.

- Eight VOCs were detected in at least 10% of the subsurface soil samples: 2,4,4-trimethyl-1-pentene; 2,4,4-trimethyl-2-pentene; 2-butanone; acetone; formaldehyde; methylene chloride; p-isopropyl toluene; and toluene. Only one VOC, hydrazine, was detected at a concentration greater than the corresponding Region IX Industrial Soil PRG. However, hydrazine was detected in only one of 30 subsurface soil samples. Region IX Industrial Soil PRGs are not available for five of the VOC compounds detected: 1,2,3-trichlorobenzene; 2,4,4-trimethyl-1-pentene; 2,4,4-trimethyl-2-pentene; 2-hexanone; and p-Isopropyl toluene. The TMPs are indicator compounds for the Facility and were detected in approximately 50% of the subsurface soil samples. The other three VOCs without Region IX soil PRGs were detected at lower frequency in subsurface soil.

- As shown previously in Figure 4.1-15, trimethylpentenes were detected in subsurface soil samples in multiple locations at the Facility. Trimethylpentenes were detected in the area of Lake Poly, the area of the East Pit and West Pit, near the former Plant D Tank Farm Area, and at the former Plant B Production Area (the EPH/VPH area at the current Plant B) and Plant B Tank Farm Area. At the locations with detectable TMPs, total trimethylpentene concentrations ranged from 0.001 mg/kg to 750 mg/kg (location AS-7 prior to AS/SVE activities).

BEHP and NDPA were the only SVOCs detected in at least 10% of subsurface soil samples.. The following SVOCs had at least one subsurface soil concentration above the corresponding Region IX Industrial Soil PRG: benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; BEHP; indeno(1,2,3-cd)pyrene; N-nitrosodipropylamine; and NDPA. BEHP and NDPA are associated with historical operations at the Facility. BEHP was reported in subsurface soil samples in the former Plant B Production Area and Plant B Tank Farm, the former Lake Poly, Drum Area A, the Central Pond, and the on-PWD (confirmatory soil samples) and the South Ditch (confirmatory soil samples). NDPA was detected less frequently and at lower concentrations than BEHP in subsurface soil. NDPA was reported in subsurface soil samples from the former Plant B Production Area and Plant B Tank Farm, the former Lake Poly, Drum Area A, and the Central Pond. NDMA was not detected in the thirty-five subsurface soil samples from the Facility that were tested for NDMA.

- Of the nine pesticides detected none were detected at a frequency greater than 10% and no PCBs were detected (Table 4.1-6). None of the pesticides were detected at concentrations greater than the corresponding Region 9 Industrial Soil PRGs. Several of the pesticides were detected only once in more than one-hundred subsurface soil samples. The distribution of total pesticide concentrations in subsurface soils is suggestive of residuals from use of pesticides for their intended use rather than a release of pesticides from a manufacturing operation. PCBs and pesticides are not site-related contaminants of concern.
- The hydrocarbons present are not related to petroleum sources such as releases from fuel storage facilities or disposal of lubricants. The three VPH fractions and the three EPH fractions were each detected in more than 10% of the subsurface soil samples analyzed for those parameters. VPH analysis has primarily been focused in areas of known or suspected releases of petroleum based hydrocarbons (or of trimethylpentenes) such as the former Plant B production area and the former Lake Poly disposal area. The total detected VPH concentrations (the sum of concentrations of C5-C8 Aliphatics, C9-C12 Aliphatics, and C9-C10 Aromatics) in subsurface soil samples ranged from 3.2 mg/kg to 1,100 mg/kg (location SVE-16 at the former Plant B Production Area was sampled and analyzed only prior to AS/SVE activities). The available VPH subsurface soil data in the former Plant B production area are indicative of conditions prior to the successful air sparge/ soil vapor extraction remedial activities in the area referred to as the EPH/VPH portion of Plant B. This area was the location of a historical release of trimethylpentenes which are detected as a component of the VPH analysis. The two trimethylpentene compounds are C8 Aliphatic compounds that are identified and quantified by the C5-C8 Aliphatic fraction of the VPH analysis.
- The AS/SVE system in the VPH/EPH area operated from 2001 to 2006 and successfully removed more than 2,035 pounds of VOCs (primarily

trimethylpentenes) from the subsurface. The rate of mass removal of TMPs had diminished to de minimis levels and operation of that portion of the AS/SVE system was discontinued in 2006. Post-AS/SVE system operation soil sampling and analysis was not conducted in this area due to the final low removal rates. Therefore, the VPH data for the EPH/VPH area of the former Plant B Production Area overestimate the contaminant concentrations for current subsurface soil conditions.

- Total detected EPH concentrations (the sum of concentrations of C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) in subsurface soil samples ranged from 5.2 mg/kg to 3,800 mg/kg (location LPB-10). The MCP soil standards for category S-2 soil (industrial/commercial) in non-drinking water areas for C9-C18 Aliphatics, C19-C36 Aliphatics, and C11-C22 Aromatics) are 2,500 mg/kg, 5,000 mg/kg, and 2,000 mg/kg respectively. Only one sample had a total EPH concentration greater than 2,000 mg/kg (location LPB-10 in former Lake Poly Area). Detected EPH petroleum fractions in subsurface soil are located in the area of Plant B, former Lake Poly, and Central Pond.

7.1.1.2 OU1 and OU2 Surface Water

The full extent of the South Ditch and the Ephemeral Drainage area comprise the on-Property, or OU1, surface water. Off-Property, or OU2, surface water includes the East Ditch, the off-Property West Ditch and MMB wetland area.

The on- and off-Property surface water bodies are interconnected. The off-Property West Ditch flows to the South Ditch, which flows into the East Ditch just beyond its confluence with the Ephemeral Drainage area outside the eastern Property boundary. The MMB wetland is a separate surface water system in a different watershed. Releases to the on-Property Ditch system did not affect the MMB wetland.

In general, shallow groundwater discharges into the on- and off-Property surface water bodies related to the Site. The nature and extent of contamination for these surface water bodies have focused on the indicator parameters associated with the Site including: ammonia, chloride, sulfate, aluminum, chromium, iron, sodium, TMPs, BEHP and NDMA.

7.1.1.2.1 OU1 Surface Water

- Metals and inorganics were detected throughout the length of the South Ditch. The South Ditch receives groundwater discharge within the first several hundred feet down stream of the weir. Groundwater discharge of dissolved inorganics and metals in the upper reach of South Ditch is not appreciably diluted by additional groundwater discharge downstream and analytes concentrations along South Ditch tend to be fairly uniform. The following bullets summarize findings for OU1 surface water.
- No VOCs, PCBs, pesticides, herbicides or petroleum hydrocarbons were detected in the most recent on-Property surface water samples
- NDMA was detected in OU1 surface water but at low concentrations, which do not pose a risk to human health and ecological receptors.

7.1.1.2.2 OU2 Surface Water

- Inorganics and metals were detected in samples taken from the East Ditch. The distribution can be seen in Figure(s) 4.2-2 through 4.2-14. The South Ditch drains to the East Ditch as seen in Figure 4.2-1.
- Ammonia has been detected in samples collected from the East Ditch (Figure 4.2-11). Additionally the data shows a substantial ammonia input from Landfill Brook which is not site related.
- NDMA was detected in the East Ditch surface water (Figure 4.2-16) at low concentrations which do not pose a risk to human health and ecological receptors.
- Inorganics and metals are present in surface water in the off-Property West Ditch. The average concentration of inorganics and metals in the off-Property West Ditch are lower than the corresponding average concentrations in the South Ditch. The construction and maintenance of the weir has successfully raised the surface water and suppressed discharge of impacted groundwater to the off-PWD. NDMA was detected in half of the samples collected from the off-PWD surface water.
- MMB and Sawmill Brook are in a different drainage system than surface waters originating on-Property.
- Surface water within MMB Wetland has not been impacted by site related constituents, particularly the very mobile constituents such as ammonia and sulfate. As discussed in Section 4.2, analytical results which reported NDMA in MMB and Sawmill Brook surface water were validated and qualified NJ or ND (not detected). The NJ qualified data are interpreted to be false positive results and that NDMA is not present in MMB or Sawmill Brook surface water.

7.1.1.3 OU1 and OU2 Sediment

The on-Property, or OU1, sediment is located in the West Ditch Wetland area, Upper South Ditch and the Lower South Ditch and Ephemeral Drainage areas. The location of the former on-PWD wetland was excavated and replaced by a concrete culvert. The off-Property, or OU2, sediment is located in the East Ditch, the off- Property West Ditch and MMB wetland area.

7.1.1.3.1 OU1 Sediment

OU1 sediments in the on- Property West Ditch Wetland area and the Upper South Ditch were remediated in 2000 and 2001. Sediment was excavated to native mineral soil in the Upper South Ditch and therefore, confirmatory soil samples, rather than confirmatory sediment samples, were collected from the Upper South Ditch. Post-excavation sediment samples collected in the Upper South Ditch as part of the PCMP sampling program were used to characterize nature and distribution of contamination in sediments of the previously remediated Upper South Ditch. The following bullets summarize major findings with respect to OU1 sediment.

- Three post remediation sampling events have been conducted under the PCMP sampling program. Concentrations of chromium, aluminum, and iron in sediment were highest in the second of three sampling events in the Upper South Ditch, suggesting that the sample in the second round incorporated some floc. The concentrations were again lower in the third sample round. Therefore the results of the second sample round do not reflect a trend of increasing metals' concentrations.
- In general, the highest concentrations of chromium and other metals detected in OU1 sediment were located in the Lower South Ditch.
- BEHP was detected in sediment samples collected throughout the West Ditch Wetland area and the Lower South Ditch. Concentrations in the lower South Ditch samples were higher, on average, than those from the West Ditch Wetland.
- NDMA was not detected at any OU1 sediment sampling locations, or in sediment samples from any location at the Site.

7.1.1.3.2 OU2 Sediment

The OU2 East Ditch sediment samples collected downstream of the confluence of the South Ditch and East Ditch prior to the 1997 Phase II Report showed detections of chromium,

ammonia, sulfate, other inorganics, BEHP, di-n-butyl phthahalate, di-n-octyl phthalate, NDPA, and trimethylpentenes. Those samples exhibited a decreasing concentration trend for most of those analytes in the downstream direction. In the more recent East Ditch sediment samples, the sample collected immediately downstream of the South Ditch/East Ditch confluence (ED SD/SW3) has concentration of BEHP and chromium that are lower than concentrations reported for the two more downstream locations (ED SD/SW4 and ED SD/SW5) which have the highest concentrations of metals detected in the East Ditch. Sediment sample chromium concentrations at locations ED SD./SW4 and ED SD/SW5 are consistent with the sediment sample chromium concentrations from the most downstream South Ditch sample locations. The East Ditch is periodically affected by railroad maintenance activities which may alter hydraulic conditions, such as sediment deposition, in portions of the ditch. The following bullets summarize major findings with respect to OU2 sediment.

- The detected concentrations of PAHs in the East Ditch appear to be associated with railroad operations and / or the adjacent industrialized areas.
- The most recent East Ditch sediment samples exhibit, relative to historical samples, lower concentrations of BEHP. The down stream extent of BEHP in East Ditch sediment is bounded by the two sample locations farthest downstream in which BEHP was not detected.
- Several SVOCs and VOCs which were previously detected were not detected in the recent samples (NDPA, di-n-buthyl phthtalate, di-n-octyl phthalate, and the trimethylpentenes).
- The concentrations of chromium, aluminum, and iron in historical and more recent East Ditch sediment samples are similar. Concentrations of metals and inorganics in sediments at the downstream locations also bound the downstream impacts in sediments. Therefore, the downstream extent of Site-related constituents in sediment in East Ditch has been delineated.
- The highest concentrations of inorganics and metals in the off-PWD sediments were detected in the northern portion of the ditch.
- Ammonia detected in the MMB sediment was determined to be from natural causes and discharge of shallow groundwater is not a source of ammonia to surface water. No evidence of Site-related impacts to sediments of the MMB wetland has been observed. The shallow groundwater that interacts with surface water in the MMBA and MMB wetland is not contaminated by releases from the Property.

7.1.1.4 OU3 Groundwater

Groundwater within the overburden and bedrock are influenced by both the regional geology as well as local heterogeneities within the subsurface glacial deposits. A summary of the geology and hydrogeology is presented below followed by a summary of the findings pertinent to the OU3 contaminant distribution.

7.1.1.4.1 Geology

Shallow regional geology includes peat and unconsolidated glacial deposits overlying crystalline metamorphic and igneous bedrock formations. The unconsolidated units include organic silts, ice contact deposits, outwash deposits and glacial till. Bedrock below the Site is generally associated with the Composite Platform of Southeast New England of more specifically the Milford-Dedham Zone (Smith 1997). This zone includes late Proterozoic mafic meta-volcanic and meta-volcaniclastics (i.e. Andover Granites) and gabbro-diorites. The Bloody Bluff Fault created a mylonite fault zone in between these two Formations.

The Bloody Bluff Fault Zone is a northeast-southwest trending fault zone located below Maple Meadow Brook, a splay of which lies between Jewel Drive and the western boundary of the property. The trend of this zone is reflected in the contours of the bedrock surface. Northeast-southwest ridges are present in sequence in this area, creating buried bedrock valleys. The bedrock surface, based interpreted bedrock elevation contours, was shown on Figure 3.2-2. Figure 3.2-3 compares this bedrock surface in 3-D to the surface topography, depicting areas where hills are supported by bedrock.

7.1.1.4.2 Hydrogeology

Groundwater occurs in two primary geologic units including the unconsolidated sand and gravel deposits and the underlying fractured crystalline bedrock. The unconsolidated overburden deposits are locally heterogeneous, however over the Site scale these sand and gravels are found to exhibit fairly uniform properties (Geomega, 2001a) typically with high porosity and permeability, and are capable of transmitting large quantities of water.

Groundwater in bedrock occurs principally in secondary porosity features (e.g., fractures) as the bedrock has limited primary porosity. Where studied, the bedrock groundwater system has low permeability and low yield and transmits a small amount of groundwater compared to the overburden aquifer. With respect to the bulk movement of groundwater within the hydrogeologic system, the bedrock system likely contributes an insignificant amount groundwater compared to the overburden aquifer.

Approximately 2,000 feet northwest of the Property under the MMB wetland, the unconsolidated deposits attain appreciable thicknesses and form a highly transmissive, though shallow, overburden aquifer above the Western Bedrock Valley. Analysis of hydraulic tests conducted on wells screened in the sand and gravel yielded horizontal hydraulic conductivities in the range between 2 and 3,000 ft/day (Smith, 1997). Although the overburden soils below this area are highly transmissive the low horizontal hydraulic gradient in the MMB aquifer indicates that average groundwater flow is relatively slow under current, non-pumping conditions.

Due to the high permeability of the shallow overburden deposits, the shallow groundwater is influenced by surface water features; with less influence being transmitted to the deeper water bearing zones. Groundwater within the Site flows both to the northwest and to the south east away from a groundwater divide that bisects the Site from north east to south west (shown previously on Figure 3.3-1). This shallow groundwater divide is located between a groundwater mound in the northern part of the Property and the hill bordering Cook Avenue, situated approximately 350 feet west of the southern half of the Property. The location of the divide is sensitive to relatively small changes in groundwater elevation owing to the generally flat gradients in the area where the divide occurs. Thus the divide moves laterally seasonally in response to changing precipitation patterns, groundwater recharge, and groundwater elevation conditions. The localized changes in the divide would not be expected to appreciably affect deeper groundwater movement.

Below the former Facility, on the southeast side of this divide, groundwater flow is generally from northwest to southeast, with a small zone of radial flow, from a small groundwater mound, in the northern end of the Property. On the northeast side of the Property, on the east side of this

localized groundwater mound, groundwater flows northeast and is captured by the Plant B groundwater extraction system. In the central portion of the Property, shallow groundwater interacts with surface water which influences shallow groundwater flow patterns. Groundwater generally supports base flow in these streams, however, under low summer recharge conditions, the central portion of the on-Property South Ditch occasionally goes dry as the groundwater potentiometric surface drops below the stream bottom elevation.

At the southwestern corner of the Property, a small groundwater divide is present underlying the Calcium Sulfate Landfill. Groundwater moves both to the southwest and to the east-northeast from this divide. The groundwater flow pattern here is influenced by a bedrock ridge below the Calcium Sulfate Landfill and surface drainage patterns and groundwater originating under the adjacent Woburn Landfill.

North and northwest of the groundwater divide, groundwater flows northwest and north toward the MMB Wetland. Groundwater recharge to the MMBA includes contributions from areas bordering Main Street and the landfill on the Spinazolla Trust Land and surrounding upland areas. Groundwater entering the MMBA from the south eventually turns to flow northeast following MMB after its confluence with Sawmill Brook.

Vertical gradients within the overburden groundwater system have been measured at numerous vertical well couplets in on-Property and off-Property areas. In general, vertical head potentials are weakly downward or neutral between shallow and deep overburden groundwater. Upward vertical head potentials are only present within or in the immediate adjacent vicinity of gaining surface water bodies such as the MMB, Sawmill Brook, and South Ditch, where groundwater discharges.

7.1.1.4.3 Nature and Extent of Site-Related Constituents in Groundwater

Previous investigations have investigated and evaluated groundwater in the context of groundwater usage and MCP groundwater categories. The MCP defines current and potential drinking water source areas as category GW-1 groundwater. Current and potential drinking water sources areas may be identified as such due to current or potential future public, community or

private water supplies. Within the boundaries of the Site, there are currently no community or private water supplies. A municipal water supply for the Town of Wilmington, including five municipal water supply wells, is located within the boundaries of the Site. A consultant for the Town of Wilmington has previously identified the zone of contribution for the five MWSWs. That zone of contribution is referred to as the Zone II of the public water supply system. Currently, within the boundaries of the Site, the groundwater area identified as Zone II is the groundwater that is classified as category GW-1 per the MCP (Figure 4.3-1). In other words, the Zone II area represents the current or potential drinking water source area within the Site. Most of the Zone II groundwater flows within the Ipswich River Watershed. A small portion of the Zone II (located at the northeast corner of the Site) flows within the Aberjona River Watershed.

That area of the Site that is not included in the Zone II is not a current or potential drinking water source area. This area is referred to r as the area outside the Zone II. This area includes most of the Facility Property and areas to the west and southwest of the Property. The groundwater beneath most of the Facility Property is outside the Zone II and flows to the Aberjona Watershed. A small area to the west of the Facility Property is outside the Zone II and flows to the Ipswich River Watershed. In summary, the two major components of the groundwater discussions focus on the Zone II area (current and potential drinking water source and classified as category GW-1 per the MCP) and the area outside the Zone II area (not a current of potential drinking water source).

The following subsections summarize the major findings concerning remaining source areas and their relationship to the nature and distribution of site-related constituents in groundwater. These discussions are organized primarily by groundwater use classification and secondarily by watershed. The discussions of the nature and extent of groundwater impacts is subdivided between groundwater within the Zone II classification and groundwater outside of Zone II. The Zone II area includes the interpreted zone of contribution to the Wilmington MWSWs. Most of the groundwater within Zone II flows to the Ipswich River Watershed. A small portion of the groundwater within Zone II (located in the northeast corner of the Property) is interpreted to flow to the Aberjona River Watershed.

The area outside the Zone II includes most of the Property and areas to the west and southwest of the Property and flows to the Aberjona Watershed. A small area to the west of the Facility Property is outside the Zone II and flows to the Ipswich River Watershed.

7.1.1.4.3.1 Summary of Source Areas

The source areas that contribute site related constituents to groundwater include the DAPL areas and residual material within Plant B Area. The following bullets summarize the major findings concerning the characterization of these sources.

- The DAPL formed in response to release of acid process waste waters with high dissolved total solids content (ie., higher density liquids) to unlined ponds on-Property including Lake Poly, East and West Acid pits the 3 acid pits located south of the warehouse buildings. The former on-Property source areas that were associated with vadose zone soils have been addressed under OU1 and are no longer sources of groundwater contaminants.
- DAPL is defined by a density threshold (a specific gravity greater than 1.025) that has been statistically correlated to a specific set of indicator parameters and pH as described in Section 2. These indicator parameters include sulfate, sodium, chloride, and ammonia, and can be used to estimate fluid density based on concentrations and statistically derived correlation factors. The potential presence of DAPL-like material is also indicated by specific conductance values greater than 20,600 micro mhos/cm (µmhos/cm).
- The DAPL migrated primarily under the influence of gravity along the bedrock surface within the Western Bedrock Valley and accumulated in pools behind bedrock saddles that arrested the movement of the DAPL. Three DAPL areas are present and have been characterized. They are identified as the Upper DAPL Pool, the Main Street DAPL Pool, and the Western Bedrock Valley DAPL Pool (shown previously on Figure 4.3-2). A portion of the Upper DAPL Pool is within the on-Property Slurry Wall / Temporary Cap containment structure. The flux and migration of DAPL constituents is controlled by chemical diffusion from the DAPL to overlying groundwater which is not an efficient mass transfer mechanism.
- Former migration of solutes and current flux of solutes by chemical diffusion from DAPL pools has resulted in an aquifer setting with a vertically stratified contaminant distribution.
- The presence of downward vertical gradients between the shallow and deep groundwater within the MMBA has resulted in a stable hydrogeologic and geochemical environment whereby contaminant flux from DAPL pools and impacted deep groundwater is governed principally by chemical diffusion, which as stated previously, is a slow and inefficient mass transfer mechanism.

- LNAPL released to the environment in the Plant B area was process oil. BEHP was also released in the Plant B area and the LNAPL now contains BEHP. NDPA, NDMA, trimethylpentenes, and ammonia are also present in groundwater in the vicinity of Plant B.

- The current findings show that LNAPL remaining in the subsurface around Plant B is limited in extent and that physical recovery of the LNAPL is approaching a practical endpoint.

7.1.1.4.3.2 Summary the Nature and Extent of Site-Related Constituents in Zone II Groundwater

The following presents a summary of the nature and extent of groundwater contaminants in the Zone II area which includes areas within the Ipswich River Watershed and to a lesser degree a small portion of groundwater that contributes to the Aberjona River Watershed (including groundwater beneath Plant B). Generally, the Zone II areas include a portion of the Maple Meadow Brook Aquifer located to the west of the Property and a small area at the northeast portion of the Property (Figure 3.6-3.) The following bullets summarize the major findings concerning the nature and distribution of site-related constituents in Zone II.

- Analytes associated with the DAPL (sulfate, ammonia, chloride, calcium, sodium, iron, chromium, aluminum, TMP-1, phenols, BEHP, and NDMA) are present within the MMBA. Chromium is rapidly attenuated by geochemical transformations and precipitation within the aquifer matrix in proximity to DAPL areas.
- The area of impacted groundwater includes deeper and intermediate depth overburden groundwater within the WBV and shallow bedrock groundwater in proximity to DAPL pools. Groundwater flow generally follows the axis of the WBV to the northwest of the property which turns northeast following the downstream direction of Sawmill Brook and MMB.
- The detected analyte concentrations are characteristically highest in deep groundwater, and attenuate rapidly vertically, such that shallow groundwater is not impacted. The lateral extent of groundwater in which NDMA is detected was depicted previously on Figure 4.3-28. This boundary is the maximum lateral extent of any detected analytes associated with releases from the Olin Property.

- The lateral extent of overburden groundwater affected by releases from the former Facility are defined and have been delineated based on comparison of indicator parameters to background (where available) and to non-detect values for NDMA. The maximum breadth of the groundwater plume within the MMBA is indicated by

NDMA distribution which has been analyzed by methods allowing a detection limit of 2 ng/L.

- Although it would appear that the northern limit of overburden groundwater affected by releases from the Facility within MMB has not been delineated by well installations, this is not an appropriate conclusion as the bedrock valley on that side of the Site rises to ground surface, limiting the lateral extent of the overburden aquifer. The northern extent of the unconsolidated glacial deposits along the edge of the WBV is therefore the northern boundary of Site-related impacts to overburden Zone II groundwater. The down gradient extent of NDMA within the WBV in deep groundwater to the northeast under the MMB wetland has not been bounded down gradient of GW-65D.

- The data presented in this Focused RI Report also demonstrated the consistent nature of the vertical change in solute concentrations within well couplets installed within the MMBA inside the boundaries of the MMB wetland for all analytes. The primary compound of regulatory concern within the aquifer is NDMA. The vertical distribution of NDMA and other constituents has been bounded and adequately characterized to make estimates of contaminant mass and distribution. NDMA is typically non-detect in groundwater from shallow well couplets indicating that its transfer vertically in the aquifer is limited. The reported analytical results of NDMA in MMB or Sawmill Brook surface water were qualified as NJ or ND during validation. The NJ qualified results are interpreted to be false positive detections. This is consistent with the known vertical distribution of NDMA in the MMBA. Based on the hydrologic setting of the MMBA, the extensive vertical monitoring well network within the wetland and within the core of the groundwater plume, the vertical and lateral extent of solutes in the MMBA has been well characterized and delineated.

- The northeast corner of the Property is also located within the Zone II area. Groundwater in this area is impacted by ammonia, trimethylpentenes, BEHP, and NDPA. An LNAPL (process oil) has been recovered by the Plant B groundwater containment and recovery system. Two past releases to the environment affected groundwater quality in this area. These include the LNAPL and BEHP that was released in vicinity of the Plant B tank farm, and a release of trimethylpentenes (diisobutylene) from the former Plant B production area (the EPH/VPH area). The LNAPL recovery has been ongoing and has reached a practical end point. The EPH/VPH area was successfully remediated by AS/SVE and the shut down and removal of that remedial system was approved by MADEP.

- VOCs in vicinity of Plant B have been evaluated for vapor intrusion potential in Plant B and have been determined to not pose an unacceptable risk under an industrial exposure scenario. Both chlorinated VOCs and petroleum based VOCs have been

detected at low concentrations in deep groundwater in vicinity of the Main Street DAPL Pool. VOCs are not present in shallow groundwater in this area of the Site and therefore a migration pathway for vapor intrusion is not present.

7.1.1.4.3.2 Summary of the Nature and Extent of Site Related Constituents in Groundwater Outside the Zone II Area

Groundwater outside the Zone II area also includes some areas within the Ipswich River Watershed but to a greater degree, includes areas within the Aberjona River Watershed. Generally, areas outside the Zone II include groundwater from beneath the properties located along Jewel Drive, below most of the Olin Property, and areas downgradient of the Property located to the southeast. The northeast portion of Property including Plant B is located in Zone II with the remaining portion of the Property, being located outside the Zone II area (shown previously on Figure 4.3-1).

As discussed above, sources that may contribute to groundwater quality include historical releases that occurred on-Property, and the chemical diffusion from the DAPL pools. The nature and distribution of site related compounds is discussed below. The following bullets summarize the nature and extent of site related contaminants in groundwater outside the Zone II area.

- The nature and distribution of site-related constituents in groundwater, outside the Zone II area, has been delineated (see Figure 4.3-28). The saturated thickness of unconsolidated deposits underlying on-Property areas is thin compared to other areas, and influence of surface water features on solute migration in groundwater is more pronounced and important than within the MMB area. Site impacts to groundwater have been well documented through sampling of groundwater from the on-Property groundwater monitoring well network. The lateral and downgradient extent of impacts to groundwater has been limited by groundwater discharge to the surface water bodies including the Upper and Lower South Ditch.

- Analytes associated with the DAPL (sulfate, ammonia, chloride, calcium, sodium, iron, chromium, aluminum, TMP-1 and TMP-2, phenols, BEHP, and NDMA) are present in groundwater outside the Zone II area. Trimethylpentenes in groundwater are also associated with direct release to the subsurface in addition to their association with DAPL. VOCs (including TMPs) have also been identified in shallow groundwater outside the Zone II area, including the Property and areas between the Property and Main Street to the west. Although chromium is attenuated

by geochemical transformations and precipitation within the aquifer matrix chromium is sufficiently mobile in groundwater to be involved in groundwater/surface water interaction in on-Property areas.

- The interaction between shallow groundwater and surface water in the on-Property groundwater outside Zone II affects distribution of site-related constituents in surface water. Shallow groundwater wells located in Upper South Ditch and near Central Pond exhibit concentrations of site-related solutes or parameters.

- Concentrations of DAPL-related constituents and specific conductance values in shallow wells that monitor upgradient shallow groundwater in the central portion of the off-Property West Ditch Study Area, are lower than shallow wells in proximity to the upper South Ditch. Thus shallow groundwater impacts to Upper South Ditch result from groundwater discharge occurring immediately under South Ditch. Ammonia concentrations in shallow groundwater within the off-Property West Ditch Study Area (GW-25, GW-24S, GW-42S, and GW-43S) are less than observed in the South Ditch surface water.

- A similar pattern of vertical stratification of solutes in groundwater is apparent within the unconsolidated deposits underlying the Upper South Ditch area; with increasing solute concentrations occurring with greater depth (GW-202D and GW202S) and the Ephemeral Drainage area (GW-55D and GW-55S). These areas are outside of the lateral extent of the Upper DAPL Pool and the on-Property Slurry Wall / Cap containment area. The impacts to groundwater in these areas predate the installation of the containment area. The shallow groundwater to surface water gradients turn rapidly upward immediately under the Upper South Ditch downstream of the weir. Impacted groundwater is present immediately underlying the Upper South Ditch and Ephemeral Drainage area and is the source of ongoing discharge of ammonia, aluminum, chromium, and related solutes to surface water from groundwater. This impacted groundwater was present at these locations at the time the Slurry Wall / Cap containment area was constructed. The Slurry Wall / Cap containment area addressed DAPL and immediately overlying groundwater within the slurry wall.

- Site-related constituents (NDMA) have been detected in groundwater samples collected from monitoring wells down gradient and to the southeast of the Property (GW-80D and GW-80BR). NDMA was not detected in the GW-74D or GW-74S which located to the east of the GW-80 well couplet. BEHP has been detected in groundwater samples collected from monitoring well GW-74S, but the presence of BEHP at this location was attributed to another upgradient source (GEI, 2002f, GEI, 2003e). Low concentrations of chlorinated solvents and fuel compounds have been detected in GW-80 D, GW-80BR and GW-80S. These constituents are not attributable to the Olin Property. This information, and the interpreted groundwater contours in the area suggest that GW-74 may not be down gradient of GW-80. Thus

the downgradient extent of NDMA in groundwater in this portion of the Site may not be bounded by the current well network. An additional well in this area is required to more definitively determine the direction of groundwater flow provide a boundary for NDMA in groundwater.

- Groundwater along the eastern side of the Property, outside of the influence of Plant B, is expected to flow toward the topographic depression formed by the MBTA railroad line that forms the East Ditch, and then follow the direction of surface water flow (southeast) within the East Ditch. Groundwater on the northeast side of East Ditch is expected to also flow toward East Ditch, then parallel with the ditch to the southeast. Thus the East Ditch is expected to be a shallow groundwater flow divide that limits easterly migration of solutes off the Olin Property.

- An extensive private well sampling program has been conducted to verify that public health is protected. No private drinking water wells are present within the boundaries of the Site. Some site-related contaminants are naturally occurring and their presence is expected in groundwater that has not been impacted by the releases from the Olin Property.

7.1.2 Fate and Transport

The environmental fate and transport of the principal site–related chemical constituents and potential routes of migration within site media was discussed in detail in Section 5. The fate of these chemicals in groundwater, soils, surface waters, and sediment was presented in the context of sources and migration pathways. The fate and transport of site-related chemical constituents considered the chemical and physical properties of the contaminants, how those properties affect the ability of the contaminants to interact with the environment, and how those interactions influence the ability of the contaminants to migrate or be retained in the media. This section summarizes key elements of fate and transport of specific constituents that will need to be considered in evaluating data limitations recommendations for future work. For a more thorough discussion of fate and transport of the broader categories of chemicals detected in site media, the reader is referred to Section 5.0. Section 5.0 discussed contaminant fate and transport by Operable Unit and included a discussion of groundwater and surface water interaction. This section summarizes those prior discussions by media, indicating where transport of contaminants from one media to another is important.

7.1.2.1 Soil

Soil media historically impacted by site-related chemicals includes surface and subsurface soils within OU1 (including the flood plain soil of the lower South Ditch).

The principal constituents that have been identified historically as having impacted site soil include chromium, trimethylpentenes, Opex and Kempore, BEHP, NDPA, calcium, sulfate, sodium, and ammonia.

Chromium present in site soil was predominantly in the trivalent form due to the presence of aerobic conditions and ferric iron which control the oxidation and reduction conditions and oxidation state of chromium. All identified on-Property areas of soil with chromium concentrations above Upper Concentration limits were remediated by soil removal. Previous risk assessments have concluded that chromium in on-property soil does not pose significant human health risk for industrial/commercial land use. Chromium concentrations in the floodplain of the lower South Ditch (off-property) will be evaluated in future risk assessments. Although moderately soluble in water, chromium is strongly sorbed to iron hydroxides present in soil and also forms hydrated chromium hydroxides and hydrated Al-Cr hydroxides in the presence of higher aluminum concentrations. Although persistent in relatively insoluble mineral forms, chromium is not particularly mobile in groundwater, when leached, due to these same geochemical reactions.

In weathered state, both Opex and Kempore are non-volatile solids and have low water solubility relative to calculated limits for groundwater exposures that are protective of human health. Opex and Kempore in weathered form are not mobile in the environment. Opex and Kempore are not present at concentrations that pose a risk to human health or the environment.

BEHP, NDPA, and trimethylpentenes are present within OU1 soil as a component of the residual material in vicinity of Plant B. BEHP, NDPA, and trimethylpentenes are moderately soluble in groundwater, and can be leached to groundwater from infiltration of precipitation when present in soil. Of these compounds, only BEHP has an MCL and a MADEP groundwater protection standard.

Based on risk assessments, discussed in Section 6 and summarized in the next section (7.3.1), the known extent of site-related contaminants and their concentrations do not present risk to human health based on industrial worker exposure scenarios.

Floodplain soils are located adjacent to sediment deposition areas within the Lower South Ditch in OU1. Sediments were removed from Upper South Ditch to the delta area. These areas were conservatively excavated to remove all sediment. The fate and transport of site-related constituents in floodplain soils is dependent on erosion by scouring and transport of eroded soil as sediment.

7.1.2.2 Surface Water

As described in Section 4, and 5, the impact to surface water occurs primarily within the Upper South Ditch (OU1) as a consequence of discharge of groundwater (OU3) that contains ammonia, chromium, aluminum, sulfate, NDMA, and other DAPL –related constituents. Some groundwater discharge to the off-Property West Ditch occurs seasonally (OU2), but the amount of groundwater discharge to that ditch has been substantially lessened by the construction and operation of the permanent weir. Surface water from the on-Property South Ditch receives surface flow from the Ephemeral Drainage and it flows into the East Ditch (OU2). South of the Property, the East Ditch (OU2) flows into a culvert and becomes the New Boston Street Drainway, which receives flow from Landfill Brook (adjacent to the Woburn MSW landfill), and flows into Halls Brook. The only migration pathway to surface water in MMB and Sawmill Brook (OU2) is groundwater and these surface waters are not impacted by site-related contaminants and therefore are not further discussed here.

As discussed in Section 5.4, groundwater discharge to OU1 surface water occurs principally within the Upper South Ditch for several hundred feet downstream of the weir. Farther down stream, the stream is neither dominantly losing nor gaining until the reach that occurs between the confluence of Ephemeral Drainage and the Property boundary. In this section of the Lower South Ditch the stream is consistently gaining. These relationships are most easily seen during summer

months when the central portion of the stream goes dry, but regains flow within the southern reaches of the Lower South Ditch.

Ammonia is discharged to surface water principally in the reach of the Upper South Ditch downstream of the weir. An additional input of ammonia has been occasionally measured in a small segment of Upper South Ditch between the storm detention basin and Central Pond. Once in surface water, ammonia is attenuated to a limited extent by nitrogen fixing plants and algae during the growing season. Ammonia is not volatile. These mechanisms are not expected to appreciably attenuate ammonia concentrations in surface water. The most important attenuation mechanism is likely to be dilution by other surface water as the surface water progressively flows downstream. Ammonia concentrations progressively decline in surface water within the East Ditch and New Boston Street Drainway until the confluence of the New Boston Street Drainway and Landfill Brook. Ammonia concentrations in surface water entering the New Boston Drainway from Landfill Brook are at concentration equal to those in surface water flowing past that point. Site ammonia impacts and Landfill Brook ammonia impacts on surface water quality are indistinguishable downstream of Landfill Brook.

Chromium discharged to surface water precipitates as redingtonite, a Fe-Cr sulfate, and as gibbsite, a hydrated Cr-Al hydroxide. Other phases such as chromium sorbed to iron hydroxides may also be prevalent. Chromium in surface water persists at low concentrations down through East Ditch, but these concentrations, measured in the non-filtered sample fraction are only slightly above background. From the Upper South Ditch downstream to the Lower South Ditch, chromium concentrations in surface water attenuate rapidly in response to the precipitation mechanisms. Chromium concentrations in filtered sample fractions are an order of magnitude lower near the confluence of East Ditch and South Ditch and non-detect in the lower reaches of East Ditch and the New Boston Drainway. Thus the chromium impact to surface water is limited primarily to OU1.

NDMA is present in surface water from the Upper South Ditch down through the East Ditch and the New Boston Street Drainway to sample location EDSW8. NDMA has low Koc and Kow partition coefficients and a low Henry's constant and therefore will not be attenuated by sorption or volatilization and will not be accumulated biologically. The primary mechanism of NDMA

attenuation is UV oxidation from exposure to sunlight (photo-oxidation), which can be rapid under appropriate conditions. The clarity and depth of water, and exposure to sunlight are the primary variables which will affect the destruction rate of NDMA in surface water by this mechanism. The downstream concentration of NDMA in surface water will be a function of stream velocity, the effective degradation rate from UV oxidation, and dilution from other surface waters and discharge of clean groundwater.

7.1.2.3 Sediment

As described in Section 4.2.2 and 5.0, existing impacts to sediment, measured by the presence of Site-related constituents in sediment, are constrained to the on-Property Lower South Ditch (OU1), and the off-Property Lower South Ditch, the East Ditch (OU2), and the off-Property West Ditch (OU2) areas. The sediments in the MMB wetland, including MMB and Sawmill Brook, are not impacted by contaminants originating from the Olin Property, and is not discussed further here.

The primary impacts observed in sediment are in the form of metals including chromium and BEHP. As discussed previously, the chromium, iron and aluminum is in chemically and thermodynamically stable mineral forms that will remain so under naturally occurring aquatic conditions. The BEHP will sorb strongly to organic matter in sediment and will be gradually attenuated through aerobic biological degradation. Based on the most recent sediment samples, BEHP is present in OU1 and OU2 sediment samples from the Lower South Ditch at concentrations several orders of magnitude higher than sediment in East Ditch (OU2). Historically, East Ditch sediment sample concentrations were similar to those in the Lower South Ditch sediment samples. The periodic dredging by the MBTA of the East Ditch may randomly affect the composition of the East Ditch sediment.. BEHP is not detected in sediment downstream of the New Boston Street Drainway. Chromium occurs in OU1 and OU2 sediment within the Lower South Ditch at concentrations similar to those observed at sediment sample locations ED SD/SW4 and ED SD/SW5 in the East Ditch (OU2). The difference in downstream attenuation of BEHP compared to chromium (BEHP concentrations being more attenuated) may be due to the on-going sources of chromium (floc) versus the historical release of BEHP to the ditch system which ceased many years ago.

As noted previously, iron, calcium, aluminum, ammonia, and chromium concentrations in sediment are similar at locations EDSD/SW4 and EDSD/SW5 to upstream locations in the lower South Ditch. These data are consistent with on-going groundwater discharge to South Ditch surface water and the subsequent formation and transport of metal-bearing floc and discharge of dissolved ammonia.

7.1.2.4 Groundwater

As described in Section 1.0, 3.0 and 4.0 site-related impacts to groundwater occurred primarily within the overburden aquifer as a consequence of historical discharge of process wastewaters to unlined lagoons and ponds on the Facility. Most site-related contaminants impacting groundwater are inorganics, such as ammonia, chloride and sulfate and metals, including both cation and anion species, such as iron, manganese, calcium, sodium, aluminum, and chromium (III). Organic compounds include both VOCs, primarily trimethylpentenes, and SVOCs, primarily NDMA, BEHP and NDPA are also present. These solutes in DAPL, where present, will migrate from DAPL to overlying groundwater by chemical diffusion. Chemical diffusion is not however an effective mass transfer mechanism. Chemical diffusion will not result in increasing concentration in the aquifer, but will contribute to a solute flux that maintains a general equilibrium concentration of solutes within adjacent areas of the aquifer. Of these compounds, NDMA, BEHP, and chromium are the most consequential to evaluating human health risks as these constituents are detected at a higher frequency within Zone II groundwater and have primary drinking water standards. Ammonia, chromium, and BEHP are present in groundwater that discharges to OU1 surface water within the South Ditch, and potentially to OU2 surface water within East Ditch. Discharge of these constituents to surface water results in dissolved phase concentrations in surface water and precipitation of chromium bearing minerals as described previously. Also as discussed previously in Section 4 and Section 6, vapor migration to buildings has been evaluated and is not a completed migration pathway for OU3.

NDMA, chromium, ammonia and BEHP are not volatile and will not be readily transferred from groundwater to vapor or air phases. Hydrodynamic dispersion and diffusion within the groundwater system will reduce all constituent concentrations along the groundwater flow path.

Chromium is particularly susceptible to geochemical transformations including precipitation of Al-Cr sulfates, chromium hydroxides, and sorption to precipitated iron hydroxides within the aquifer. The effects of these reactions on chromium transport are conspicuous near areas of DAPL in which chromium concentrations in groundwater are rapidly attenuated away from the DAPL source areas. BEHP distribution in Zone II groundwater is similar to that of other primary indicator parameters, but is present at low concentrations, typically less than the MCL. Near Plant B, BEHP concentrations are higher in groundwater reflecting proximity to LNAPL source material.

NDMA is present in groundwater within and outside of Zone II. The distribution of NDMA has been assessed through a recent and comprehensive sampling program (2003-2004) that included site groundwater monitoring wells, public and private water supply wells, surface waters, sediment and soils. NDMA has a low carbon partition coefficient or Koc and will not readily sorb to organic material within the aquifer, and will be transported in a conservative (non-reactive) manner. NDMA has not been detected in sediment or soil. The lateral and vertical extent of NDMA within the aquifer has been bounded by non-detect values at a detection limit of 0.000002 mg/L or 2 ng/L.

Within Zone II groundwater in the MMB aquifer, vertical gradients are neutral and even slightly downward over most of the aquifer. The groundwater contaminants are stratified within the aquifer with higher solute concentrations occurring in deeper portions the aquifer within the Western Bedrock Valley. These stratified conditions have persisted for decades with little change and have not been appreciably affected the extensive pumping from shallower strata in the aquifer. Monitoring of groundwater since cessation of pumping indicates groundwater conditions are still adjusting in certain portions of the aquifer. Based on a lack of strong evidence for vertical advective transport within the aquifer (e.g., lack of upward vertical gradients), the vertical migration of contaminants is primarily by chemical diffusion and dispersion which is balanced by mixing with cleaner groundwater in shallow portions of the aquifer which remains un-impacted by site-related constituents. For these reasons surface water within the Ipswich watershed has not been impacted and it not anticipated that these conditions will change measurably in the foreseeable future. Down gradient migration of solutes will occur but mixing with the cleaner groundwater that laterally recharges the aquifer along the groundwater flow path will dilute and

attenuate contaminant concentrations. The mass flux of solutes from residual sources deep within the aquifer will be balanced by these inflows and solutes attain equilibrium concentrations at some downgradient distance within the aquifer and will at some distance no longer be detectable under a long term steady state condition.

The overburden aquifer in the eastern and southern portions of the Site is for the most part outside of Zone II and shallower. Groundwater in this area flows toward discharge points within the Aberjona watershed and some groundwater actively discharges in reaches within the Upper and Lower South Ditch. This groundwater discharge will result in capture of some of the chromium, ammonia and NDMA in groundwater and transfer of the chromium, ammonia and NDMA from groundwater to surface water. The fate and transport of these and other associated DAPL related constituents will be determined by processes acting upon surface water and sediment as previously discussed. BEHP is not prevalent in groundwater outside of Zone II. The primary source of BEHP within Zone II is the Plant B area. Based on current data from down gradient well locations, it appears the down gradient extent of BEHP has been delineated and bounded by wells couplets GW-4, GW-5, and GW-80.

The distribution of NDMA was also comprehensively investigated in groundwater within and to the south east of the Olin Property. As discussed previously, the downgradient extent of NDMA in groundwater beyond well couplet GW-80 and near GW-74 may not be bounded and requires an additional well to determine groundwater flow direction in this area. Risk assessments based on the results of investigations of NDMA have concluded that there is currently minimal potential for human exposure to NDMA in groundwater since impacted groundwater is not used. At concentrations present in surface water, NDMA does not pose a risk to human or ecological receptors.

7.1.3 Risk Assessment

The section summarizes the results and conclusions of human health and ecological risk assessments that have been conducted to date. The human health risk assessments are summarized first followed by the ecological risk assessments.

7.1.3.1 Human Health

Human health risk assessments have been conducted for the Olin Chemical Superfund Site under proposed scopes of work approved by MADEP. Each risk assessment has been submitted to and approved by MADEP.

Human exposures to analytical parameters detected in the soil, surface water, sediment, floc, air and groundwater have been assessed using various receptor scenarios. The receptors evaluated include industrial/commercial workers (both on-property and off-property) construction workers, utility workers, trespassers, and neighborhood residents.

- The Property has been determined to be suitable for industrial/commercial use and would be subject to institutional controls. Risk assessments have assumed that institutional controls will be implemented to maintain industrial/commercial use and to control certain activities (such as excavation in remediated former source areas and under building foundations).

- A number of sources have been identified during investigations of the Site. Sources have been contained, eliminated or are currently being treated/controlled.

- No hexavalent chromium has been detected at levels of concern in any media.

- Olin actively identified and tested private drinking water wells in the area. Currently, there are no private drinking water wells within the boundaries of the Site.

- Risk assessments performed to evaluate potential off-property exposures to surface water, sediment, and via vapor intrusion to buildings concluded that these potential exposure pathways are associated with a condition of no significant risk.

- Risk assessments conducted to evaluate the use of Town water while the MWSWs were still in use concluded there was no significant risk to the water consumers. No primary drinking water standards (Massachusetts MCLs) for site-related constituents were exceeded in samples from the five MWSWs located in

the MMBA. The MWSWs were not in use when NDMA was detected and have not been in use since.

- A comprehensive investigation of the nature and extent of NDMA in groundwater (including private wells), surface water, sediment, and soil has been conducted. NDMA was not detected in sediment or soil. Risk assessments based on the results of the investigation have concluded that there is currently minimal potential for human exposure to NDMA, and the reported NDMA concentrations in groundwater and surface water do not currently pose a significant risk to human health risk.

7.1.3.2 Ecological

Twelve ecological risk assessments were conducted for the Site. The ecological risk assessments were conducted under the Massachusetts Contingency Plan (MCP); all proposed Scopes of Work were submitted to MADEP for review and comment, and all were approved (conditionally or unconditionally). Assessments were performed for exposure areas which are present on-Property (terrestrial habitat at the Facility, on-Property West Ditch, South Ditch, Ephemeral Ditch, and Central Pond) and off-Property (off-Property West Ditch, East Ditch, New Boston Street Drainway, and Maple Meadow Brook Wetland) exposure areas.

Ecological exposures to analytical parameters detected in surface water, soil, sediment, floc, and groundwater were assessed for terrestrial and aquatic receptors including red fox (terrestrial mammal), woodcock (terrestrial bird), earthworms (terrestrial invertebrate), green heron (semi-aquatic bird), amphibians, the benthic macroinvertebrate community), aquatic and terrestrial plants, and fish. Data used to evaluate potential risk have included analytical chemistry, soil and sediment toxicity testing, site-specific tissue samples (plant, benthic invertebrate, amphibian, and small mammal tissue), benthic macroinvertebrate community surveys, amphibian calling and population surveys, and habitat surveys (including weekly inspections of the ditch system from 1997 to 2005). Assessment endpoints generally consisted of protection and maintenance of receptor populations, typically stated in terms of growth, survival, and reproduction.

Risk conclusions were based on a weight-of-evidence approach and have included the following methods, techniques, and measurement endpoints to evaluate risk:

- comparison of surface water, sediment, groundwater, and soil concentrations to benchmark screening values, receptor TRVs, and/or other chronic and acute effects concentrations, as applicable; calculation of HQs and HIs; FETAX and earthworm toxicity tests for survival and growth; earthworm bioaccumulation testing; use of toxicity test and dilution studies to attempt to derive concentration response curves; population modeling to identify adverse effects to receptor populations or their prey bases; food chain models using site-specific prey tissue concentrations to estimate total daily doses from OHMPCs, and comparison of modeled doses to published TRVs indicative of potential impairment; comparison of study area conditions to background, reference, or local conditions; quantitative evaluation of benthic macroinvertebrate community data, and comparison of soil and groundwater data to MCP Upper Concentration Limits.

Collectively, the ecological risk assessments have concluded the following:

- The most recent and the most robust of the risk assessments have repeatedly demonstrated a condition of No Significant Risk for terrestrial receptors at the Facility.

- IHAs at South Ditch have repeatedly concluded no readily apparent harm.

- A condition of No Significant Risk has been concluded at the Ephemeral Drainage.

- Based on Site-specific risk assessments using multiple lines of evidence and based on sediment remedial activities in the on-Property West Ditch, Off-Property West Ditch, and the Upper South Ditch, as well as the sediment removal and culverting of the on-Property West Ditch, there is negligible ecological risk associated with sediments within most of the ditch system, including the East Ditch and New Boston Street Drainway. The lower South Ditch sediments require further risk evaluation.

- The Site-specific risk assessments conducted to date have not documented significant impacts to aquatic life associated with surface water quality. However, the assessments conducted per the MCP require that Massachusetts Ambient Water Quality Criteria (AWQC) be considered applicable environmental standards. Since there have been concentrations of inorganics and metals in surface water above corresponding AWQC, the MCP risk assessments could not conclude that a condition of no significant risk to the environmental

exists with respect to surface water in the ditch system. The AWQC are overly conservative for Site habitat conditions.

- Overall, in the ditch system, ammonia is the parameter that most consistently has been detected above surface water criteria. However, stress to aquatic receptors has not been observed within the ditch system. Risk associated with ammonia based on comparison to generic criteria is likely overestimated.

- In the Maple Meadow Brook Wetland, there is no ecological risk associated with aquatic and benthic exposure areas. Comparison of deep groundwater quality data (particularly in source areas) in the Western Bedrock Channel to MCP Upper concentration Limits suggests a potential environmental risk. Current data indicates that the stratified nature of contamination in Site groundwater in the MMBA, with the most impacted groundwater being located at the bottom of the aquifer, would negate potential for exposure of these higher contaminant concentrations to surface water and sediment. Investigation and monitoring data of actual exposure areas and actual exposure media (surface water and sediment) for ecological receptors will address this issue.

- NDMA has never been identified as a risk driver in any of the terrestrial, aquatic, or benthic exposure areas, either on-Property or off-Property.

7.2 CONCLUSIONS

The following subsections discuss data limitations, or gaps, and provide recommendations for future work. These recommendations will be more fully developed in the RI Workplan, which will be submitted after this Focused RI Report. To support development of the Draft RI Work Plan a preliminary list of chemical specific and location specific ARARs has been developed and are contained in Appendix G. These preliminary ARARs will be refined during development of the Work plan and will be used to aid establishing data quality objectives for the subsequent RI investigation.

7.2.1 Data Limitations and Recommendations for Future Work

Data limitations and recommendations for future work are presented below by OU and media.

7.2.1.1 OU1 Soil

The following text discusses the limitations of available data for surface soil and subsurface soil at the Facility (OU1). In addition, recommended actions to address the data limitations or data gaps are also identified.

7.2.1.1.1 Surface Soil

A review of the available data characterizing current Site conditions provides information concerning the delineation of the nature and extent of contamination, the availability of data for conducting risk assessments, and the information necessary to evaluate the need for remedial activities and the evaluation of remedial alternatives. Based on a review of the sampling and analytical information with respect to soil at OU1, only one data gaps has been identified for surface soils.

- Surface soils in the floodplain area of the Lower South Ditch (between the Property Line and the East Ditch) have been well characterized for chromium only. Since chromium impacts have been identified, additional characterization of metals, inorganics, and SVOCs in surface soils in that area is recommended.

Surface soils have been well characterized both in potential source areas as well as throughout the former Facility and other on-Property areas. The sample density is lower in the portion of the facility south of the South Ditch. This area was not part of the industrialized portion of the Facility and the only identified area, SWMU-33 (oil-stained soil), has been thoroughly investigated, and there is no other evidence of releases in that area. In addition, the area is subject to the terms of an Environmental and Open Space Restriction that restricts future development activities on the portion of the Property. The soil sampling and analysis has been limited to the former Facility Property. The available historical information indicates that manufacturing and waste disposal activities were limited to the Property and the potential for overland flow to surface soil on adjacent properties is limited by several physical features, including Eames Street to the north, the off Property West Ditch to the west, the elevated railroad line to the west, the South Ditch that intercepts overland flow to the south, and the East Ditch and railroad tracks immediately to the east of the Facility.

7.2.1.1.2 Subsurface Soil

A review of the available data characterizing current Site conditions provides information concerning the delineation of the nature and extent of contamination, the availability of data for conducting risk assessments, and the information necessary to evaluate the need for remedial activities and the evaluation of remedial alternatives. Based on a review of the sampling and analytical information with respect to soil at OU1, data gaps have been identified as shown below.

- In proposed development plans of the Property, some buildings and foundations would be removed (see Figure 1.4-1). In consideration of final development plans characterization of subsurface soils would be conducted for those foundations scheduled for removal. Investigations have been conducted within the East and West Warehouses and the Plant B Production Area, and data collected do not indicate further investigation is warranted. Proposed development would increase soil cover over the warehouse foundation areas, further limiting access to existing subsurface soil. Building foundations left in place will prevent access to site soil and would be covered by land use restrictions and would not be investigated. Furthermore, groundwater analytical data from wells located downgradient of and in vicinity of Plant A and Plant C foundations do not indicate these areas as sources of groundwater contaminants.

- Post-remedial subsurface soil confirmatory sampling and analysis in the EPH/VPH area west of Plant B would reduce uncertainty concerning nature and extent in that remediated area. Characterization of VOCs and SVOCs in soils is recommended.

- Delineate the extent of metals and SVOCs in subsurface (and surface) floodplain soils immediately adjacent to the Lower South Ditch. This characterization will support completion of human health and ecological risk assessments for these and Central Wetland soils, for which characterization has been completed.

7.2.1.1.3 OU1 Surface Water and Sediment

OU1 surface water and sediment are currently monitored under the PCMP program. The following bullets provide information on some specific data limitations which have been identified. These data limitations do not however represent data gaps that would require additional data collection.

- Seasonal variability in OU1 surface water NDMA concentrations have not been characterized as they have been for other compounds. Three OU1 surface water samples were analyzed for NDMA in 2003. At the low concentrations detected NDMA does not pose a risk to human health and ecological receptors as discussed in Section 6.0. The downstream extent of NDMA in surface water has been investigated during East Ditch/New Boston Drainway sampling events.

- In the comprehensive sediment sampling and analysis program of 2001, reporting limits in fifteen sediment samples from the Lower South Ditch were elevated due to high moisture content. Most of the SVOCs, including all of the PAH compounds, most of the phthalates, and NDPA, were not detected in any of the samples, but the reporting limits were well above typical sediment screening values. In other words, the non-detects could be "false negatives". However, PAHs are not characteristic of sediments in the Upper South Ditch, and the uncertainty in that Lower South Ditch data is not a substantial concern. The ecological risk assessment relied primarily on sediment toxicity testing (frog embryo) and associated population modeling as well as food chain modeling using measured biological tissue data as inputs to assess the ecological risk for aquatic life in the ditches. These measures of ecological risk make the uncertainty in measured sediment concentrations of lesser concern. Additional sediment sampling and analysis in the Lower South Ditch confirmed the presence of BEHP and NDPA in sediments. Overall, the body of information for Lower South Ditch sediments has been sufficient to evaluate human and ecological risks as described in Section 6.0.

7.2.1.2 OU2 Surface Water and Sediment

OU2 surface water and sediment have been adequately characterized to support assessment of the nature and extent of contamination, human health and ecological risk assessments, and evaluation of remedial alternatives. No additional characterization of these sediments waters is recommended.

The following bullet provides information on some specific data limitations which have been identified. These data limitations do not however represent data gaps that would require additional data collection.

- Several site-related compounds have been detected in downstream East Ditch surface water locations. NDMA and ammonia have been detected in the farthest downstream locations (EDSW8). The NDMA concentrations at the downstream surface water sample locations are below screening benchmarks for aquatic life,

and human exposure potential in the downstream area is minimal. Ammonia concentrations have not been delineated to background in the downstream direction. However, a substantial ammonia input from Landfill Brook to the New Boston Street Drainway appears to make the delineation of the Site-contributed impact infeasible.

7.2.1.3 OU3 Groundwater

A comprehensive series of investigative and remedial work has been conducted at the Facility and off-Property areas. This work has led to the development of a substantially complete Conceptual Site Model that:

- relates the historic facility operations to impacts to groundwater quality,
- explains the manner in which DAPL formed and migrated to its current locations,
- documents that DAPL Pool elevations are stable,
- demonstrates that the measured concentrations of solutes in the diffuse layer above the DAPL are consistent with the expected concentration based on the theoretical flux due to chemical diffusion processes,
- documents how geochemistry has and will continue to effect solute transport of chromium,
- documents and explains the vertical distribution of solutes in groundwater with respect to transport mechanisms and hydrogeologic considerations,
- defines the completed groundwater migration pathways to surface water and based upon the interaction of surface water and groundwater explains the location and extent of impacts to surface waters, including the mechanisms of floc formation and the stable nature of all precipitated chromium bearing minerals,
- documents that volatile compounds in groundwater do not present risks to atmospheres within building structures, and defines the lateral and vertical extent of groundwater impacts and documents that impacted groundwater is not in use for consumption by the public.

7.2.1.3.1 Geology

The geology is well understood both below the on-Property areas as well as below the MMB Wetland. Additional investigations aimed solely at geologic characterization are not required given the nature and scale of the Site.

7.2.1.3.2 Hydrogeology

The hydrogeology of this Site has been studied extensively, is well documented, and generally is well understood. However since the cessation of pumping of the Town MWSWs, a comprehensive Site wide series of seasonal synoptic groundwater water measurements has not been collected and evaluated. Collection of this data is necessary to complete a comprehensive assessment of groundwater flow directions across the entire Site, document post pumping vertical head patterns within the aquifer and to confirm the extent and seasonal variations of localized groundwater divides that have previously been identified.

The only surface water bodies that that are impacted by discharge of impacted groundwater are located within the Aberjona River Watershed and include, to a limited extent, the off-Property West Ditch, to a greater extent the Upper South Ditch, and to a moderate extent, the Lower South Ditch and potentially the confluence area of the Upper South Ditch and the East Ditch. Therefore no additional hydrologic monitoring is required for the MMB and Sawmill Brook streams.

7.2.1.3.3 Nature and Extent of Site-Related Constituents in Groundwater

The following paragraphs describe the data limitations and recommendations for future work with respect to the identified source areas.

Sources

The three DAPL pools have been extensively investigated and the boundaries defined. No additional work is necessary to further define these areas. Groundwater analytical data from on-Property well locations does not indicate the presence of additional residual sources of DAPL

related constituents. Inductance logging should be conducted annually to continue to document that these DAPL pools remain stable as expected.

The remaining LNAPL at Plant B is increasingly immobile. Residual material in the Plant B area contributes to dissolved phase impacts to groundwater, however, within this industrial setting there are no groundwater receptors, other than surface water. Although the groundwater in vicinity of Plant B is classified as Zone II, other information such as the direction of surface water flow within East Ditch suggest this area may not actually be within the zone of contribution of the Wilmington MWSWs and therefore may be misclassified. The groundwater monitoring well network in the Plant B area is adequate to characterize the nature and extent of groundwater impacts.

Zone II Groundwater

Within the Zone II Area, for most site-related constituents, the extent of impacted groundwater (i.e. the plume boundaries) has been defined and bounded in terms of lateral extent and vertical distribution. The extent of impact as defined by NDMA has also been bounded vertically and laterally to a detection limit of 0.000002 mg/L or 2 ng/L. The level that is considered protective of human health for ingestion of groundwater is 10 ng/L. The downgradient extent of NDMA to non-detected values to the north-northeast of GW-65D has not been bounded. The following recommendations for future work are based on the distribution on NDMA in Zone II Groundwater.

Within the MMBA, NDMA was detected in GW-65D at low concentrations, and as such the downgradient extent of groundwater contamination has not been bounded to non-detect values to the north north east in the downgradient plume direction along the Western Bedrock Valley under the MMB wetland. Although GW-73D and GW-73S near the Town Park well are non-detect for NDMA, this location is not necessarily downgradient of GW-65D. The monitoring well pair GW-73D/73S provides a lateral delineation of impacted groundwater in this area of the Site. Two additional deep and shallow groundwater well pairs are recommended to define the down gradient extent of NDMA in the aquifer. Therefore a down gradient well location is proposed that takes advantage of the road crossing (Main Street) that occurs down gradient over the MMB

wetland and aquifer. To the extent access can be obtained a well pair would be installed on each side of MMB on properties adjacent to the road.

The Wilmington MWSWs wells are no longer active, and the volume of water flowing through the aquifer area has decreased thereby decreasing the potential to transfer solutes that have diffused into the diffuse layer to surrounding groundwater. Since cessation of pumping, solute concentrations within certain portions of the aquifer have been readjusting. Statistical changes in aquifer solute concentrations were discussed in Section 5.0. Groundwater locations where geochemical conditions are identified as changing should be evaluated for inclusion into a final set of wells for a final groundwater sampling program to be implemented prior to submittal of a final RI.

A final groundwater sampling strategy for OU3 should be established to confirm the boundaries of the plume as presented in this report. A subset of wells within the interior of the plume should be identified for the final OU3 sampling program as well as a subset of perimeter wells to support preparation of the final RI report and evaluations in the FS.

Groundwater Outside Zone II Area

Similar to the Zone II areas, NDMA is the primary site-related constituent that has migrated within the aquifer. Although the lateral and vertical extent of NDMA has been defined and is largely bounded, the downgradient plume is not bounded. The following bullets summarize the data gaps identified under this evaluation.

Site-related constituents (NDMA) have been detected in groundwater samples collected from monitoring wells down gradient to the southeast (GW-80 cluster). As discussed previously, the next well cluster GW-74D and GW-74S, which did not detect NDMA in groundwater, may not be downgradient of the GW-80 wells. An additional shallow and deep well pair is recommended to the southeast of GW-80 to completed the contaminant delineation and verify groundwater flow direction.

In addition, it is recommended that two shallow and deep groundwater well pairs be installed on the east side of East Ditch to confirm the boundary delineation of site-related impacts to groundwater on that side of the Property. As discussed previously, the inferred direction of groundwater flow in this direction of the Site is to the southeast along the topographic depression formed by the MBTA rail line and East Ditch. These wells will confirm the delineation and boundary of site related groundwater impacts and provide additional data points to measure groundwater elevations and interpret the direction of groundwater flow. The proposed location of these wells would at a minimum be several hundred feet east of the MBTA, and located between GW-48 (to the north) and GW-80(to the south). Locations are dependent of access.

Wells outside of Zone II should be included in a final OU3 groundwater sampling program to confirm the plume boundaries as delineated and provide a final data set to support risk assessments.

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MADEP, 2004b. Ltr to Steve Morrow, Re: Wilmington – Olin Chemical, DEP RTN 3-0471, Additional Investigations, Lake Poly, April.

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TABLES

Table ES-1
History of Investigations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Investigation	Monitoring Wells Installed	Groundwater Samples	Soil Samples	Surface Water Samples	Sediment Samples	Test Pits	Soil Gas Sampling	Seismic	Bedrock Elevation Investigation	Biological Surveys	Human Health Risk Assessment	Ecological Risk Assessment	Other Investigations
1978 Groundwater and Surface Water Study	x	x	borings	x									
1980 Soil and Groundwater Investigation - Eastern Boundary of Facility													
November 1980 USEPA Field Investigation Team (FIT) Inspection													
1981-1982 Hydrogeologic Investigation	x	x	borings	x		x							
1990-1991 Private Well Sampling		x											
1991-1993 Comprehensive Site Investigation	x	x	x	x	x	x	x	x	x		x	x	
1993-1997 Supplemental Phase II Investigations	x	x	x					x	x		x	x	
April 1998 Warehouses Soil Investigation	x	x	x										
1998 Supplemental Soil Investigations (response to MADEP comments on 1997 Supplemental Phase II)			x										
August/September 1998 Soil Borings to Confirm Existence of Bedrock Saddle (The Main Street Boring Program) Also 3 seismic lines shot previous to borings SB-1 thru SB-6)			borings					x	x				
November 1999 Pesticide in Soil Investigation (Warehouses)			x										
1999 - 2001 Bioremediation of Soil/Sediment Pilot Test RAM					x								
April-May 2000 Soil Borings and Installation of MP-4	x		x						x				
2000 Focused Site Characterization and Risk Assessment (to support proposed warehouse redevelopment)			x								x	x	
October 2000 Comprehensive Groundwater Investigation - MMB Aquifer		x											
October/November 2000 Plant B VPH/EPH Soil Investigation (installation of AS/SVE)			x										
2001 Groundwater and Surface Water Elevation and Stream Flow Investigation													Groundwater and surface water elevations
2004 - 2005 East Ditch Investigations and Assessments				x	x					x	x	x	
2000 - 2004 Construction-Related Release Abatement Measure			x	x	x						x	x	
2000 Drum Removal RAM			x										
September 2001 Sediment and Bank Soil Investigation - Lower South Ditch			x		x								
2002 - 2006 Supplemental Phase 2 Investigation - Maple Meadow Brook Wetland and Aquifer		x		x	x							x	
2003 - 2004 NDMA Immediate Response Action		x		x							x	x	
2003- 2004 NDMA Supplemental Phase 2 Investigation	x	x	x	x	x						x	x	
NDMA Precursor Study		x											
April 2003 - January 2004 Determining DAPL Removal Rates Using a Laboratory Column		x											DAPL Column Study
2003 - 2004 Floc Morphology and Bioavailability Study				x									Floc sampling and analysis
June 2003 Off-Property West Ditch sediment and subsurface soil investigation			x		x								
August 2003 Update to the Modified Stage I Environmental Screening - Maple Meadow Brook Wetland [1404]												x	
November 2003 North Pond Investigation			x										
March 2004 Plant D and Sewer System Investigation (NDMA Phase II, Part 2)	x	x	x										
2004 Focused Environmental Risk Characterization - East Ditch and Downstream Areas				x	x							x	
2004 Focused Site Characterization (ECS Marin) in support of TransRail facility Development			x										
2004 Focused Site Characterization and Risk Assessment											x	x	
2005 Lower South Ditch Sediment and Soil Investigation and Central Wetland Soil Investigation			x		x								
2005-2006 Supplemental South Ditch Investigation of South Ditch Surface Water Quality and Adjacent Groundwater Quality		x		x	x								
Monitoring													
1980 - 1990 On-Going groundwater and Surface Water Monitoring													
2001 - 2007 Post-Construction Monitoring Plan Monitoring		x		x	x								
2003 - 2006 Maple Meadow Brook Aquifer Groundwater and Surface Water Monitoring		x		x									
1993 - 2005 Municipal Water Supply Wells Monitoring Program (including Sentinel Well Monitoring Program)		x											
1997 - 2007 Plant B Immediate Response Action (IRA) Monitoring		x											

borings = borings only, no samples collected for chemical analysis

Prepared/Date: MJM 8/30/07
Checked/Date: PHT 09/27/07

Table 2.1-1
List of Important Historical Reports and Other Key Documents

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Date	Title	Author
June 1993	Comprehensive Site Assessment Phase II Field Investigation Report	Conestoga-Rovers & Associates
September 1993	Public Health Risk Assessment	ABB Environmental Services, Inc.
June 1997	Supplemental Phase II Report	Smith, et al.
July 2001	Release Abatement Measure Status Report No. 2 and Completion Statement. Drum Removal	GEI Consultants
April 2001	Olin Wilmington Technical Series - XIV. A Groundwater Flow and Solute Transport Model for the Olin Corporation Site RTN-3-0471	GEOMEGA
December 2001	Olin Wilmington Technical Series - XVII. The Main Street Bedrock Saddle Investigations	GEOMEGA
January 2004	Olin Wilmington Technical Series - XXXI. Composition, Morphology, and Solubility of Flocculent in the Ditch System at the Olin Corporation Site, Wilmington, MA	GEOMEGA
September 2004	Part 2 Construction-Related Release Abatement Measure (RAM) Status Report Number 8, Olin Wilmington, Property, 51 Eames Street Wilmington, MA RTN3-0471	GEI Consultants
October 2004	Completion Statement and Addendum to Status Report No. 8, Part 2 Construction-Related Release Abatement Measure (RAM)	GEI Consultants
October 2004	Olin Technical Series -XXXVII Conclusion of the Laboratory Column Test Simulating Aquifer Pumping for DAPL Removal	GEOMEGA
August 2005	Olin Wilmington Technical Series - XXXVIII. The 2004 Western Bedrock Valley Statistical Report	GEOMEGA
October 2005	Olin Technical Series -XXXIX. Results of 2005 Annual Induction Logging and Multilevel Piezometer Sampling Events: 51 Eames Street Site, Wilmington, MA RTN3-0471	GEOMEGA

Prepared/Date: MH 07/31/07
Checked/Date: MJM 08/01/07

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-10	AREA 10		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-10	AREA 10		Duplicate	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-3	AREA 03		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-4	AREA 04		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-5	AREA 05		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-6	AREA 06		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-7	AREA 07		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-9	AREA 09		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	30-Jul-91	OU1		SWMU-33	SWMU-33		Sample	36				65				21	7		23	4	1				
	CRA	S	02-Oct-91	OU1		TP-1	TP-1-SN1		Sample	34				65				21	7		23	4	1				
	CRA	S	07-Oct-91	OU1		TP-19	TP-19-SN6		Sample	34				65				21	7		23	4	1				
	CRA	S	08-Oct-91	OU1		TP-21	TP-21-SN8		Sample	34				65				21	7		23	4					
	CRA	SS	07-May-93	OU1		SWMU-25	SWMU-25		Sample	36				65				21			23	3	1				
	SMITH	SS	15-Dec-96	OU1		SWMU-26	SWMU26 COMP		Sample					65				21			1	2					
	SMITH	SS	15-Dec-96	OU1		SWMU-26-1	SWMU26-1		Sample	36																	
	SMITH	SS	15-Dec-96	OU1		SWMU-26-2	SWMU26-2		Sample	36																	
	SMITH	SS	15-Dec-96	OU1		SWMU-26-3	SWMU26-3		Sample	36														1			
	SMITH	SS	15-Dec-96	OU1		SWMU-26-4	SWMU26-4		Sample	36																	
	SMITH	SS	16-Dec-96	OU1		AREA-8-2	AREA8-2		Sample	36				65				21			1	2					
	SMITH	SS	16-Dec-96	OU1		AREA-8-3	AREA8-3		Sample	36				65				21			1	2					
	SMITH	SS	16-Dec-96	OU1		CPDA-5	CPDA-5		Sample	36				65				21			1	2					
Soil Sampling 1998	OLIN	S	03-Nov-98	OU1		SBGR	SBGR		Sample												23	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-27-101	SS101XX27X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-27-101	SS101XX27D		Duplicate	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-33-101	SS101XX33X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-33-102	SS102XX33X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-33-103	SS103XX33X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-27-101	SS101XX27X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-33-101	SS101XX33X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-33-102	SS102XX33X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-33-103	SS103XX33X		Sample	62																	
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		CP-1	CP 1 (Central Pond 1)		Sample									1				1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		CP-2	CP 2 (Central Pond 2)		Sample									1				1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		NW-WAREHOUSE	NW Warehouse		Sample									1				1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		SE-WAREHOUSE	SE Warehouse		Sample									1				1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-09	RSO-09-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-09	RSO-09-S1 (0-3 FT)	0-3 FT	Sample												22	1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-09	RSO-09-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	24-Jan-00	OU1		RSO-09	RSO-09-S2 (3-6 FT)	3-6 FT	Sample												22	1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-10	RSO-10-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-10	RSO-10-S1 (0-3 FT)	0-3 FT	Sample												22	1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-10	RSO-10-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	24-Jan-00	OU1		RSO-10	RSO-10-S2 (3-6 FT)	3-6 FT	Sample												22	1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-11	RSO-11-S1 (0-3)	0-3 FT	Sample	37				66													

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-11	RSO-11-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-11	RSO-11-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	24-Jan-00	OU1		RSO-11	RSO-11-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-12	RSO-12-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-12	RSO-12-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-12	RSO-12-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	24-Jan-00	OU1		RSO-12	RSO-12-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-13	RSO-13-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-13	RSO-13-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-13	RSO-13-S2 (3-5.5 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-13	RSO-13-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-01	RSO-01-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-01	RSO-01-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-01	RSO-01-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	OU1		RSO-01	RSO-01-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-02	RSO-02-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-02	RSO-02-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-02	RSO-02-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	OU1		RSO-02	RSO-02-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-03	RSO-03-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-03	RSO-03-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-03	RSO-03-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	OU1		RSO-03	RSO-03-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-04	RSO-04-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-04	RSO-04-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-04	RSO-04-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	OU1		RSO-04	RSO-04-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-05	RSO-05-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-05	RSO-05-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-05	RSO-05-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	OU1		RSO-05	RSO-05-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-07	RSO-07-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-07	RSO-07-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-07	RSO-07-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	OU1		RSO-07	RSO-07-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-08	RSO-08-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-08	RSO-08-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-08	RSO-08-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	OU1		RSO-08	RSO-08-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-16	RSO-16 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-16	RSO-16 (0-3)	0-3 FT	Sample											23		1					
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-17	RSO-17 (0-3)	0-3 FT	Sample				66														
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-17	RSO-17 (0-3)RE	0-3 FT	Sample	37																	
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-17	RSO-17 (0-3)	0-3 FT	Sample											23		1					
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-18	RSO-18 (0-3)	0-3 FT	Sample				66														
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-18	RSO-18 (0-3)RE	0-3 FT	Sample	37																	
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-18	RSO-18 (0-3)	0-3 FT	Sample											23		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory		WD-C1B	1140-WD-C1B		Sample				67							1		1					

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Plant B	Envirogen	S	10-Oct-00	OU1		AS-1	AS-1-8-10	8-10 ft	Sample	37												1			12		22
Plant B	Envirogen	S	10-Oct-00	OU1		AS-1	AS-1 12-13	12-13 ft	Sample	37			67									1			12		22
Plant B	Envirogen	S	11-Oct-00	OU1		AS-3	AS-3 8-10	8-10 ft	Sample	37												1			12		22
Plant B	Envirogen	S	11-Oct-00	OU1		AS-3	AS-3 10-12	10-12 ft	Sample	37			67									1			12		22
Plant B	Envirogen	S	11-Oct-00	Isolated		AS-3	AS-3 15-16	15-16 ft	Sample													1					22
Plant B	Envirogen	S	12-Oct-00	OU1		AS-2	AS-2-15	15 ft	Sample													1					22
Plant B	Envirogen	S	12-Oct-00	OU1		AS-7	AS-7-8-10	8-10 ft	Sample	37												1			12		22
Plant B	Envirogen	S	12-Oct-00	OU1		AS-7	AS-7-10-12	10-12 ft	Sample	37			67									1			12		22
Plant B	Envirogen	S	13-Oct-00	OU1		AS-5	AS-5-10	10 ft	Sample	37												1			12		22
Plant B	Envirogen	S	16-Oct-00	OU1		AS-4	AS-4-8	8 ft	Sample	37												1			12		22
Plant B	Envirogen	S	16-Oct-00	OU1		AS-8	AS-8-15	15 ft	Sample													1					22
Plant B	Envirogen	S	17-Oct-00	OU1		AS-9	AS-9 S-2 7	7 ft	Sample	37												1			12		22
Plant B	Envirogen	S	17-Oct-00	OU1		AS-9	AS-9 S-2D 7	7 ft	Duplicate	37												1			12		22
Plant B	Envirogen	S	25-Oct-00	OU1		B-10	B-10 S-2	5-6.2 ft bgs	Sample	37												2			12		22
Plant B	Envirogen	S	01-Nov-00	OU1		B-10	TP-1, 6-9`	6-9 ft	Sample	37			67									1			12		22
Plant B	Envirogen	S	01-Nov-00	OU1		B-10	TP-1 5-1 9.5	9.5 ft	Sample	37			67									1			12		22
Plant B	Envirogen	S	01-Nov-00	OU1		B-10	TP-1 S-1DUP 9.5	9.5 ft	Duplicate	37			67									1			12		22
Plant B Spent Carbon	Envirogen	S	16-Feb-01	OU1		SV-460	SV-460 MS/MSD		Sample	63			67									2					
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1		PLD-1	PLD1-5-8	5-8 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1		PLD-2	PLD2-5-8	5-8 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	SS	08-Mar-04	OU1		PLD-3	PLD3-0-4	0-4 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1		PLD-3	PLD3-5-8	5-8 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	S	09-Mar-04	OU1		WSS-2	WSS2-2-4	2-4 ft	Sample			2	3		1							1					
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-1	ECS-1	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-2	ECS-2	10-12 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-3	ECS-3	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-5a	ECS-5	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-4	ECS-4	10-12 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-6	ECS-6	10-12 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-8	ECS-8	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-C-1	ECS-C-1		Sample					74	1			9		8		6					21
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-C-2	ECS-C-2		Sample					72	1		2	9		8		6					21
Part 2 Phase II	MACTEC	SS	08-Mar-04	OU1	51 Eames Street	GW-306	PLD1A-0-4 (GW-306)	0-4 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	SS	08-Mar-04	OU1	51 Eames Street	GW-307	PLD2A-0-4 (GW-307)	0-4 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	S	09-Mar-04	OU1	51 Eames Street	GW-301	WSS1-2-4 (GW-301)	2-4 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	S	09-Mar-04	OU1	51 Eames Street	GW-302	WSS3-2-4 (GW-302)	2-4 ft	Sample			2	3		1							1					
Part 2 Phase II	MACTEC	S	10-Mar-04	OU1	51 Eames Street	GW-303	WSL1-6-10 (GW-303)	6-10 ft	Sample			2			1							1					
Part 2 Phase II	MACTEC	S	10-Mar-04	OU1	51 Eames Street	GW-303	WSL1-6-10 DUP (GW-303)	6-10 ft	Duplicate			2			1							1					
Part 2 Phase II	MACTEC	S	10-Mar-04	OU1	51 Eames Street	GW-304	WSL2-5-9 MS/MSD (GW-304)	5-9 ft	Duplicate			2			1							1					
Part 2 Phase II	MACTEC	S	11-Mar-04	OU1	51 Eames Street	GW-305	WSL3-5-9 (GW-305)	5-9 ft	Sample			2			1							1					
1996 Bedrock Investigation		S	24-Nov-96	Isolated	Adj to Chestnut St along access road to Pumphouse	CB-1	CB-1/35-37'	35-37 FT	Sample				67														
1996 Bedrock Investigation		S	24-Nov-96	Isolated	Adj to Chestnut St along access road to Pumphouse	CB-1	CB-1/35-37'	35-37 FT	Sample	43			67														

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
		S	02-Nov-92	SS Background	Background	BGS-1	BGS-1		Background Sample					50							23	1	1				
		S	02-Nov-92	SS Background	Background	BH41	BH41	10-12 FT	Background Sample					50							23	1	1				
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-015	SS015XXBKX		Background Sample					17							3	4					
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-016	SS016XXBKX		Background Sample					17							3	4					
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-017	SS017XXBKD		Background Duplicate					17							3	4					
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-017	SS017XXBKX		Background Sample					17							3	4					
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-018	SS018XXBKX		Background Sample					17							3	4					
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-019	SS019XXBKX		Background Sample					17							3	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-101	SS101XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-103	SS103XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-104	SS104XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-105	SS105XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	01-Dec-98	SS Background	Background	SSBK-102	SS102XXBKX		Background Sample												1	1					
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-1	BP-1		Sample					67				22			6	1					
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-2	BP-2		Sample					67				22			6	1					
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-3	BP-3		Sample					67				22			6	1					
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-4	BP-4		Sample					67				22			6	1					
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS1		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS2		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS3		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS4		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS5		Sample				3	68		1						1		1			
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS1-02		Sample				3	68		1						2		1			
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS2-02		Sample				3	68		1						2		1			
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS3-02		Sample				3	68		1						2		1			
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS4-02		Sample				3	68		1						2		1			
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS5-02		Sample				3	68		1						2		1			
CRA, 1991	CRA	SS	30-Jul-91	Excavated	Buried Debris Area	SWMU-27	SWMU-27		Sample	36				65				21	7		23		4	1			
CRA, 1991	CRA	SS	30-Jul-91	Excavated	Buried Debris Area	SWMU-27	SWMU-27		Sample													2		1			

Table 2.1-2
Soil Samples Collected To Date - By Area

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Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons	
	CRA	SS	22-Apr-93	Excavated	Buried Debris Area	SWMU-27	SWMU-27		Sample												2		1					
Soil Sampling 1998	HLA	SS	23-Nov-98	Excavated	Buried Debris Area	SWMU-27-102	SS102XX27X		Sample	64			67								23		4					
Soil Sampling 1998	HLA	SS	23-Nov-98	Excavated	Buried Debris Area	SWMU-27-103	SS103XX27X		Sample	64			67								23		4					
Soil Sampling 1998	HLA	SS	30-Nov-98	Excavated	Buried Debris Area	SWMU-27-102	SS102XX27X		Sample	62																		
Soil Sampling 1998	HLA	SS	30-Nov-98	Excavated	Buried Debris Area	SWMU-27-103	SS103XX27X		Sample	62																		
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C1	1120-BD-C1		Sample	64			67				19				8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C2	1120-BD-C2		Sample	64			67				19				8		1					
C-RAM	GEI	SS	10-Oct-00	Confirmatory	Buried Debris Area	BD-C3	1120-BD-C3		Sample	64			67				19				8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C4	1120-BD-C4		Sample	64			67				19				8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C5	1120-BD-C5		Sample	64			67				19				8		1					
C-RAM	GEI	SS	10-Oct-00	Confirmatory	Buried Debris Area	BD-C6	1120-BD-C6		Sample	64			67				19				8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C11	1120-BD-C11		Sample	64			67				19				8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C12	1120-BD-C12		Sample	64			67				19				8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C14	1120-BD-C14		Sample	64			67				19				8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C14	1120-BD-C14-D		Duplicate	64			67				19				8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C15	1120-BD-C15		Sample	64			67				19				8		1					
C-RAM	GEI	S	11-Oct-00	Excavated	Buried Debris Area	BD-C8	1120-BD-C8		Sample	64			67				19				8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C9	1120-BD-C9		Sample	64			67				19				8		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C10	1120-BD-C10		Sample				67				19				8		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C10	1120-BD-C10		Sample	64													1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C13	1120-BD-C13		Sample				67				19				8		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C13	1120-BD-C13		Sample	64													1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C7	1120-BD-C7		Sample				67				19				8		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C7	1120-BD-C7		Sample	64													1					
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C18	1120-BD-C18		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C19	1120-BD-C19		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C20	1120-BD-C20		Sample	64			67				19				8		1					
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C21	1120-BD-C21		Sample	64			67				19				8		1					
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C22	1120-BD-C22		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C23	1120-BD-C23		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C24	1120-BD-C24		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C25	1120-BD-C25		Sample	64			67				19				8		1					
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C26	1120-BD-C26		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C28	1120-BD-C28		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C29	1120-BD-C29		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C30	1120-BD-C30		Sample	64			67				19				8		1					
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C31	1120-BD-C31		Sample	64			67				19				8		1					
C-RAM	GEI	SS	27-Oct-00	Excavated	Buried Debris Area	BD-C33	1120-BD-C33		Sample	64			67				19				8		1					
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C34	1120-BD-C34		Sample	64			67				19				8		1					
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C35	1120-BD-C35		Sample	64			67				19				8		1					
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C50	1140-BD-C50		Sample				67										1					
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C50	1140-BD-C50		Sample	64																		
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C50	1140-BD-C50		Sample												1							
C-RAM	GEI	SS	19-May-01	Confirmatory	Buried Debris Area	BD-C51	1140-BD-C51		Sample				67										1					
C-RAM	GEI	SS	19-May-01	Confirmatory	Buried Debris Area	BD-C51	1140-BD-C51		Sample	64																		
C-RAM	GEI	SS	19-May-01	Confirmatory	Buried Debris Area	BD-C51	1140-BD-C51		Sample												1							
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C52	1140-BD-C52		Sample				67										1					
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C52	1140-BD-C52		Sample	64																		

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons	
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C52	1140-BD-C52		Sample												1							
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C53	1140-BD-C53		Sample					67								1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C53	1140-BD-C53		Sample	64																		
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C53	1140-BD-C53		Sample												1							
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C54	1140-BD-C54		Sample					67								1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C54	1140-BD-C54		Sample	64																		
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C54	1140-BD-C54		Sample												1							
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55		Sample					67								1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55D		Sample					67								1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55		Sample	64																		
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55		Sample												1							
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55D		Sample	64																		
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55D		Sample												1							
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1	Calcium Sulfate Landfill	CSL-1	CSL1-4-6	4-6 ft	Sample			2	3			1						1						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-1	CS GPS-1	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-11	CS GPS-11	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-13	CS GPS-13	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-15	CS GPS-15	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-17	CS GPS-17	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-19	CS GPS-19	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-21	CS GPS-21	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-21	CS GPS-21DUP	0-1 ft	Duplicate													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-23	CS GPS-23	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-25	CS GPS-25	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-27	CS GPS-27	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-29	CS GPS-29	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-3	CS GPS-3	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-5	CS GPS-5	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-7	CS GPS-7	0-1 ft	Sample													2						
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-9	CS GPS-9	0-1 ft	Sample													2						
CRA, 1991	CRA	SS	09-Jul-91	Excavated	Central Pond	AREA-8	AREA 08		Sample	36				65				21	7		23		4	1				

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons	
	SMITH	SS	16-Dec-96	Excavated	Central Pond	A8CW-1	A8CW-1		Sample	36			65				21			1		2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	AREA-8-4	AREA8-4		Sample	36			65				21			1		2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-6	CPDA-6		Sample	36			65				21			1		2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-7	CPDA-7		Sample	36			65				21			1		2						
	SMITH	SS	16-Dec-96	OU1	Central Pond	CPDA-8	CPDA-8		Sample	36			65				21			23		2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-9	CPDA-9		Sample	36			65				21			23		2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-9	CPDA-9		Duplicate	36			65				21			1		2						
C-RAM	GEI	SS	02-Oct-00	Excavated	Central Pond	CP-C10	1140-CP-C10		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C11	1140-CP-C11		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C12	1140-CP-C12		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C13	1140-CP-C13-D		Duplicate	64			67				19			8		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C13	1140-CP-C13		Sample	64			67				19			8		1						
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C14	1140-CP-C14		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C15	1140-CP-C15		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C16	1140-CP-C16		Sample	64			67				19			8		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C17	1140-CP-C17		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C18	1140-CP-C18		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C19	1140-CP-C19		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C20	1140-CP-C20		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C21	1140-CP-C21		Sample	64			67				19			8		1						
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C22	1140-CP-C22		Sample				67							1		1						
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C24	1140-CP-C24		Sample				67							1		1						
C-RAM	GEI	SS	02-Oct-00	Excavated	Central Pond	CP-C9	1140-CP-C9		Sample				67							1		1						
C-RAM	GEI	SS	05-Oct-00	Excavated	Central Pond	CP-C25	1140-CP-C25		Sample	64			67				19			8		1						
C-RAM	GEI	SS	05-Oct-00	Confirmatory	Central Pond	CP-C26	1140-CP-C26		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C27	1140-CP-C27		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C28	1140-CP-C28		Sample	64			67				19			8		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C29	1140-CP-C29		Sample				67							1		1						
C-RAM	GEI	SS	05-Oct-00	Confirmatory	Central Pond	CP-C30	1140-CP-C30		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C31	1140-CP-C31		Sample	64			67				19			8		1						
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C32	1140-CP-C32		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C33	1140-CP-C33		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C34	1140-CP-C34		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C35	1140-CP-C35		Sample	64			67				19			8		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C36	1140-CP-C36		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C37	1140-CP-C37		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C38	1140-CP-C38		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C39	1140-CP-C39		Sample	64			67				19			8		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C40	1140-CP-C40		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C41	1140-CP-C41		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C42	1140-CP-C42		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C43	1140-CP-C43		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C44	1140-CP-C44		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C45	1140-CP-C45		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C46	1140-CP-C46		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C47	1140-CP-C47		Sample	64			67				19			8		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C48	1140-CP-C48		Sample				67							1		1						
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C49	1140-CP-C49		Sample	64			67				19			8		1						

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C50	1140-CP-C50		Sample					67							1	1					
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C51	1140-CP-C51		Sample					67							1	1					
C-RAM	GEI	S	09-Oct-00	Confirmatory	Central Pond	CP-C52	1140-CP-C52		Sample					67							1	1					
C-RAM	GEI	S	09-Oct-00	Confirmatory	Central Pond	CP-C53	1140-CP-C53		Sample					67							1	1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C54	1140-CP-C54		Sample					67							1	1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C55	1140-CP-C55		Sample					67							1	1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C56	1140-CP-C56		Sample	64				67				19			8	1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C57	1140-CP-C57		Sample					67							1	1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C58	1140-CP-C58		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C59	1140-CP-C59		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C60	1140-CP-C60		Sample	64				67				19			8	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C61	1140-CP-C61		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C62	1140-CP-C62		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C64	1140-CP-C64		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C65	1140-CP-C65		Sample	64				67				19			8	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C66	1140-CP-C66		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C67	1140-CP-C67		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C68	1140-CP-C68		Sample					67							1	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C69	1140-CP-C69		Sample	64				67				19			8	1					
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C70	1140-CP-C70		Sample					67							1	1					
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C71	1140-CP-C71		Sample												1	1					
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C72	1140-CP-C72		Sample												1	1					
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C73	1140-CP-C73		Sample												1	1					
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C74	1140-CP-C74		Sample												1	1					
C-RAM	GEI	S	18-Nov-00	Confirmatory	Central Pond	CP-C75	1140-CP-C75		Sample												1	1					
C-RAM	GEI	S	18-Nov-00	Confirmatory	Central Pond	CP-C76	1140-CP-C76		Sample												1	1					
C-RAM	GEI	S	01-Dec-00	Confirmatory	Central Pond	CP-C77	1160-CP-C77		Sample												1	1					
C-RAM	GEI	SS	09-May-01	Confirmatory	Central Pond	CP-C78	1140-CP-C78		Sample					66							1	1					
C-RAM	GEI	S	09-May-01	Excavated	Central Pond	CP-C79	1140-CP-C79		Sample					66							1	1					
C-RAM	GEI	S	09-May-01	Confirmatory	Central Pond	CP-C80	1140-CP-C80		Sample	64				66							7	1					
C-RAM	GEI	S	09-May-01	Confirmatory	Central Pond	CP-C81	1140-CP-C81		Sample					66							1	1					
C-RAM	GEI	S	09-May-01	Confirmatory	Central Pond	CP-C82	1140-CP-C82		Sample					66							1	1					
C-RAM	GEI	SS	09-May-01	Confirmatory	Central Pond	CP-C83	1140-CP-C83		Sample					66							1	1					
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C84	1140-CP-C84		Sample	64				67							7	1					
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C85	1140-CP-C85		Sample					67							1	1					
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C86	1140-CP-C86		Sample					67							1	1					
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C87	1140-CP-C87		Sample	64				67							7	1					
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C88	1140-CP-C88		Sample					67							1	1					
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C89	1140-CP-C89		Sample					67							1	1					
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C90	1140-CP-C90		Sample	64											7	1					
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C91	1140-CP-C91		Sample					67							1	1					
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C92	1140-CP-C92		Sample					67							1	1					
C-RAM	GEI	S	17-May-01	Confirmatory	Central Pond	CP-C79B	1140-CP-C79B		Sample												1	1					
Central Pond Test Pits	GEI	SS	18-Sep-01	Excavated	Central Pond	CP-TP14	1010-CP-TP14 MS/MSD		Sample										7		8	1					22
Central Pond Test Pits	GEI	SS	18-Sep-01	OU1	Central Pond	CP-TP15	1010-CP-TP15		Sample										7		8	1					22

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Olin Chemical Superfund Site
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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Central Pond Test Pits	GEI	SS	18-Sep-01	OU1	Central Pond	CP-TP19	1010-CP-TP19		Sample										7		8	1					22
Central Pond Test Pits	GEI	SS	18-Sep-01	OU1	Central Pond	CP-TP8	1010-CP-TP8		Sample										7		8	1					22
Central Pond Excavation	GEI	S	27-Aug-03	Confirmatory	Central Pond	CP-EX1	1170-CPEX1-BOT		Sample												8	1					22
Central Pond Excavation	GEI	S	27-Aug-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-BOT		Sample												8	1					22
Central Pond Excavation	GEI	S	27-Aug-03	Confirmatory	Central Pond	CP-EX3	1170-CPEX3-BOT		Sample												8	1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX1	1170-CPEX1-SIDE123		Sample												8	1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX1	1170-CPEX1-SIDE4		Sample												8	1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-SIDE123		Sample												8	1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-SIDE4		Sample												8	1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX3	1170-CPEX3-SIDE123		Sample												8	1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX3	1170-CPEX3-SIDE4		Sample												8	1					22
Central Pond Excavation	GEI	S	10-Oct-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-Side1		Sample													1					22
Central Pond Excavation	GEI	S	10-Oct-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-Side2		Sample													1					22
Central Pond Excavation	GEI	S	10-Oct-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-Side3		Sample													1					22
1996 Bedrock Investigation		S	25-Nov-96	Isolated	Chestnut St on access road to Pumphouse	CB-2	CB-2/44-49	44-49 FT	Sample	43																	
1996 Bedrock Investigation		S	25-Nov-96	Isolated	Chestnut St on access road to Pumphouse	CB-2	CB-2/44-49	44-49 FT	Sample				67														
1996 Bedrock Investigation		S	18-Nov-96	Isolated	Chestnut St on access road to Pumphouse, N of CB-2	CB-3	CB-3/63'	63 FT	Sample				67														
1996 Bedrock Investigation		S	18-Nov-96	Isolated	Chestnut St on access road to Pumphouse, N of CB-2	CB-3	CB-3/63'	63 FT	Sample	43			67														
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH1	BH01	6-8 FT	Sample	36			65				20	7		23		5	1				
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH2	BH02	6-8 FT	Sample	36			65				20	7		23		5	1				
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH3	BH03	6-8 FT	Sample	36			65				20	7		23		5	1				
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH4	BH04	6-8 FT	Sample	36			65				20	7		23		5	1				
CRA, 1991	CRA	S	06-Jun-91	OU1	Containment Area	BH5	BH05	6-8 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	06-Jun-91	OU1	Containment Area	BH6	BH06	4-6 FT	Sample	36			65				20	7		23		4	1				

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
CRA, 1991	CRA	S	06-Jun-91	OU1	Containment Area	BH7	BH07	4-6 FT	Sample	36				65				20	7		23		5	1			
CRA, 1991	CRA	S	07-Jun-91	OU1	Containment Area	BH10	BH10	4-6 FT	Sample	36				65				20	7		23		4	1			
CRA, 1991	CRA	S	07-Jun-91	OU1	Containment Area	BH8	BH08	4-6 FT	Sample	36				65				20	7		23		4	1			
CRA, 1991	CRA	S	07-Jun-91	OU1	Containment Area	BH9	BH09	4-6 FT	Sample	36				65				20	7		23		4	1			
CRA, 1991	CRA	SS	08-Jul-91	Excavated	Containment Area	AREA-1	AREA 01		Sample	36				65				21	7		23		4	1			
CRA, 1991	CRA	SS	09-Jul-91	Excavated	Containment Area	AREA-2	AREA 02		Sample	36				65				21	7		23		4	1			
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1	AREA 1(COMP)		Sample					65				21			23		2	1			
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-1	AREA 1-1		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-2	AREA 1-2		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-4	AREA 1-4		Sample	36														1			
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-5	AREA 1-5		Sample	36														1			
	SMITH	SS	16-Dec-96	OU1	Containment Area	CPDA-1	CPDA-1		Sample	36				65				21			1		2					
	SMITH	SS	16-Dec-96	OU1	Containment Area	CPDA-2	CPDA-2		Sample	36				65				21			1		2					
	SMITH	SS	16-Dec-96	Excavated	Containment Area	CPDA-3	CPDA-3		Sample	36				65				21			1		2					
	SMITH	SS	16-Dec-96	Excavated	Containment Area	CPDA-4	CPDA-4		Sample	36				65				21			1		2					
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	Containment Area	BS017	BS017PND		Sample					65				21			23							
Soil Pesticide Sampling	LAW	SS	04-Nov-99	Excavated	Containment Area	WD-2	WD 2 (West Ditch 2)		Sample									1					1					
Jan2000	HLA	S	24-Jan-00	OU1	Containment Area	CPDA-1-A	CPD-1-A (0-3 FT)	0-3 FT	Sample												22		1					
Jan2000	HLA	SS	24-Jan-00	Excavated	Containment Area	RSO-14	RSO-14-S1 (0-3)	0-3 FT	Sample	37				66														
Jan2000	HLA	SS	24-Jan-00	Excavated	Containment Area	RSO-14	RSO-14-S1 (0-3 FT)	0-3 FT	Sample												22		1					
Jan2000	HLA	SS	24-Jan-00	OU1	Containment Area	RSO-15	RSO-15-S1 (0-3)	0-3 FT	Sample	37				66														
Jan2000	HLA	SS	24-Jan-00	OU1	Containment Area	RSO-15	RSO-15-S1 (0-3 FT)	0-3 FT	Sample												22		1					
C-RAM	GEI	SS	13-Oct-00	OU1	Containment Area	OSFILL-450	1130-OSFILL-450		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	13-Oct-00	OU1	Containment Area	OSFILL-550	1130-OSFILL-550		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1120	1130-OSFILL-1120		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1170	1130-OSFILL-1170		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1220	1130-OSFILL-1220		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1220	1130-OSFILL-1220 D		Duplicate	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-400	1130-OSFILL-400		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-460	1130-OSFILL-460		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-530	1130-OSFILL-530		Sample	64				67					7		8		1					5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-600	1130-OSFILL-600		Sample	64				67					7		8		1					5
	SMITH	SS	15-Dec-96	Excavated	Containment Wall	AREA-1-3	AREA 1-3		Sample	36														1				
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-B	1160-A8CW-1-B		Sample					67				19			3		1					
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-E	1160-A8CW-1-E		Sample					67				19			3		1					
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-N	1160-A8CW-1-N		Sample					67				19			3		1					
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-S	1160-A8CW-1-S		Sample					67				19			3		1					
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-W	1160-A8CW-1-W		Sample					67				19			3		1					
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-B	1160-RS0-06-B		Sample	1				66				19			3		1					
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-E	1160-RS0-06-E		Sample					67				19			3		1					
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-N	1160-RS0-06-N		Sample					67				19			3		1					
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-S	1160-RS0-06-S		Sample					67				19			3		1					
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-W	1160-RS0-06-W		Sample					67				19			3		1					
	SMITH	SS	16-Dec-96	Excavated	Detention Pond	AREA-8-1	AREA8-1		Sample	36				65				21			23		2					
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	DRMA-COMP-A	DRMA(COMP A)		Sample					65				21			23		2					
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	DRMA-COMP-B	DRMA(COMP B)		Sample					65				21			23		2					
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA1-DRMA	GA1-DRMA		Sample	36																		

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA2-DRMA	GA2-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA3-DRMA	GA3-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA4-DRMA	GA4-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB1-DRMA	GB1-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB2-DRMA	GB2-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB3-DRMA	GB3-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB4-DRMA	GB4-DRMA		Sample	36																	
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C10	1120-DA-C10		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C11	1120-DA-C11		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C12	1120-DA-C12		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C13	1120-DA-C13		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C14	1120-DA-C14		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C15	1120-DA-C15		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C16	1120-DA-C16		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C17	1120-DA-C17		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C18	1120-DA-C18		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C19	1120-DA-C19		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C2	1120-DA-C2		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C20	1120-DA-C20		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C21	1120-DA-C21		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C22	1120-DA-C22		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C23	1120-DA-C23		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C24	1120-DA-C24		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C3	1120-DA-C3		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C4	1120-DA-C4		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C5	1120-DA-C5		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C6	1120-DA-C6		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C7	1120-DA-C7		Sample	64			67				19			3	1					
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C8	1120-DA-C8		Sample	64			67				19			3	1					
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C9	1120-DA-C9		Sample	64			67				19			3	1					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C25	1120-DA-C25		Sample	64			67				19			3	2					
D-RAM	GEI	SS	29-Sep-00	Confirmatory	Drum Area A	DA-C26	1120-DA-C26		Sample	64			67				19			3	2					
D-RAM	GEI	SS	29-Sep-00	Confirmatory	Drum Area A	DA-C27	1120-DA-C27		Sample	64			67				19			3	2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C28	1120-DA-C28		Sample	64			67				19			3	2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C29	1120-DA-C29		Sample	64			67				19			3	2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C29	1120-DA-C29-D		Duplicate	64			67								2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C30	1120-DA-C30		Sample	64			67				19			3	2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C31	1120-DA-C31		Sample	64			67				19			3	2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C32	1120-DA-C32		Sample	64			67				19			3	2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C33	1120-DA-C33		Sample	64			67				19			3	2					
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C34	1120-DA-C34		Sample	64			67				19			3	2					
D-RAM	GEI	S	07-Oct-00	Confirmatory	Drum Area A	DA-C35	1120-DA-C35		Sample	64			67				19			3	2					
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	DRMB-COMP	DRMB-(COMP)		Sample				65				21			23	2					
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G1-DRMB	G1-DRMB		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G2-DRMB	G2-DRMB		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G3-DRMB	G3-DRMB		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G4-DRMB	G4-DRMB		Sample	36																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C1	DB-C1		Sample	64																	

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C1	DB-C1		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C10	DB-C10		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C10	DB-C10		Sample					67				22			3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C11	DB-C11		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C11	DB-C11		Sample					66				22			3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C12	DB-C12		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C12	DB-C12		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C13	DB-C13		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C13	DB-C13		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Excavated	Drum Area B	DB-C14	DB-C14		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Excavated	Drum Area B	DB-C14	DB-C14		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C15	DB-C15		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C15	DB-C15		Sample					67				22			3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C16	DB-C16		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C16	DB-C16		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C2	DB-C2		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C2	DB-C2		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C3	DB-C3		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C3	DB-C3		Sample					67				22			3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C4	DB-C4		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C4	DB-C4		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C5	DB-C5		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C5	DB-C5		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C6	DB-C6		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C6	DB-C6		Sample					67				22			3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C7	DB-C7		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C7	DB-C7		Sample					67				22			3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C8	DB-C8		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C8	DB-C8		Sample					67				22			3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C9	DB-C9		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C9	DB-C9		Sample					67				22			3		1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH12	BH12	4-6 FT	Sample	36				65				20	7		23		4	1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH14	BH14	4-6 FT	Sample	36				65				20	7		23		4	1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH16	BH16	4-6 FT	Sample	36				65				20	7		23		4	1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH17	BH17	8-10 FT	Sample	36				65				20	7		23		4	1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH18	BH18	4-6 FT	Sample	36				65				20	7		23		4	1			
	SMITH	S	18-Jan-95	Excavated	Lake Poly	LPB-1	LPB-1(4-6)	4-6 FT	Sample	35				64							23		3	1			
	SMITH	S	18-Jan-95	Excavated	Lake Poly	LPB-1	LPB-1(6-8)	6-8 FT	Sample	36				64							22		3	1			
		S	18-Jan-95	OU1	Lake Poly	LPB-2	LPB-2(7-8)	7-8 FT	Sample	36				64							23		3	1			
		S	18-Jan-95	OU1	Lake Poly	LPB-2	LPB-2(8-9)	8-9 FT	Sample	36				64							23		3	1			
	SMITH	SS	15-Dec-96	Excavated	Lake Poly	LAKE POLY-1	LAKE POLY-1		Sample	36				65				21			23		2				
	SMITH	SS	15-Dec-96	OU1	Lake Poly	LAKE POLY-2	LAKE POLY-2		Sample	36				65				21			23		2				
	SMITH	SS	15-Dec-96	OU1	Lake Poly	LAKE POLY-2	LAKE POLY-2		Duplicate	36				65				21			23		2				
	SMITH	SS	15-Dec-96	OU1	Lake Poly	LAKE POLY-3	LAKE POLY-3		Sample	36				65				21			23		2				
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-101	SB101XXLPX	6-8 FT	Sample												2		4				
Lake Poly	HLA	SS	24-Nov-98	Excavated	Lake Poly	LP-102	SS101XXLPX	0-2 FT	Sample												2		4				
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-102	SS102XXLPX	0-2 FT	Sample												2		4				
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-102	SB102XXLPX	6-8 FT	Sample												2		4				

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-103	SS103XXLPX	0-2 FT	Sample											2		4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-103	SS103XXLPX	0-2 FT	Matrix Spike Duplicate											2		4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-103	SS103XXLPD	0-2 FT	Duplicate											2		4					
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-103	SB103XXLPX	6-8 FT	Sample											2		4					
Lake Poly	HLA	SS	24-Nov-98	Excavated	Lake Poly	LP-104	SS104XXLPX	0-2 FT	Sample											2		4					
Lake Poly	HLA	S	24-Nov-98	Excavated	Lake Poly	LP-104	SB104XXLPX	6-8 FT	Sample											2		4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-105	SS105XXLPX	0-2 FT	Sample											2		4					
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-105	SB105XXLPX	6-8 FT	Sample											2		4					
Lake Poly	HLA	SS	30-Nov-98	Excavated	Lake Poly	LP-101	101A	0-2 FT	Sample											2		1					
Lake Poly	HLA	S	30-Nov-98	OU1	Lake Poly	LP-101	101B	6-8 FT	Sample											2		1					
Lake Poly	HLA	SS	30-Nov-98	OU1	Lake Poly	LP-102	102A	0-2 FT	Sample											2		1					
Lake Poly	HLA	S	30-Nov-98	OU1	Lake Poly	LP-102	102B	6-8 FT	Sample											2		1					
Lake Poly	HLA	SS	30-Nov-98	Excavated	Lake Poly	LP-104	104A	0-2 FT	Sample											2		1					
Lake Poly	HLA	S	30-Nov-98	Excavated	Lake Poly	LP-104	104B	6-8 FT	Sample											2		1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1	Lake Poly	LP-1	LP 1 (Lake Poly 1)		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1	Lake Poly	LP-2	LP 2 (Lake Poly 2)		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1	Lake Poly	LP-2	Duplicate		Duplicate								1					1					
C-RAM	GEI	S	17-Nov-00	OU1	Lake Poly	LAKE POLY 1-B	1160-LAKE POLY 1-B		Sample	64			67				19			3		1					
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-E	1160-LAKE POLY 1-E		Sample	64			66				19			3		1					
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-N	1160-LAKE POLY 1-N		Sample	64			67				19			3		1					
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-S	1160-LAKE POLY 1-S		Sample	64			67				19			3		1					
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-W	1160-LAKE POLY 1-W		Sample	64			67				19			3		1					
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-01	1160-LAKEPOLY1-01		Sample	64												1					
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-01	1160-LAKEPOLY1-01		Sample				66							3		2					
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-02	1160-LAKEPOLY1-02		Sample	64												1					
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-02	1160-LAKEPOLY1-02		Sample				66							3		2					
C-RAM	GEI	SS	09-Jul-01	Excavated	Lake Poly	LPB11	1160-LPB11-S1		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	Excavated	Lake Poly	LPB11	1160-LPB11-S2		Sample											1		2					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB11	1160-LPB11-S3		Sample											1		1					
C-RAM	GEI	SS	09-Jul-01	Excavated	Lake Poly	LPB13	1160-LPB13-S1		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB13	1160-LPB13-S2		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB13	1160-LPB13-S3		Sample											1		1					
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB17	1160-LPB17-S1		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB17	1160-LPB17-S2		Sample											1		1					
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB19	1160-LPB19-S1		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB19	1160-LPB19-S2		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB19	1160-LPB19-S3		Sample											1		1					
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB3	1160-LPB3-S1		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB3	1160-LPB3-S2		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB3	1160-LPB3-S3		Sample											1		1					
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB9	1160-LPB9-S1		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB9	1160-LPB9-S2		Sample											1		1					
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB9	1160-LPB9-S3		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample											1		1					

Table 2.1-2
Soil Samples Collected To Date - By Area

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample												1		2				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2-D		Duplicate					67				19			3		2				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S3		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S1		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample												1		2				
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample									19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample													1					
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S2		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample													1					
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1 RX (178582)		Sample					67									1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample													1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S1		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S2		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S2		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S3		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB4	1160-LPB4-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB4	1160-LPB4-S2		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB4	1160-LPB4-S3		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample													1					

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Soil Samples Collected To Date - By Area

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample											1		1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample				67				19	7		7		7					22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample												1						
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB6	1160-LPB6-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB6	1160-LPB6-S2		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB6	1160-LPB6-S2		Sample												1						
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S1		Sample				67				19			3		2					22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S1		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample											1		1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample													2					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S1		Sample				67				19			3		2					22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S1		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample											1		2					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample				67				19	7		7		7					22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample												1						
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S3		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB1	1160-LPB1-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB1	1160-LPB1-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3 RX (178578)		Sample				67									1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1		Sample								19			3		2					22
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1		Sample	64															12		
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1 RX (178762)		Sample				67									1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample				67				19			3		2					22
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample													2					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample	64															12		
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB2	1160-LPB2-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB2	1160-LPB2-S2		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB22	1160-LPB22-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB22	1160-LPB22-S2		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB23	1160-LPB23-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB23	1160-LPB23-S2		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB24	1160-LPB24-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB24	1160-LPB24-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB24	1160-LPB24-S3		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB25	1160-LPB25-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB25	1160-LPB25-S2		Sample											1		2					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB25	1160-LPB25-S3		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB26	1160-LPB26-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB26	1160-LPB26-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB26	1160-LPB26-S3		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB27	1160-LPB27-S1		Sample											1		1					

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB27	1160-LPB27-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB27	1160-LPB27-S3		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB 28-S1		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S1		Sample				67				19			3		2					22
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S1		Sample	64															12		
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB 28-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S2		Sample				67				19			3		2					22
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S2		Sample													2					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S2		Sample	64															12		
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB 28-S3		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample				67				19			3		2					22
C-RAM	GEI	SS	12-Jul-01	Excavated	Lake Poly	LPB29	1160-LPB 29-S1		Sample											1		1					
C-RAM	GEI	S	12-Jul-01	Excavated	Lake Poly	LPB29	1160-LPB 29-S2		Sample											1		2					
C-RAM	GEI	S	12-Jul-01	Excavated	Lake Poly	LPB29	1160-LPB29-S2		Sample												1						
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB29	1160-LPB 29-S3		Sample											1		1					
C-RAM	GEI	SS	12-Jul-01	Excavated	Lake Poly	LPB30	1160-LPB 30-S1		Sample											1		1					
C-RAM	GEI	S	12-Jul-01	Excavated	Lake Poly	LPB30	1160-LPB 30-S2		Sample											1		2					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB30	1160-LPB 30-S3		Sample											1		1					
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB31	1160-LPB 31-S1		Sample											1		1					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB31	1160-LPB 31-S2		Sample											1		1					
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB32	1160-LPB 32-S1		Sample											1		1					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB32	1160-LPB 32-S2		Sample											1		1					
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB 33-S1		Sample											1		1					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB 33-S2		Sample											1		1					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB33-S2		Sample												1						
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB 33-S3		Sample											1		1					
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB34	1160-LPB 34-S1		Sample											1		1					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB34	1160-LPB 34-S2		Sample											1		1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-40	LPB-40-OVR	0-2.9 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-40	LPB-40-VI	5-10 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-40	LPB-40-BLW	10-11 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-41	LPB-41-OVR	0-1.5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-41	LPB-41-VI	1.5-3.5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-41	LPB-41-BLW	5-9.5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-42	LPB-42-OVR	0-3.5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-42	LPB-42-VI	3.5-5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-42	LPB-42-BLW	9-10 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-43	LPB-43-OVR	1-3.5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-43	LPB-43-VI	3.5-5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-43	LPB-43-BLW	8.7-10 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-48	LPB-48-OVR	2.5-5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-48	LPB-48-VI	5-8 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-48	LPB-48-BLW	8-10 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-50	LPB-50-OVR	2.5-5 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-50	LPB-50-VI	7.5-8.4 ft bgs	Sample			2	3		1							1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-50	LPB-50-BLW	8.4-10 ft bgs	Sample			2	3		1							1					

Table 2.1-2
Soil Samples Collected To Date - By Area

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-BOT-A	LP-BOT-A	7.5-9.0	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-BOT-B	LP-BOT-B	7.0-9.0	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-BOT-C	LP-BOT-C	5.0-9.0	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Excavated	Lake Poly	LP-C01	LP-C01	5.5-7.5	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C02	LP-C02	5.0-6.5	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C03	LP-C03	5.0-7.0	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C04	LP-C04	5.0-7.0	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C05	LP-C05	4.5-5.5	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C06	LP-C06	4.0-6.0	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C07	LP-C07	4.5-6.5	Sample											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C07	LP-C07D	4.5-6.5	Duplicate											1		2					
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C08	LP-C08	5.0-7.0	Sample											1		2					

Table 2.1-2
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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lake Poly Confirmatory Samples/Excavation	GEI	S	15-Jun-04	Confirmatory	Lake Poly	LP-C09	LP-C09	5.5-7.5 ft bgs	Sample												1	2					
1996 Bedrock Investigation	ABB-ES	S	08-Oct-96	Maple Meadow Brook	Leo Property (North of Garden)	MB-2	MB-2		Sample												23	3					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS040	BS040LSD RE	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS040	BS040LSD	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSD	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSD-DUP	0-0.5 ft	Duplicate					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSDRE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSD-DUPRE	0-0.5 ft	Duplicate					68								1					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS042	BS042LSD	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS042	BS042LSDRE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS043	BS043LSD RE	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS043	BS043LSD	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS044	BS044LSD	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS044	BS044LSD RE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS045	BS045LSD	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS045	BS045LSD RE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD17	SOLSD-17-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD17	SOLSD-17-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD18	SOLSD-18-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD18	SOLSD-18-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD18	SOLSD-18-12-18	1-1.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD19	SOLSD-19-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD19	SOLSD-19-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD20	SOLSD-20-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD20	SOLSD-20-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD21	SOLSD-21-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD22	SOLSD-22-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD23	SOLSD-23-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD01	SOLSD-1-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD02	SOLSD-2-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD03	SOLSD-3-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD04	SOLSD-4-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD05	SOLSD-5-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD06	SOLSD-6-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD06	SOLSD-6-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD06	SOLSD-6-12-18	1-1.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD07	SOLSD-7-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD07	SOLSD-7-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD08	SOLSD-8-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD09	SOLSD-9-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD10	SOLSD-10-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-6-12-D	0.5-1 ft	Duplicate												1	1					

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-12-18	1-1.5 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD12	SOLSD-12-0-6	0-0.5 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD12	SOLSD-12-0-6-D	0-0.5 ft	Duplicate												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD13	SOLSD-13-0-6	0-0.5 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD13	SOLSD-13-6-12	0.5-1 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD13	SOLSD-13-12-18	1-1.5 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD14	SOLSD-14-0-6	0-0.5 ft	Sample												2		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD14	SOLSD-14-6-12	0.5-1 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD15	SOLSD-15-0-6	0-0.5 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD16	SOLSD-16-0-6	0-0.5 ft	Sample												1		1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-02	BS021REF-02 ( )	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-02	BS021REF-02 ( )RE	0-0.5 ft	Sample					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-03	BS021REF-03 ( )	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-03	BS021REF-03 ( )RE	0-0.5 ft	Sample					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-04	BS021REF-04 ( )	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-04	BS021REF-04 ( )RE	0-0.5 ft	Sample					68									1				
North Pond	MACTEC	SS	20-Nov-03	North Pond	North Pond	NPSB1	NPSB1-Fill1	0-2 ft	Sample												8		2				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB1	NPSB1-SED1	6-7.5 ft	Sample	75				68		1		19		11	8		6				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB1	NPSB1-SOIL1	9-11 ft	Sample	75													6				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB2	NPSB2-Fill1	2-3 ft	Sample												8		2				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB3	NPSB3-Fill1	2-4 ft	Sample												8		2				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB3	NPSB3-SED1	9.4-10.4 ft	Sample	75				68		1		19			8		6				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB3	NPSB3-SOIL1	10.4-12 ft	Sample	75													6				
North Pond	MACTEC	SS	08-Sep-04	North Pond	North Pond	NPSB4	NPSB4-Fill	0-2 ft	Sample	75				68		1		21		11	7		5				
North Pond	MACTEC	S	08-Sep-04	North Pond	North Pond	NPSB4	NPSB4-Sed	5-7 ft	Sample	75				68		1		21		11	7		5				
North Pond	MACTEC	S	08-Sep-04	North Pond	North Pond	NPSB4	NPSB4-Soil	10-11.5 ft	Sample	75				68		1		21		11	7		5				
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-06-01	0 - 0.5 ft bgs	Sample												22		3				
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-C12-01	0 - 1.0 ft bgs	Sample	68				65		1							1				
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-12-01	0.5 - 1.0 ft bgs	Sample												22		3				
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-18-01	1.0 - 1.5 ft bgs	Sample												22		3				
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-C36-01	1.0 - 3.0 ft bgs	Sample	68				65		1							1				
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-24-01	1.5 - 2.0 ft bgs	Sample												22		3				
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-30-01	2.0 - 2.5 ft bgs	Sample												22		3				
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-36-01	2.5 - 3.0 ft bgs	Sample												22		3				

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-06-01	0 - 0.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-C12-01	0 - 1.0 ft bgs	Sample	68				65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-12-01	0.5 - 1.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-18-01	1.0 - 1.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-C36-01	1.0 - 3.0 ft bgs	Sample	68				65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-24-01	1.5 - 2.0 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-30-01	2.0 - 2.5 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-36-01	2.5 - 3.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-06-01	0 - 0.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C12-01	0 - 1.0 ft bgs	Sample	68												1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C12-01	0 - 1.0 ft bgs	Sample					65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-12-01	0.5 - 1.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-18-01	1.0 - 1.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C36-01	1.0 - 3.0 ft bgs	Sample	68												1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C36-01	1.0 - 3.0 ft bgs	Sample					65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-24-01	1.5 - 2.0 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-30-01	2.0 - 2.5 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-36-01	2.5 - 3.0 ft bgs	Sample											22		3					
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	On-Property West Ditch	BS014	BS014WDX		Sample					65				21		23							
Soil Pesticide Sampling	LAW	SS	04-Nov-99	Excavated	On-Property West Ditch	WD-1	WD 1 (West Ditch 1)		Sample									1				1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C1	1140-WD-C1		Sample					67						1		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C10	1140-WD-C10		Sample					67						1		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C11	1140-WD-C11		Sample	64				67						8		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C11	1140-WD-C11 (156878)		Sample									19									

Table 2.1-2
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Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C2	1140-WD-C2		Sample					67						1		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C3	1140-WD-C3		Sample					67						1		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C4	1140-WD-C4		Sample	64				67						8		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C4	1140-WD-C4 (156876)		Sample								19										
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C5	1140-WD-C5		Sample					67						1		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C6	1140-WD-C6		Sample					67						1		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C7	1140-WD-C7		Sample					67						1		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C8	1140-WD-C8		Sample	64				67						8		1					
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C8	1140-WD-C8 (156877)		Sample								19										
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C9	1140-WD-C9		Sample					67						1		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C10B	1140-WD-C10B		Sample					67						1		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C11B	1140-WD-C11B		Sample					67						8		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C11B	1140-WD-C11B		Sample	64												1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C11B	1140-WD-C11B (157182)		Sample								19										
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C2B	1140-WD-C2B		Sample					67						1		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C3B	1140-WD-C3B		Sample					67						1		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C4B	1140-WD-C4B		Sample					67						8		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C4B	1140-WD-C4B		Sample	64												1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C4B	1140-WD-C4B (157180)		Sample								19										
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C5B	1140-WD-C5B		Sample					67						1		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C6B	1140-WD-C6B		Sample					67						1		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C7B	1140-WD-C7B		Sample					67						1		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C8B	1140-WD-C8B		Sample					67						8		1					
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C8B	1140-WD-C8B		Sample	64												1					

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C8B	1140-WD-C8B (157181)		Sample								19										
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C9B	1140-WD-C9B		Sample				67							1		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C12	1140-WD-C12		Sample				67							1		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C12B	1140-WD-C12B		Sample				67							1		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C13	1140-WD-C13		Sample				67							1		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C13B	1140-WD-C13B		Sample				67							1		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C14	1140-WD-C14		Sample				67							1		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C14B	1140-WD-C14B		Sample				67							1		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C15	1140-WD-C15		Sample				67				19			8		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C15B	1140-WD-C15B		Sample				67				19			8		1					
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C15B	1140-WD-C15B		Sample	64												1					
C-RAM	GEI	S	13-Oct-00	Confirmatory	On-Property West Ditch	WD-C16	1140-WD-C16		Sample	64			67				19			8		1					
C-RAM	GEI	S	16-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C33	1140-WDW-C33		Sample											1		1					
C-RAM	GEI	SS	16-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C34	1140-WDW-C34		Sample											1		1					
C-RAM	GEI	S	21-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35		Sample				67									1					
C-RAM	GEI	S	21-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35		Sample	64																	
C-RAM	GEI	S	21-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35		Sample											1							
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH27	BH27	4-6 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH28	BH28	4-6 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH28	BH28	4-6 FT	Duplicate	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH29	BH29	4-6 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH30	BH30	8-10 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH32	BH32	4-6 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH32	BH32	4-6 FT	Duplicate	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH33	BH33	6-8 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH34	BH34	6-8 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH35	BH35	6-8 FT	Sample	36			65				20	7		23		4	1				
Jan2000	HLA	SS	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S2 (3-6)	3-6 FT	Sample	37			66														
Jan2000	HLA	SS	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S1 (0-3)	0-3 FT	Sample	37			66														
Jan2000	HLA	S	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S1 (0-3 FT)	0-3 FT	Sample											22		1					

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Plant B	Envirogen	S	17-Oct-00	OU1	Plant B	SVE-6B	SVE-6B S2 8	8 ft	Sample	37													1		12		22
Plant B	Envirogen	S	17-Oct-00	OU1	Plant B	SVE-6B	SVE-6B S2DUP 8	8 ft	Sample	37													1		12		22
Plant B	Envirogen	S	17-Oct-00	OU1	Plant B	SVE-6B	SVE-6B S3 10	10 ft	Sample	37													1		12		22
Plant B	Envirogen	S	25-Oct-00	OU1	Plant B	SVE-11	SVE-11 S2 7-9	7-9 ft	Sample	37													1		12		22
Plant B	Envirogen	S	14-Nov-00	OU1	Plant B	SVE-12	SVE 12-6-8	6-8 ft	Sample	37			67										2				22
Plant B	Envirogen	S	14-Nov-00	OU1	Plant B	SVE-13	SVE 13-9	9 ft	Sample	37			67										2				22
Plant B	Envirogen	S	15-Nov-00	OU1	Plant B	SVE-14	SVE 14-8-9	8-9 ft	Sample	37			67										2		12		22
Plant B	Envirogen	S	15-Nov-00	OU1	Plant B	SVE-15	SVE 15-9-9.5	9-9.5 ft	Sample	37			67										2		12		22
Plant B	Envirogen	S	15-Nov-00	OU1	Plant B	SVE-16	SVE 16-8	8 ft	Sample	37			67										2		12		22
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVEMW-9	SVESB-9-10-12	10-12 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-1	SVESB1-8-10	8-10 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-2	SVESB2-6-8	6-8 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-3	SVESB-3-6-8	6-8 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-4	SVESB4-4-6.5	4-6.5 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-5	SVESB-5-6-8	6-8 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-5	SVESB-5-8-11	8-11 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-6	SVESB-6-8-10	8-10 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-7	SVESB7-8-10	8-10 ft	Sample	2													1		14		
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-8	SVESB-8-8-10	8-10 ft	Sample	2													1		14		
CRA, 1991	CRA	S	10-Jun-91	OU1	Property	BH23	BH23	4-6 FT	Sample	36			65				20	7		23		4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Property	BH24	BH24	4-6 FT	Sample	36													4	1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Property	BH25	BH25	4-6 FT	Sample	36													4	1			
CRA, 1991	CRA	S	11-Jun-91	OU1	Property	BH19	BH19	5-7 FT	Sample	36			65				20	7		23		4	1			
CRA, 1991	CRA	S	11-Jun-91	OU1	Property	BH26	BH26	7-9 FT	Sample	36			65				20	7		23		4	1			
CRA, 1991	CRA	S	11-Jun-91	OU1	Property	BH31	BH31	3-5 FT	Sample	36			65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH36	BH36	4-6 FT	Sample	36			65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH37	BH37	4-6 FT	Sample	36			65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH38	BH38	3-5 FT	Sample	36			65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH39	BH39	4-6 FT	Sample	36			65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH40	BH40	4-6 FT	Sample	36			65				20	7		23		4	1			
	SMITH	SS	15-Dec-96	OU1	Property	AREA-1-6	AREA 1-6		Sample	36														1			
	SMITH	SS	16-Dec-96	OU1	Property	A8CW-2	A8CW-2		Sample	36			65				21			1		2					
	SMITH	SS	16-Dec-96	OU1	Property	A8CW-3	A8CW-3		Sample	36			65				21			1		2					
	SMITH	SS	16-Dec-96	OU1	Property	A8CW-4	A8CW-4		Sample	36			65				21			23		2					
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-(COMP)	A9CW-(COMP)		Sample				65				21			23		2					
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-1	A9CW-1		Sample	36																	
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-2	A9CW-2		Sample	36																	
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-3	A9CW-3		Sample	36																	

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-4	A9CW-4		Sample	36																	
1996 Bedrock Investigation	ABB-ES	S	07-Oct-96	Maple Meadow Brook	Rutland Corp (behind garage)	MB-1	MB-1		Sample		12				11					23		3					
	ABB-ES	S	07-Oct-96	Maple Meadow Brook	Sentinel	GW-85D	GW-85-D		Sample		12				12					23		3					
	ABB-ES	S	08-Oct-96	Maple Meadow Brook	Sentinel	GW-83D	GW-83-D		Sample		12				12					23		3					
		S	20-Nov-96	Isolated	Sentinel	GW-86D	GW-86-D1/82-85	82-85 FT	Sample	43				67													
		S	21-Nov-96	Isolated	Sentinel	GW-86D	GW-86-D2/90-95'	90-95 FT	Sample	43																	
		S	21-Nov-96	Isolated	Sentinel	GW-86D	GW-86-D2/90-95'	90-95 FT	Sample					67													
CRA, 1991	CRA	SS	30-Jul-91	Excavated	South Ditch	SWMU-30	SWMU-30		Sample	36				65			21	7		23		4	1				
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS015	BS015SDX		Sample					65			21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS016	BS016SMD		Sample					65			21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS018	BS018PND		Sample					65			21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS019	BS019WMD		Sample					65			21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS020	BS020WMD		Sample					65			21			23							
1997 ERC	ABB ES	SS	21-Jan-97	SS Background	South Ditch	SSREF-021	BS021REF		Background Sample					65			21			23							
C-RAM	GEI	SS	03-Oct-00	Confirmatory	South Ditch	SD-C1	1140-SD-C1		Sample					67						1		1					
C-RAM	GEI	SS	03-Oct-00	Confirmatory	South Ditch	SD-C1	1140-SD-C1		Sample					67						1		1					
C-RAM	GEI	SS	03-Oct-00	Confirmatory	South Ditch	SD-C1B	1140-SD-C1B		Sample					67						1		1					
C-RAM	GEI	SS	03-Oct-00	Confirmatory	South Ditch	SD-C2	1140-SD-C2		Sample					67						1		1					
C-RAM	GEI	SS	03-Oct-00	Excavated	South Ditch	SD-C2B	1140-SD-C2B		Sample					67						1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C10	1140-SD-C10		Sample	64				67			19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C11	1140-SD-C11		Sample					67						1		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C12	1140-SD-C12		Sample					67						1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C13	1140-SD-C13		Sample					67						1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C14	1140-SD-C14		Sample					67						1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C15	1140-SD-C15		Sample	64				67			19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C3	1140-SD-C3		Sample					67						1		1					
C-RAM	GEI	SS	11-Oct-00	Excavated	South Ditch	SD-C3B	1140-SD-C3B		Sample					67						1		1					
C-RAM	GEI	SS	11-Oct-00	Excavated	South Ditch	SD-C4	1140-SD-C4		Sample					67						1		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C5	1140-SD-C5		Sample					67						1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C6	1140-SD-C6		Sample	64				67			19			8		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C7	1140-SD-C7		Sample					67						1		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C8	1140-SD-C8		Sample	64				67			19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C8	1140-SD-C8-D		Duplicate	64				67			19			8		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C9	1140-SD-C9		Sample					67						1		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C16	1140-SD-C16		Sample					67						1		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C16B	1140-SD-C16B		Sample					67						1		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C17	1140-SD-C17		Sample					67						1		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C17B	1140-SD-C17B		Sample					67			19			8		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C17B	1140-SD-C17B		Sample	64												1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C18	1140-SD-C18		Sample					67						1		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C18B	1140-SD-C18B		Sample					67						1		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C19	1140-SD-C19		Sample					67						1		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C19B	1140-SD-C19B		Sample					67			19			8		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C19B	1140-SD-C19B		Sample	64												1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C20	1140-SD-C20		Sample					67						1		1					
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C20B	1140-SD-C20B		Sample					67						1		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C21	1140-SD-C21		Sample					67						1		1					

Table 2.1-2
Soil Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C21B	1140-SD-C21B		Sample					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C21B	1140-SD-C21B		Sample	64													1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C22	1140-SD-C22		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C22B	1140-SD-C22B		Sample					67							1		1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C23	1140-SD-C23		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B		Sample					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B		Sample	64													1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B-D		Duplicate					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B-D		Duplicate	64													1				
C-RAM	GEI	S	18-Oct-00	Confirmatory	South Ditch	SD-C24	1140-SD-C24		Sample					67							1		1				
C-RAM	GEI	SS	18-Oct-00	Confirmatory	South Ditch	SD-C24B	1140-SD-C24B		Sample					67							1		1				
C-RAM	GEI	SS	18-Oct-00	Confirmatory	South Ditch	SD-C24B	1140-SD-C24B-D		Duplicate					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C25	1140-SD-C25		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C25B	1140-SD-C25B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C25B	1140-SD-C25B		Sample	64													1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C26	1140-SD-C26		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C26B	1140-SD-C26B		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C27	1140-SD-C27		Sample	64				67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C27B	1140-SD-C27B		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C28	1140-SD-C28		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C28	1140-SD-C28-D		Duplicate					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C28B	1140-SD-C28B		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C29	1140-SD-C29		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C29B	1140-SD-C29B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C29B	1140-SD-C29B		Sample	64													1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C30	1140-SD-C30		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C30B	1140-SD-C30B		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C31	1140-SD-C31		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C31B	1140-SD-C31B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C31B	1140-SD-C31B		Sample	64													1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C32	1140-SD-C32		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C32B	1140-SD-C32B		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C33	1140-SD-C33		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B-D		Duplicate					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B		Sample	64													1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B-D		Duplicate	64													1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C34	1140-SD-C34		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C34B	1140-SD-C34B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C35	1140-SD-C35		Sample	64				67				19			8		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C35B	1140-SD-C35B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C36	1140-SD-C36		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C36B	1140-SD-C36B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C37	1140-SD-C37		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C37B	1140-SD-C37B		Sample					67				19			8		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C37B	1140-SD-C37B		Sample	64													1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C38	1140-SD-C38		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C38B	1140-SD-C38B		Sample					67							1		1				

Table 2.1-2
Soil Samples Collected To Date - By Area

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons	
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C38B	1140-SD-C38B-D		Duplicate					67						1		1						
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C39	1140-SD-C39		Sample					67						1		1						
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C39B	1140-SD-C39B		Sample					67				19		8		1						
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C39B	1140-SD-C39B		Sample	64												1						
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C40	1140-SD-C40		Sample					67						1		1						
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C40B	1140-SD-C40B		Sample					67						1		1						
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C41	1140-SD-C41		Sample					67						1		1						
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C41B	1140-SD-C41B		Sample					67						1		1						
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C42	1140-SD-C42		Sample					67						1		1						
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C42B	1140-SD-C42B		Sample					67				19		8		1						
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C42B	1140-SD-C42B		Sample	64												1						
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C43	1140-SD-C43		Sample					67						1		1						
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C43B	1140-SD-C43B		Sample					67				19		8		1						
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C43B	1140-SD-C43B		Sample	64												1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C44N	1140-SD-C44N		Sample					67						1		1						
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C44S	1140-SD-C44S		Sample					67						1		1						
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C45N	1140-SD-C45N		Sample					67						1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C45S	1140-SD-C45S		Sample					67						1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C46N	1140-SD-C46N		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C46S	1140-SD-C46S		Sample											1		1						
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C47N	1140-SD-C47N		Sample					67						1		1						
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C47S	1140-SD-C47S		Sample					67						1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C48N	1140-SD-C48N		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C48S	1140-SD-C48S		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C49N	1140-SD-C49N		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C49S	1140-SD-C49S		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C50N	1140-SD-C50N		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C50S	1140-SD-C50S		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C51N	1140-SD-C51N		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C51S	1140-SD-C51S		Sample											1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C52N	1140-SD-C52N		Sample	64										1		1						
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C52S	1140-SD-C52S		Sample	64										1		1						
C-RAM	GEI	SS	15-May-01	Confirmatory	South Ditch	SD-C53N	1140-SD-C53N		Sample											1		1						
C-RAM	GEI	SS	15-May-01	Confirmatory	South Ditch	SD-C53S	1140-SD-C53S		Sample											1		1						
C-RAM	GEI	SS	15-May-01	Excavated	South Ditch	SD-C54N	1140-SD-C54N		Sample					67						1		1						
C-RAM	GEI	SS	15-May-01	Confirmatory	South Ditch	SD-C54S	1140-SD-C54S		Sample					67						1		1						
C-RAM	GEI	SS	18-May-01	Confirmatory	South Ditch	SD-C55	1140-SD-C55		Sample											1		1						
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-1	1010-SED-SDF-1S		Sample	64												1						
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-1	1010-SED-SDF-1S		Sample					67						9		4						22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-2	1010-SED-SDF-2S		Sample	64												1						
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-2	1010-SED-SDF-2S		Sample					67						9		4						22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-SDF-3S		Sample	64												1						
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-DUPE1		Duplicate	64												1						
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-SDF-3S		Sample					67						9		3						22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-DUPE1		Duplicate					67						9		3						22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-4	1010-SED-SDF-4S		Sample	64												1						
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-4	1010-SED-SDF-4S		Sample					67						9		3						22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-5	1010-SED-SDF-5S		Sample	64												1						

Table 2.1-2
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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	SampleDepth	SampleType	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-5	1010-SED-SDF-5S		Sample					67							9		3				22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-6	1010-SED-SDF-6S		Sample	64													1				
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-6	1010-SED-SDF-6S		Sample					67							9		3				22
CRA, 1991	CRA	S	07-Jun-91	OU1	Warehouse	BH11	BH11	4-6 FT	Sample	36				65			20	7		23		4		1			
CRA, 1991	CRA	S	07-Jun-91	OU1	Warehouse	BH11	BH11	10-12 FT	Sample	36				65			20	7		23		4		1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH13	BH13	8-10 FT	Sample	36				65			20	7		23		4		1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH15	BH15	8-10 FT	Sample	36				65			20	7		23		4		1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH20	BH20	10-12 FT	Sample	36				65			20	7		23		4		1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH21	BH21	8-10 FT	Sample	36				65			20	7		23		4		1			
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH22	BH22	8-10 FT	Sample	36				65			20	7		23		4		1			
1998 Warehouse	OLIN	S	14-Apr-98	OU1	Warehouse	TE2.10	TE2.10.11-12	11-12 FT	Sample	56				67			19			15		3					
1998 Warehouse	OLIN	S	15-Apr-98	OU1	Warehouse	W1.35	W1.35, 6-7	6-7 FT	Sample	56				67			19			15		3					
1998 Warehouse	OLIN	S	15-Apr-98	OU1	Warehouse	W1.35	W1.35, 7.5-8.5	7.5-8.5 FT	Sample	56				67			19			15		3					
1998 Warehouse	OLIN	S	16-Apr-98	OU1	Warehouse	E1.40	E1, 40, 3-4	3-4 FT	Sample											23		3					
1998 Warehouse	OLIN	SS	16-Apr-98	OU1	Warehouse	E1.45	E1, 45, 1.5	1.5 FT	Sample											23		3					
1998 Warehouse	OLIN	S	17-Apr-98	OU1	Warehouse	E1.50	E1.5, 6-7	6-7 FT	Sample	57				66			19			15		3					
1998 Warehouse	OLIN	S	17-Apr-98	OU1	Warehouse	E1.50	E1.5, 8-8.5	8-8.5 FT	Sample	56				67			19			15		3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E1.75	E1.75, 6-7	6-7 FT	Sample	56				67			19			15		3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E1.75	E1.75,8.5-9.5	8.5-9.5 FT	Sample	57				66			19			15		3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E2.70	E2.70, 9.2	9.2 FT	Sample	56				67			19			15		3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E2.70	E2.70, 10	10 FT	Sample	56				67			19			15		3					
1998 Warehouse	OLIN	S	21-Apr-98	OU1	Warehouse	E2.22	E2.22, 7-8	7-8 FT	Sample	56				67			19			15		3					
Warehouse	LAW	S	12-Aug-98		Warehouse	B-1A	B-1, 8'-10'	8-10 ft	Sample											4		6		4			
Warehouse	LAW	S	12-Aug-98		Warehouse	B-1A	B-1, 16'-17.3'	16-17.3 ft	Sample											4		6		4			
Warehouse	LAW	S	13-Aug-98		Warehouse	B-2A	B-2, 16'-18'	16-18 ft	Sample											4		6		4			
Warehouse	LAW	S	13-Aug-98		Warehouse	B-2A	B-2, 22'-24'	22-24 ft	Sample											4		6		4			
Warehouse	LAW	S	14-Aug-98		Warehouse	B-1B	B-1B, 19.0'-19.6'	19-19.6 ft	Sample											4		6		4			
Warehouse	LAW	S	14-Aug-98		Warehouse	B-3A	B-3, 12'-14'	12-14 ft	Sample											4		6		4			
Warehouse	LAW	S	14-Aug-98		Warehouse	B-3A	B-3, 18'-20'	18-20 ft	Sample											4		6		4			
Jan2000	HLA	S	24-Jan-00	OU1	Warehouse	BH20-A	BH20-A (3-6 FT)	3-6 FT	Sample											22		1					
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	West Ditch Wetland	BS013	BS013WDX		Sample					65			21			23							
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	West Ditch Wetland	BS013	BS013WDX		Laboratory Duplicate											23							

Notes:
SS - Surface Soil
S - Subsurface Soil

Prepared/Date: KJC 7/27/2007
Checked/Date: MJM 7/27/2007

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH1	BH01	6-8 FT	Sample	36				65				20	7		23	5	1				
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH2	BH02	6-8 FT	Sample	36				65				20	7		23	5	1				
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH3	BH03	6-8 FT	Sample	36				65				20	7		23	5	1				
CRA, 1991	CRA	S	05-Jun-91	OU1	Containment Area	BH4	BH04	6-8 FT	Sample	36				65				20	7		23	5	1				
CRA, 1991	CRA	S	06-Jun-91	OU1	Containment Area	BH5	BH05	6-8 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	06-Jun-91	OU1	Containment Area	BH6	BH06	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	06-Jun-91	OU1	Containment Area	BH7	BH07	4-6 FT	Sample	36				65				20	7		23	5	1				
CRA, 1991	CRA	S	07-Jun-91	OU1	Containment Area	BH10	BH10	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	07-Jun-91	OU1	Containment Area	BH8	BH08	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	07-Jun-91	OU1	Containment Area	BH9	BH09	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	07-Jun-91	OU1	Warehouse	BH11	BH11	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	07-Jun-91	OU1	Warehouse	BH11	BH11	10-12 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH12	BH12	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH14	BH14	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH16	BH16	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH17	BH17	8-10 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Lake Poly	BH18	BH18	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Property	BH23	BH23	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Property	BH24	BH24	4-6 FT	Sample	36												4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Property	BH25	BH25	4-6 FT	Sample	36												4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH13	BH13	8-10 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH15	BH15	8-10 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH20	BH20	10-12 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH21	BH21	8-10 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	10-Jun-91	OU1	Warehouse	BH22	BH22	8-10 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH27	BH27	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH28	BH28	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH28	BH28	4-6 FT	Duplicate	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH29	BH29	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH30	BH30	8-10 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH32	BH32	4-6 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH32	BH32	4-6 FT	Duplicate	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH33	BH33	6-8 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH34	BH34	6-8 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Plant B	BH35	BH35	6-8 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Property	BH19	BH19	5-7 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Property	BH26	BH26	7-9 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	S	11-Jun-91	OU1	Property	BH31	BH31	3-5 FT	Sample	36				65				20	7		23	4	1				
CRA, 1991	CRA	SS	08-Jul-91	Excavated	Containment Area	AREA-1	AREA 01		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-10	AREA 10		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-10	AREA 10		Duplicate	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-3	AREA 03		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-4	AREA 04		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-5	AREA 05		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-6	AREA 06		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-7	AREA 07		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	OU1		AREA-9	AREA 09		Sample	36				65				21	7		23	4	1				
CRA, 1991	CRA	SS	09-Jul-91	Excavated	Central Pond	AREA-8	AREA 08		Sample	36				65				21	7		23	4	1				

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
CRA, 1991	CRA	SS	09-Jul-91	Excavated	Containment Area	AREA-2	AREA 02		Sample	36				65				21	7		23		4	1			
CRA, 1991	CRA	SS	30-Jul-91	OU1		SWMU-33	SWMU-33		Sample	36				65				21	7		23		4	1			
CRA, 1991	CRA	SS	30-Jul-91	Excavated	Buried Debris Area	SWMU-27	SWMU-27		Sample	36				65				21	7		23		4	1			
CRA, 1991	CRA	SS	30-Jul-91	Excavated	Buried Debris Area	SWMU-27	SWMU-27		Sample													2		1			
CRA, 1991	CRA	SS	30-Jul-91	Excavated	South Ditch	SWMU-30	SWMU-30		Sample	36				65				21	7		23		4	1			
	CRA	S	02-Oct-91	OU1		TP-1	TP-1-SN1		Sample	34				65				21	7		23		4	1			
	CRA	S	07-Oct-91	OU1		TP-19	TP-19-SN6		Sample	34				65				21	7		23		4	1			
	CRA	S	08-Oct-91	OU1		TP-21	TP-21-SN8		Sample	34				65				21	7		23		4				
	CRA	S	06-Feb-92	OU1	Property	BH36	BH36	4-6 FT	Sample	36				65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH37	BH37	4-6 FT	Sample	36				65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH38	BH38	3-5 FT	Sample	36				65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH39	BH39	4-6 FT	Sample	36				65				20	7		23		4	1			
	CRA	S	06-Feb-92	OU1	Property	BH40	BH40	4-6 FT	Sample	36				65				20	7		23		4	1			
		S	02-Nov-92	SS Background	Background	BGS-1	BGS-1		Background Sample					50							23		1	1			
		S	02-Nov-92	SS Background	Background	BH41	BH41	10-12 FT	Background Sample					50							23		1	1			
	CRA	SS	22-Apr-93	Excavated	Buried Debris Area	SWMU-27	SWMU-27		Sample												2		1				
	CRA	SS	07-May-93	OU1		SWMU-25	SWMU-25		Sample	36				65				21			23		3	1			
	SMITH	S	18-Jan-95	Excavated	Lake Poly	LPB-1	LPB-1(4-6)	4-6 FT	Sample	35				64							23		3	1			
	SMITH	S	18-Jan-95	Excavated	Lake Poly	LPB-1	LPB-1(6-8)	6-8 FT	Sample	36				64							22		3	1			
		S	18-Jan-95	OU1	Lake Poly	LPB-2	LPB-2(7-8)	7-8 FT	Sample	36				64							23		3	1			
		S	18-Jan-95	OU1	Lake Poly	LPB-2	LPB-2(8-9)	8-9 FT	Sample	36				64							23		3	1			
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-015	SS015XXBKX		Background Sample					17							3		4				
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-016	SS016XXBKX		Background Sample					17							3		4				
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-017	SS017XXBKD		Background Duplicate					17							3		4				
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-017	SS017XXBKX		Background Sample					17							3		4				
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-018	SS018XXBKX		Background Sample					17							3		4				
1996 Surface Soil Background Investigation	ABB-ES	SS	22-Apr-96	SS Background	Background	SSBK-019	SS019XXBKX		Background Sample					17							3		4				
1996 Bedrock Investigation	ABB-ES	S	07-Oct-96	Maple Meadow Brook	Rutland Corp (behind garage)	MB-1	MB-1		Sample		12				11						23		3				
	ABB-ES	S	07-Oct-96	Maple Meadow Brook	Sentinel	GW-85D	GW-85-D		Sample		12				12						23		3				
1996 Bedrock Investigation	ABB-ES	S	08-Oct-96	Maple Meadow Brook	Leo Property (North of Garden)	MB-2	MB-2		Sample												23		3				
	ABB-ES	S	08-Oct-96	Maple Meadow Brook	Sentinel	GW-83D	GW-83-D		Sample		12				12						23		3				

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1996 Bedrock Investigation		S	18-Nov-96	Isolated	Chestnut St on access road to Pumphouse, N of CB-2	CB-3	CB-3/63'	63 FT	Sample					67													
1996 Bedrock Investigation		S	18-Nov-96	Isolated	Chestnut St on access road to Pumphouse, N of CB-2	CB-3	CB-3/63'	63 FT	Sample	43																	
		S	20-Nov-96	Isolated	Sentinel	GW-86D	GW-86-D1/82-85	82-85 FT	Sample	43				67													
		S	21-Nov-96	Isolated	Sentinel	GW-86D	GW-86-D2/90-95'	90-95 FT	Sample	43																	
		S	21-Nov-96	Isolated	Sentinel	GW-86D	GW-86-D2/90-95'	90-95 FT	Sample					67													
1996 Bedrock Investigation		S	24-Nov-96	Isolated	Adj to Chestnut St along access road to Pumphouse	CB-1	CB-1/35-37'	35-37 FT	Sample					67													
1996 Bedrock Investigation		S	24-Nov-96	Isolated	Adj to Chestnut St along access road to Pumphouse	CB-1	CB-1/35-37'	35-37 FT	Sample	43																	
1996 Bedrock Investigation		S	25-Nov-96	Isolated	Chestnut St on access road to Pumphouse	CB-2	CB-2/44-49	44-49 FT	Sample	43																	
1996 Bedrock Investigation		S	25-Nov-96	Isolated	Chestnut St on access road to Pumphouse	CB-2	CB-2/44-49	44-49 FT	Sample					67													
	SMITH	SS	15-Dec-96	OU1		SWMU-26	SWMU26 COMP		Sample					65			21		1		2						
	SMITH	SS	15-Dec-96	OU1		SWMU-26-1	SWMU26-1		Sample	36																	
	SMITH	SS	15-Dec-96	OU1		SWMU-26-2	SWMU26-2		Sample	36																	
	SMITH	SS	15-Dec-96	OU1		SWMU-26-3	SWMU26-3		Sample	36														1			
	SMITH	SS	15-Dec-96	OU1		SWMU-26-4	SWMU26-4		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1	AREA 1(COMP)		Sample					65			21		23		2	1				
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-1	AREA 1-1		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-2	AREA 1-2		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-4	AREA 1-4		Sample	36														1			
	SMITH	SS	15-Dec-96	Excavated	Containment Area	AREA-1-5	AREA 1-5		Sample	36														1			
	SMITH	SS	15-Dec-96	Excavated	Containment Wall	AREA-1-3	AREA 1-3		Sample	36														1			
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	DRMA-COMP-A	DRMA(COMP A)		Sample					65			21		23		2						
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	DRMA-COMP-B	DRMA(COMP B)		Sample					65			21		23		2						
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA1-DRMA	GA1-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA2-DRMA	GA2-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA3-DRMA	GA3-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GA4-DRMA	GA4-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB1-DRMA	GB1-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB2-DRMA	GB2-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB3-DRMA	GB3-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area A	GB4-DRMA	GB4-DRMA		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	DRMB-COMP	DRMB-(COMP)		Sample					65			21		23		2						
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G1-DRMB	G1-DRMB		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G2-DRMB	G2-DRMB		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G3-DRMB	G3-DRMB		Sample	36																	

Table 2.1-3
Soil Samples Collected To Date - By Date

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
	SMITH	SS	15-Dec-96	Excavated	Drum Area B	G4-DRMB	G4-DRMB		Sample	36																	
	SMITH	SS	15-Dec-96	Excavated	Lake Poly	LAKE POLY-1	LAKE POLY-1		Sample	36			65				21			23	2						
	SMITH	SS	15-Dec-96	OU1	Lake Poly	LAKE POLY-2	LAKE POLY-2		Sample	36			65				21			23	2						
	SMITH	SS	15-Dec-96	OU1	Lake Poly	LAKE POLY-2	LAKE POLY-2		Duplicate	36			65				21			23	2						
	SMITH	SS	15-Dec-96	OU1	Lake Poly	LAKE POLY-3	LAKE POLY-3		Sample	36			65				21			23	2						
	SMITH	SS	15-Dec-96	OU1	Property	AREA-1-6	AREA 1-6		Sample	36													1				
	SMITH	SS	16-Dec-96	OU1		AREA-8-2	AREA8-2		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	OU1		AREA-8-3	AREA8-3		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	OU1		CPDA-5	CPDA-5		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	A8CW-1	A8CW-1		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	AREA-8-4	AREA8-4		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-6	CPDA-6		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-7	CPDA-7		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	OU1	Central Pond	CPDA-8	CPDA-8		Sample	36			65				21			23	2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-9	CPDA-9		Sample	36			65				21			23	2						
	SMITH	SS	16-Dec-96	Excavated	Central Pond	CPDA-9	CPDA-9		Duplicate	36			65				21			1	2						
	SMITH	SS	16-Dec-96	OU1	Containment Area	CPDA-1	CPDA-1		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	OU1	Containment Area	CPDA-2	CPDA-2		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	Excavated	Containment Area	CPDA-3	CPDA-3		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	Excavated	Containment Area	CPDA-4	CPDA-4		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	Excavated	Detention Pond	AREA-8-1	AREA8-1		Sample	36			65				21			23	2						
	SMITH	SS	16-Dec-96	OU1	Property	A8CW-2	A8CW-2		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	OU1	Property	A8CW-3	A8CW-3		Sample	36			65				21			1	2						
	SMITH	SS	16-Dec-96	OU1	Property	A8CW-4	A8CW-4		Sample	36			65				21			23	2						
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-(COMP)	A9CW-(COMP)		Sample				65				21			23	2						
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-1	A9CW-1		Sample	36																	
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-2	A9CW-2		Sample	36																	
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-3	A9CW-3		Sample	36																	
	SMITH	SS	16-Dec-96	OU1	Property	A9CW-4	A9CW-4		Sample	36																	
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	Containment Area	BS017	BS017PND		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	On-Property West Ditch	BS014	BS014WDX		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS015	BS015SDX		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS016	BS016SMD		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS018	BS018PND		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS019	BS019WMD		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	OU1	South Ditch	BS020	BS020WMD		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	SS Background	South Ditch	SSREF-021	BS021REF		Background Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	West Ditch Wetland	BS013	BS013WDX		Sample				65				21			23							
1997 ERC	ABB ES	SS	21-Jan-97	Excavated	West Ditch Wetland	BS013	BS013WDX		Laboratory Duplicate											23							
1998 Warehouse	OLIN	S	14-Apr-98	OU1	Warehouse	TE2.10	TE2.10.11-12	11-12 FT	Sample	56			67				19			15	3						
1998 Warehouse	OLIN	S	15-Apr-98	OU1	Warehouse	W1.35	W1.35, 6-7	6-7 FT	Sample	56			67				19			15	3						
1998 Warehouse	OLIN	S	15-Apr-98	OU1	Warehouse	W1.35	W1.35, 7.5-8.5	7.5-8.5 FT	Sample	56			67				19			15	3						
1998 Warehouse	OLIN	S	16-Apr-98	OU1	Warehouse	E1.40	E1, 40, 3-4	3-4 FT	Sample											23	3						
1998 Warehouse	OLIN	SS	16-Apr-98	OU1	Warehouse	E1.45	E1, 45, 1.5	1.5 FT	Sample											23	3						
1998 Warehouse	OLIN	S	17-Apr-98	OU1	Warehouse	E1.50	E1.5, 6-7	6-7 FT	Sample	57			66				19			15	3						

Table 2.1-3
Soil Samples Collected To Date - By Date

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
1998 Warehouse	OLIN	S	17-Apr-98	OU1	Warehouse	E1.50	E1.5, 8-8.5	8-8.5 FT	Sample	56				67				19			15	3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E1.75	E1.75, 6-7	6-7 FT	Sample	56				67				19			15	3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E1.75	E1.75,8.5-9.5	8.5-9.5 FT	Sample	57				66				19			15	3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E2.70	E2.70, 9.2	9.2 FT	Sample	56				67				19			15	3					
1998 Warehouse	OLIN	S	20-Apr-98	OU1	Warehouse	E2.70	E2.70, 10	10 FT	Sample	56				67				19			15	3					
1998 Warehouse	OLIN	S	21-Apr-98	OU1	Warehouse	E2.22	E2.22, 7-8	7-8 FT	Sample	56				67				19			15	3					
Warehouse	LAW	S	12-Aug-98		Warehouse	B-1A	B-1, 8'-10'	8-10 ft	Sample												4	6	4				
Warehouse	LAW	S	12-Aug-98		Warehouse	B-1A	B-1, 16'-17.3'	16-17.3 ft	Sample												4	6	4				
Warehouse	LAW	S	13-Aug-98		Warehouse	B-2A	B-2, 16'-18'	16-18 ft	Sample												4	6	4				
Warehouse	LAW	S	13-Aug-98		Warehouse	B-2A	B-2, 22'-24'	22-24 ft	Sample												4	6	4				
Warehouse	LAW	S	14-Aug-98		Warehouse	B-1B	B-1B, 19.0'-19.6'	19-19.6 ft	Sample												4	6	4				
Warehouse	LAW	S	14-Aug-98		Warehouse	B-3A	B-3, 12'-14'	12-14 ft	Sample												4	6	4				
Warehouse	LAW	S	14-Aug-98		Warehouse	B-3A	B-3, 18'-20'	18-20 ft	Sample												4	6	4				
Soil Sampling 1998	OLIN	S	03-Nov-98	OU1		SBGR	SBGR		Sample												23	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-27-101	SS101XX27X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-27-101	SS101XX27D		Duplicate	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-33-101	SS101XX33X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-33-102	SS102XX33X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	OU1		SWMU-33-103	SS103XX33X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-101	SS101XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-103	SS103XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-104	SS104XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	SS Background	Background	SSBK-105	SS105XXBKX		Background Sample												1	1					
Soil Sampling 1998	HLA	SS	23-Nov-98	Excavated	Buried Debris Area	SWMU-27-102	SS102XX27X		Sample	64				67							23	4					
Soil Sampling 1998	HLA	SS	23-Nov-98	Excavated	Buried Debris Area	SWMU-27-103	SS103XX27X		Sample	64				67							23	4					
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-101	SB101XXLPX	6-8 FT	Sample												2	4					
Lake Poly	HLA	SS	24-Nov-98	Excavated	Lake Poly	LP-102	SS101XXLPX	0-2 FT	Sample												2	4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-102	SS102XXLPX	0-2 FT	Sample												2	4					
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-102	SB102XXLPX	6-8 FT	Sample												2	4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-103	SS103XXLPX	0-2 FT	Sample												2	4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-103	SS103XXLPX	0-2 FT	Matrix Spike Duplicate												2	4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-103	SS103XXLPD	0-2 FT	Duplicate												2	4					
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-103	SB103XXLPX	6-8 FT	Sample												2	4					
Lake Poly	HLA	SS	24-Nov-98	Excavated	Lake Poly	LP-104	SS104XXLPX	0-2 FT	Sample												2	4					
Lake Poly	HLA	S	24-Nov-98	Excavated	Lake Poly	LP-104	SB104XXLPX	6-8 FT	Sample												2	4					
Lake Poly	HLA	SS	24-Nov-98	OU1	Lake Poly	LP-105	SS105XXLPX	0-2 FT	Sample												2	4					
Lake Poly	HLA	S	24-Nov-98	OU1	Lake Poly	LP-105	SB105XXLPX	6-8 FT	Sample												2	4					
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-27-101	SS101XX27X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-33-101	SS101XX33X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-33-102	SS102XX33X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	OU1		SWMU-33-103	SS103XX33X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	Excavated	Buried Debris Area	SWMU-27-102	SS102XX27X		Sample	62																	
Soil Sampling 1998	HLA	SS	30-Nov-98	Excavated	Buried Debris Area	SWMU-27-103	SS103XX27X		Sample	62																	

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lake Poly	HLA	SS	30-Nov-98	Excavated	Lake Poly	LP-101	101A	0-2 FT	Sample											2		1					
Lake Poly	HLA	S	30-Nov-98	OU1	Lake Poly	LP-101	101B	6-8 FT	Sample											2		1					
Lake Poly	HLA	SS	30-Nov-98	OU1	Lake Poly	LP-102	102A	0-2 FT	Sample											2		1					
Lake Poly	HLA	S	30-Nov-98	OU1	Lake Poly	LP-102	102B	6-8 FT	Sample											2		1					
Lake Poly	HLA	SS	30-Nov-98	Excavated	Lake Poly	LP-104	104A	0-2 FT	Sample											2		1					
Lake Poly	HLA	S	30-Nov-98	Excavated	Lake Poly	LP-104	104B	6-8 FT	Sample											2		1					
Soil Sampling 1998	HLA	SS	01-Dec-98	SS Background	Background	SSBK-102	SS102XXBKX		Background Sample											1		1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		CP-1	CP 1 (Central Pond 1)		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		CP-2	CP 2 (Central Pond 2)		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		NW-WAREHOUSE	NW Warehouse		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1		SE-WAREHOUSE	SE Warehouse		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	Excavated	Containment Area	WD-2	WD 2 (West Ditch 2)		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1	Lake Poly	LP-1	LP 1 (Lake Poly 1)		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1	Lake Poly	LP-2	LP 2 (Lake Poly 2)		Sample								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	OU1	Lake Poly	LP-2	Duplicate		Duplicate								1					1					
Soil Pesticide Sampling	LAW	SS	04-Nov-99	Excavated	On-Property West Ditch	WD-1	WD 1 (West Ditch 1)		Sample								1					1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-09	RSO-09-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-09	RSO-09-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-09	RSO-09-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	24-Jan-00	OU1		RSO-09	RSO-09-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-10	RSO-10-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-10	RSO-10-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-10	RSO-10-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	24-Jan-00	OU1		RSO-10	RSO-10-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-11	RSO-11-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-11	RSO-11-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-11	RSO-11-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	24-Jan-00	OU1		RSO-11	RSO-11-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-12	RSO-12-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-12	RSO-12-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-12	RSO-12-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	24-Jan-00	OU1		RSO-12	RSO-12-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-13	RSO-13-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1		RSO-13	RSO-13-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-13	RSO-13-S2 (3-5.5 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1		RSO-13	RSO-13-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	24-Jan-00	OU1	Containment Area	CPDA-1-A	CPD-1-A (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	Excavated	Containment Area	RSO-14	RSO-14-S1 (0-3)	0-3 FT	Sample	37				66													

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Jan2000	HLA	SS	24-Jan-00	Excavated	Containment Area	RSO-14	RSO-14-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	SS	24-Jan-00	OU1	Containment Area	RSO-15	RSO-15-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	24-Jan-00	OU1	Containment Area	RSO-15	RSO-15-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	24-Jan-00	OU1	Warehouse	BH20-A	BH20-A (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-01	RSO-01-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-01	RSO-01-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-01	RSO-01-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	OU1		RSO-01	RSO-01-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-02	RSO-02-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-02	RSO-02-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-02	RSO-02-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	OU1		RSO-02	RSO-02-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-03	RSO-03-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-03	RSO-03-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-03	RSO-03-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	OU1		RSO-03	RSO-03-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-04	RSO-04-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-04	RSO-04-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-04	RSO-04-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	OU1		RSO-04	RSO-04-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-05	RSO-05-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-05	RSO-05-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-05	RSO-05-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	OU1		RSO-05	RSO-05-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-07	RSO-07-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-07	RSO-07-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-07	RSO-07-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	OU1		RSO-07	RSO-07-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-08	RSO-08-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	OU1		RSO-08	RSO-08-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	OU1		RSO-08	RSO-08-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	OU1		RSO-08	RSO-08-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	SS	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S2 (3-6)	3-6 FT	Sample	37				66													
Jan2000	HLA	SS	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S2 (3-6 FT)	3-6 FT	Sample											22		1					
Jan2000	HLA	S	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S1 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	S	25-Jan-00	Excavated	Plant B	RSO-06	RSO-06-S1 (0-3 FT)	0-3 FT	Sample											22		1					
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-16	RSO-16 (0-3)	0-3 FT	Sample	37				66													
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-16	RSO-16 (0-3)	0-3 FT	Sample											23		1					
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-17	RSO-17 (0-3)	0-3 FT	Sample					66													
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-17	RSO-17 (0-3)RE	0-3 FT	Sample	37																	
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-17	RSO-17 (0-3)	0-3 FT	Sample											23		1					
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-18	RSO-18 (0-3)	0-3 FT	Sample					66													
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-18	RSO-18 (0-3)RE	0-3 FT	Sample	37																	
Jan2000	HLA	SS	26-Jan-00	OU1		RSO-18	RSO-18 (0-3)	0-3 FT	Sample											23		1					
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C1	DB-C1		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C1	DB-C1		Sample					67				22		3		1					
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C10	DB-C10		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C10	DB-C10		Sample					67				22		3		1					

Table 2.1-3
Soil Samples Collected To Date - By Date

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C11	DB-C11		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C11	DB-C11		Sample				66				22				3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C12	DB-C12		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C12	DB-C12		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C13	DB-C13		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C13	DB-C13		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Excavated	Drum Area B	DB-C14	DB-C14		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Excavated	Drum Area B	DB-C14	DB-C14		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C15	DB-C15		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C15	DB-C15		Sample				67				22				3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C16	DB-C16		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C16	DB-C16		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C2	DB-C2		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C2	DB-C2		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C3	DB-C3		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C3	DB-C3		Sample				67				22				3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C4	DB-C4		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C3	DB-C3		Sample				67				22				3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C4	DB-C4		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C4	DB-C4		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C5	DB-C5		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C5	DB-C5		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C6	DB-C6		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C6	DB-C6		Sample				67				22				3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C7	DB-C7		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C7	DB-C7		Sample				67				22				3		1				
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C8	DB-C8		Sample	64																	
D-RAM	GEI	S	10-Aug-00	Confirmatory	Drum Area B	DB-C8	DB-C8		Sample				67				22				3		1				
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C9	DB-C9		Sample	64																	
D-RAM	GEI	SS	10-Aug-00	Confirmatory	Drum Area B	DB-C9	DB-C9		Sample				67				22				3		1				
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-1	BP-1		Sample				67				22				6		1				
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-2	BP-2		Sample				67				22				6		1				
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-3	BP-3		Sample				67				22				6		1				
C-RAM	GEI	SS	11-Aug-00	Excavated	Biocell	BP-4	BP-4		Sample				67				22				6		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C10	1120-DA-C10		Sample	64			67				19				3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C11	1120-DA-C11		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C12	1120-DA-C12		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C13	1120-DA-C13		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C14	1120-DA-C14		Sample	64			67				19				3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C15	1120-DA-C15		Sample	64			67				19				3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C16	1120-DA-C16		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C17	1120-DA-C17		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C18	1120-DA-C18		Sample	64			67				19				3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C19	1120-DA-C19		Sample	64			67				19				3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C2	1120-DA-C2		Sample	64			67				19				3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C20	1120-DA-C20		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C21	1120-DA-C21		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C22	1120-DA-C22		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C23	1120-DA-C23		Sample	64			67				19				3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C24	1120-DA-C24		Sample	64			67				19				3		1				

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Soil Samples Collected To Date - By Date

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Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C3	1120-DA-C3		Sample	64				67				19			3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C4	1120-DA-C4		Sample	64				67				19			3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C5	1120-DA-C5		Sample	64				67				19			3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C6	1120-DA-C6		Sample	64				67				19			3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C7	1120-DA-C7		Sample	64				67				19			3		1				
D-RAM	GEI	S	18-Sep-00	Confirmatory	Drum Area A	DA-C8	1120-DA-C8		Sample	64				67				19			3		1				
D-RAM	GEI	SS	18-Sep-00	Confirmatory	Drum Area A	DA-C9	1120-DA-C9		Sample	64				67				19			3		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C1	1140-WD-C1		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C10	1140-WD-C10		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C11	1140-WD-C11		Sample	64				67							8		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C11	1140-WD-C11 (156878)		Sample									19									
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C2	1140-WD-C2		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C2	1140-WD-C2		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C3	1140-WD-C3		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C4	1140-WD-C4		Sample	64				67							8		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C4	1140-WD-C4 (156876)		Sample									19									
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C5	1140-WD-C5		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C6	1140-WD-C6		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C7	1140-WD-C7		Sample					67							1		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C8	1140-WD-C8		Sample	64				67							8		1				
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C8	1140-WD-C8 (156877)		Sample									19									
C-RAM	GEI	S	19-Sep-00	Confirmatory	On-Property West Ditch	WD-C9	1140-WD-C9		Sample					67							1		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory		WD-C1B	1140-WD-C1B		Sample					67							1		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C10B	1140-WD-C10B		Sample					67							1		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C11B	1140-WD-C11B		Sample					67							8		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C11B	1140-WD-C11B		Sample	64													1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C11B	1140-WD-C11B (157182)		Sample									19									
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C2B	1140-WD-C2B		Sample					67							1		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C3B	1140-WD-C3B		Sample					67							1		1				

Table 2.1-3
Soil Samples Collected To Date - By Date

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C4B	1140-WD-C4B		Sample					67							8		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C4B	1140-WD-C4B		Sample	64													1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C4B	1140-WD-C4B (157180)		Sample								19										
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C5B	1140-WD-C5B		Sample					67							1		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C6B	1140-WD-C6B		Sample					67							1		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C7B	1140-WD-C7B		Sample					67							1		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C8B	1140-WD-C8B		Sample					67							8		1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C8B	1140-WD-C8B		Sample	64													1				
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C8B	1140-WD-C8B (157181)		Sample								19										
C-RAM	GEI	S	21-Sep-00	Confirmatory	On-Property West Ditch	WD-C9B	1140-WD-C9B		Sample					67							1		1				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C25	1120-DA-C25		Sample	64				67			19				3		2				
D-RAM	GEI	SS	29-Sep-00	Confirmatory	Drum Area A	DA-C26	1120-DA-C26		Sample	64				67			19				3		2				
D-RAM	GEI	SS	29-Sep-00	Confirmatory	Drum Area A	DA-C27	1120-DA-C27		Sample	64				67			19				3		2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C28	1120-DA-C28		Sample	64				67			19				3		2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C29	1120-DA-C29		Sample	64				67			19				3		2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C29	1120-DA-C29-D		Duplicate	64				67									2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C30	1120-DA-C30		Sample	64				67			19				3		2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C31	1120-DA-C31		Sample	64				67			19				3		2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C32	1120-DA-C32		Sample	64				67			19				3		2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C33	1120-DA-C33		Sample	64				67			19				3		2				
D-RAM	GEI	S	29-Sep-00	Confirmatory	Drum Area A	DA-C34	1120-DA-C34		Sample	64				67			19				3		2				
C-RAM	GEI	SS	02-Oct-00	Excavated	Central Pond	CP-C10	1140-CP-C10		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C11	1140-CP-C11		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C12	1140-CP-C12		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C13	1140-CP-C13-D		Duplicate	64				67			19				8		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C13	1140-CP-C13		Sample	64				67			19				8		1				
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C14	1140-CP-C14		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C15	1140-CP-C15		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C16	1140-CP-C16		Sample	64				67			19				8		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C17	1140-CP-C17		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C18	1140-CP-C18		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C19	1140-CP-C19		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C20	1140-CP-C20		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C21	1140-CP-C21		Sample	64				67			19				8		1				
C-RAM	GEI	S	02-Oct-00	Excavated	Central Pond	CP-C22	1140-CP-C22		Sample					67							1		1				
C-RAM	GEI	S	02-Oct-00	Confirmatory	Central Pond	CP-C24	1140-CP-C24		Sample					67							1		1				
C-RAM	GEI	SS	02-Oct-00	Excavated	Central Pond	CP-C9	1140-CP-C9		Sample					67							1		1				
C-RAM	GEI	SS	03-Oct-00	Confirmatory	South Ditch	SD-C1	1140-SD-C1		Sample					67							1		1				

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	03-Oct-00	Confirmatory	South Ditch	SD-C1B	1140-SD-C1B		Sample					67							1		1				
C-RAM	GEI	SS	03-Oct-00	Confirmatory	South Ditch	SD-C2	1140-SD-C2		Sample					67							1		1				
C-RAM	GEI	SS	03-Oct-00	Excavated	South Ditch	SD-C2B	1140-SD-C2B		Sample					67							1		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C12	1140-WD-C12		Sample					67							1		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C12B	1140-WD-C12B		Sample					67							1		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C13	1140-WD-C13		Sample					67							1		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C13B	1140-WD-C13B		Sample					67							1		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C14	1140-WD-C14		Sample					67							1		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C14B	1140-WD-C14B		Sample					67							1		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C15	1140-WD-C15		Sample					67			19				8		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C15B	1140-WD-C15B		Sample					67			19				8		1				
C-RAM	GEI	S	04-Oct-00	Confirmatory	On-Property West Ditch	WD-C15B	1140-WD-C15B		Sample	64													1				
C-RAM	GEI	SS	05-Oct-00	Excavated	Central Pond	CP-C25	1140-CP-C25		Sample	64				67			19				8		1				
C-RAM	GEI	SS	05-Oct-00	Confirmatory	Central Pond	CP-C26	1140-CP-C26		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C27	1140-CP-C27		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C28	1140-CP-C28		Sample	64				67			19				8		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C29	1140-CP-C29		Sample					67							1		1				
C-RAM	GEI	SS	05-Oct-00	Confirmatory	Central Pond	CP-C30	1140-CP-C30		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C31	1140-CP-C31		Sample	64				67			19				8		1				
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C32	1140-CP-C32		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C33	1140-CP-C33		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C34	1140-CP-C34		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C35	1140-CP-C35		Sample	64				67			19				8		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C36	1140-CP-C36		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C37	1140-CP-C37		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Excavated	Central Pond	CP-C38	1140-CP-C38		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C39	1140-CP-C39		Sample	64				67			19				8		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C40	1140-CP-C40		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C41	1140-CP-C41		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C42	1140-CP-C42		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C43	1140-CP-C43		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C44	1140-CP-C44		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C45	1140-CP-C45		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C46	1140-CP-C46		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C47	1140-CP-C47		Sample	64				67			19				8		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C48	1140-CP-C48		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C49	1140-CP-C49		Sample	64				67			19				8		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C50	1140-CP-C50		Sample					67							1		1				
C-RAM	GEI	S	05-Oct-00	Confirmatory	Central Pond	CP-C51	1140-CP-C51		Sample					67							1		1				

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
D-RAM	GEI	S	07-Oct-00	Confirmatory	Drum Area A	DA-C35	1120-DA-C35		Sample	64			67				19			3		2					
C-RAM	GEI	S	09-Oct-00	Confirmatory	Central Pond	CP-C52	1140-CP-C52		Sample				67							1		1					
C-RAM	GEI	S	09-Oct-00	Confirmatory	Central Pond	CP-C53	1140-CP-C53		Sample				67							1		1					
Plant B	Envirogen	S	10-Oct-00	OU1		AS-1	AS-1-8-10	8-10 ft	Sample	37												1			12	22
Plant B	Envirogen	S	10-Oct-00	OU1		AS-1	AS-1 12-13	12-13 ft	Sample	37			67									1			12	22
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C1	1120-BD-C1		Sample	64			67				19			8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C2	1120-BD-C2		Sample	64			67				19			8		1					
C-RAM	GEI	SS	10-Oct-00	Confirmatory	Buried Debris Area	BD-C3	1120-BD-C3		Sample	64			67				19			8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C4	1120-BD-C4		Sample	64			67				19			8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Buried Debris Area	BD-C5	1120-BD-C5		Sample	64			67				19			8		1					
C-RAM	GEI	SS	10-Oct-00	Confirmatory	Buried Debris Area	BD-C6	1120-BD-C6		Sample	64			67				19			8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C54	1140-CP-C54		Sample				67							1		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C55	1140-CP-C55		Sample				67							1		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C56	1140-CP-C56		Sample	64			67				19			8		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C57	1140-CP-C57		Sample				67							1		1					
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C58	1140-CP-C58		Sample				67							1		1					
Plant B	Envirogen	S	11-Oct-00	OU1		AS-3	AS-3 8-10	8-10 ft	Sample	37												1			12	22
C-RAM	GEI	S	10-Oct-00	Confirmatory	Central Pond	CP-C58	1140-CP-C58		Sample				67							1		1					
Plant B	Envirogen	S	11-Oct-00	OU1		AS-3	AS-3 8-10	8-10 ft	Sample	37												1			12	22
Plant B	Envirogen	S	11-Oct-00	OU1		AS-3	AS-3 10-12	10-12 ft	Sample	37			67									1			12	22
Plant B	Envirogen	S	11-Oct-00	Isolated		AS-3	AS-3 15-16	15-16 ft	Sample													1				22
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C11	1120-BD-C11		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C12	1120-BD-C12		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C14	1120-BD-C14		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C14	1120-BD-C14-D		Duplicate	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C15	1120-BD-C15		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Excavated	Buried Debris Area	BD-C8	1120-BD-C8		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	Buried Debris Area	BD-C9	1120-BD-C9		Sample	64			67				19			8		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C10	1140-SD-C10		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C11	1140-SD-C11		Sample				67							1		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C12	1140-SD-C12		Sample				67							1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C13	1140-SD-C13		Sample				67							1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C14	1140-SD-C14		Sample				67							1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C15	1140-SD-C15		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C3	1140-SD-C3		Sample				67							1		1					
C-RAM	GEI	SS	11-Oct-00	Excavated	South Ditch	SD-C3B	1140-SD-C3B		Sample				67							1		1					
C-RAM	GEI	SS	11-Oct-00	Excavated	South Ditch	SD-C4	1140-SD-C4		Sample				67							1		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C5	1140-SD-C5		Sample				67							1		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C6	1140-SD-C6		Sample	64			67				19			8		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C7	1140-SD-C7		Sample				67							1		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C8	1140-SD-C8		Sample	64			67				19			8		1					
C-RAM	GEI	S	11-Oct-00	Confirmatory	South Ditch	SD-C8	1140-SD-C8-D		Duplicate	64			67				19			8		1					
C-RAM	GEI	SS	11-Oct-00	Confirmatory	South Ditch	SD-C9	1140-SD-C9		Sample				67							1		1					
Plant B	Envirogen	S	12-Oct-00	OU1		AS-2	AS-2-15	15 ft	Sample													1				22
Plant B	Envirogen	S	12-Oct-00	OU1		AS-7	AS-7-8-10	8-10 ft	Sample	37												1			12	22
Plant B	Envirogen	S	12-Oct-00	OU1		AS-7	AS-7-10-12	10-12 ft	Sample	37			67									1			12	22
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C10	1120-BD-C10		Sample				67				19			8		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C10	1120-BD-C10		Sample	64												1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C13	1120-BD-C13		Sample				67				19			8		1					
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C13	1120-BD-C13		Sample	64												1					

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Soil Samples Collected To Date - By Date

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C7	1120-BD-C7		Sample					67				19			8		1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	Buried Debris Area	BD-C7	1120-BD-C7		Sample	64													1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C16	1140-SD-C16		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C16B	1140-SD-C16B		Sample					67							1		1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C17	1140-SD-C17		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C17B	1140-SD-C17B		Sample					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C17B	1140-SD-C17B		Sample	64													1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C18	1140-SD-C18		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C18B	1140-SD-C18B		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C19	1140-SD-C19		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C19B	1140-SD-C19B		Sample					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C19B	1140-SD-C19B		Sample	64													1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C20	1140-SD-C20		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C20B	1140-SD-C20B		Sample					67							1		1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C21	1140-SD-C21		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C21B	1140-SD-C21B		Sample					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Confirmatory	South Ditch	SD-C21B	1140-SD-C21B		Sample	64													1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C22	1140-SD-C22		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C22B	1140-SD-C22B		Sample					67							1		1				
C-RAM	GEI	S	12-Oct-00	Confirmatory	South Ditch	SD-C23	1140-SD-C23		Sample					67							1		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B		Sample					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B		Sample	64													1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B-D		Duplicate					67				19			8		1				
C-RAM	GEI	SS	12-Oct-00	Excavated	South Ditch	SD-C23B	1140-SD-C23B-D		Duplicate	64													1				
Plant B	Envirogen	S	13-Oct-00	OU1		AS-5	AS-5-10	10 ft	Sample	37													1		12	22	
C-RAM	GEI	SS	13-Oct-00	OU1	Containment Area	OSFILL-450	1130-OSFILL-450		Sample	64				67					7		8		1				5
C-RAM	GEI	SS	13-Oct-00	OU1	Containment Area	OSFILL-550	1130-OSFILL-550		Sample	64				67					7		8		1				5
C-RAM	GEI	S	13-Oct-00	Confirmatory	On-Property West Ditch	WD-C16	1140-WD-C16		Sample	64				67				19			8		1				
Plant B	Envirogen	S	16-Oct-00	OU1		AS-4	AS-4-8	8 ft	Sample	37													1		12	22	
Plant B	Envirogen	S	16-Oct-00	OU1		AS-8	AS-8-15	15 ft	Sample														1				22
Plant B	Envirogen	S	17-Oct-00	OU1		AS-9	AS-9 S-2 7	7 ft	Sample	37													1		12	22	
Plant B	Envirogen	S	17-Oct-00	OU1		AS-9	AS-9 S-2D 7	7 ft	Duplicate	37													1		12	22	
Plant B	Envirogen	S	17-Oct-00	OU1	Plant B	SVE-6B	SVE-6B S2 8	8 ft	Sample	37													1		12	22	
Plant B	Envirogen	S	17-Oct-00	OU1	Plant B	SVE-6B	SVE-6B S2DUP 8	8 ft	Sample	37													1		12	22	
Plant B	Envirogen	S	17-Oct-00	OU1	Plant B	SVE-6B	SVE-6B S3 10	10 ft	Sample	37													1		12	22	
C-RAM	GEI	S	18-Oct-00	Confirmatory	South Ditch	SD-C24	1140-SD-C24		Sample					67							1		1				
C-RAM	GEI	SS	18-Oct-00	Confirmatory	South Ditch	SD-C24B	1140-SD-C24B		Sample					67							1		1				
C-RAM	GEI	SS	18-Oct-00	Confirmatory	South Ditch	SD-C24B	1140-SD-C24B-D		Duplicate					67							1		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C59	1140-CP-C59		Sample					67							1		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C60	1140-CP-C60		Sample	64				67				19			8		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C61	1140-CP-C61		Sample					67							1		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C62	1140-CP-C62		Sample					67							1		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C64	1140-CP-C64		Sample					67							1		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C65	1140-CP-C65		Sample	64				67				19			8		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C66	1140-CP-C66		Sample					67							1		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C67	1140-CP-C67		Sample					67							1		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C68	1140-CP-C68		Sample					67							1		1				

Table 2.1-3
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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C69	1140-CP-C69		Sample	64				67				19			8		1				
C-RAM	GEI	S	20-Oct-00	Confirmatory	Central Pond	CP-C70	1140-CP-C70		Sample					67							1		1				
Plant B	Envirogen	S	25-Oct-00	OU1		B-10	B-10 S-2	5-6.2 ft bgs	Sample	37													2		12	22	
Plant B	Envirogen	S	25-Oct-00	OU1	Plant B	SVE-11	SVE-11 S2 7-9	7-9 ft	Sample	37													1		12	22	
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C18	1120-BD-C18		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C19	1120-BD-C19		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C20	1120-BD-C20		Sample	64				67				19			8		1				
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C21	1120-BD-C21		Sample	64				67				19			8		1				
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C22	1120-BD-C22		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C23	1120-BD-C23		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C24	1120-BD-C24		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C25	1120-BD-C25		Sample	64				67				19			8		1				
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C26	1120-BD-C26		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C28	1120-BD-C28		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Excavated	Buried Debris Area	BD-C29	1120-BD-C29		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C30	1120-BD-C30		Sample	64				67				19			8		1				
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C31	1120-BD-C31		Sample	64				67				19			8		1				
C-RAM	GEI	SS	27-Oct-00	Excavated	Buried Debris Area	BD-C33	1120-BD-C33		Sample	64				67				19			8		1				
C-RAM	GEI	S	27-Oct-00	Confirmatory	Buried Debris Area	BD-C34	1120-BD-C34		Sample	64				67				19			8		1				
C-RAM	GEI	SS	27-Oct-00	Confirmatory	Buried Debris Area	BD-C35	1120-BD-C35		Sample	64				67				19			8		1				
Plant B	Envirogen	S	01-Nov-00	OU1		B-10	TP-1, 6-9`	6-9 ft	Sample	37				67									1		12	22	
Plant B	Envirogen	S	01-Nov-00	OU1		B-10	TP-1 5-1 9.5	9.5 ft	Sample	37				67									1		12	22	
Plant B	Envirogen	S	01-Nov-00	OU1		B-10	TP-1 S-1DUP 9.5	9.5 ft	Duplicate	37				67									1		12	22	
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C71	1140-CP-C71		Sample												1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C72	1140-CP-C72		Sample												1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C73	1140-CP-C73		Sample												1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	Central Pond	CP-C74	1140-CP-C74		Sample												1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C25	1140-SD-C25		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C25B	1140-SD-C25B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C25B	1140-SD-C25B		Sample	64													1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C26	1140-SD-C26		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C26B	1140-SD-C26B		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C27	1140-SD-C27		Sample	64				67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C27B	1140-SD-C27B		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C28	1140-SD-C28		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C28	1140-SD-C28-D		Duplicate					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C28B	1140-SD-C28B		Sample					67							1		1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C29	1140-SD-C29		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C29B	1140-SD-C29B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C29B	1140-SD-C29B		Sample	64													1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C30	1140-SD-C30		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C30B	1140-SD-C30B		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C31	1140-SD-C31		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C31B	1140-SD-C31B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C31B	1140-SD-C31B		Sample	64													1				
C-RAM	GEI	S	02-Nov-00	Confirmatory	South Ditch	SD-C32	1140-SD-C32		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C32B	1140-SD-C32B		Sample					67							1		1				
C-RAM	GEI	SS	02-Nov-00	Confirmatory	South Ditch	SD-C33	1140-SD-C33		Sample					67							1		1				

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B		Sample					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B-D		Duplicate					67				19			8		1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B		Sample	64													1				
C-RAM	GEI	SS	02-Nov-00	Excavated	South Ditch	SD-C33B	1140-SD-C33B-D		Duplicate	64													1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C34	1140-SD-C34		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C34B	1140-SD-C34B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C35	1140-SD-C35		Sample	64				67				19			8		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C35B	1140-SD-C35B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C36	1140-SD-C36		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C36B	1140-SD-C36B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C37	1140-SD-C37		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C37B	1140-SD-C37B		Sample					67				19			8		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C37B	1140-SD-C37B		Sample	64													1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C38	1140-SD-C38		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C38B	1140-SD-C38B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C38B	1140-SD-C38B-D		Duplicate					67							1		1				
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C39	1140-SD-C39		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C39B	1140-SD-C39B		Sample					67				19			8		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C39B	1140-SD-C39B		Sample	64													1				
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C40	1140-SD-C40		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C40B	1140-SD-C40B		Sample					67							1		1				
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C41	1140-SD-C41		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Excavated	South Ditch	SD-C41B	1140-SD-C41B		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C42	1140-SD-C42		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C42B	1140-SD-C42B		Sample					67				19			8		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C42B	1140-SD-C42B		Sample	64													1				
C-RAM	GEI	S	03-Nov-00	Confirmatory	South Ditch	SD-C43	1140-SD-C43		Sample					67							1		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C43B	1140-SD-C43B		Sample					67				19			8		1				
C-RAM	GEI	SS	03-Nov-00	Confirmatory	South Ditch	SD-C43B	1140-SD-C43B		Sample	64													1				
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-B	1160-A8CW-1-B		Sample					67				19			3		1				
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-E	1160-A8CW-1-E		Sample					67				19			3		1				
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-N	1160-A8CW-1-N		Sample					67				19			3		1				
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-S	1160-A8CW-1-S		Sample					67				19			3		1				
C-RAM	GEI	SS	09-Nov-00	OU1	C-RAM Hotspot	A8CW-1-W	1160-A8CW-1-W		Sample					67				19			3		1				
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-B	1160-RS0-06-B		Sample	1				66				19			3		1				
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-E	1160-RS0-06-E		Sample					67				19			3		1				
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-N	1160-RS0-06-N		Sample					67				19			3		1				
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-S	1160-RS0-06-S		Sample					67				19			3		1				
C-RAM	GEI	S	09-Nov-00	OU1	C-RAM Hotspot	RSO-06-W	1160-RS0-06-W		Sample					67				19			3		1				
Plant B	Envirogen	S	14-Nov-00	OU1	Plant B	SVE-12	SVE 12-6-8	6-8 ft	Sample	37				67									2				22
Plant B	Envirogen	S	14-Nov-00	OU1	Plant B	SVE-13	SVE 13-9	9 ft	Sample	37				67									2				22
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1120	1130-OSFILL-1120		Sample	64				67					7		8		1				5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1170	1130-OSFILL-1170		Sample	64				67					7		8		1				5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1220	1130-OSFILL-1220		Sample	64				67					7		8		1				5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-1220	1130-OSFILL-1220 D		Duplicate	64				67					7		8		1				5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-400	1130-OSFILL-400		Sample	64				67					7		8		1				5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-460	1130-OSFILL-460		Sample	64				67					7		8		1				5
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-530	1130-OSFILL-530		Sample	64				67					7		8		1				5

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	15-Nov-00	OU1	Containment Area	OSFILL-600	1130-OSFILL-600		Sample	64				67					7		8		1				5
Plant B	Envirogen	S	15-Nov-00	OU1	Plant B	SVE-14	SVE 14-8-9	8-9 ft	Sample	37				67									2			12	22
Plant B	Envirogen	S	15-Nov-00	OU1	Plant B	SVE-15	SVE 15-9-9.5	9-9.5 ft	Sample	37				67									2			12	22
Plant B	Envirogen	S	15-Nov-00	OU1	Plant B	SVE-16	SVE 16-8	8 ft	Sample	37				67									2			12	22
C-RAM	GEI	S	17-Nov-00	OU1	Lake Poly	LAKE POLY 1-B	1160-LAKE POLY 1-B		Sample	64				67				19			3		1				
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-E	1160-LAKE POLY 1-E		Sample	64				66				19			3		1				
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-N	1160-LAKE POLY 1-N		Sample	64				67				19			3		1				
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-S	1160-LAKE POLY 1-S		Sample	64				67				19			3		1				
C-RAM	GEI	S	17-Nov-00	Excavated	Lake Poly	LAKE POLY 1-W	1160-LAKE POLY 1-W		Sample	64				67				19			3		1				
C-RAM	GEI	S	18-Nov-00	Confirmatory	Central Pond	CP-C75	1140-CP-C75		Sample												1		1				
C-RAM	GEI	S	18-Nov-00	Confirmatory	Central Pond	CP-C76	1140-CP-C76		Sample												1		1				
C-RAM	GEI	S	01-Dec-00	Confirmatory	Central Pond	CP-C77	1160-CP-C77		Sample												1		1				
Plant B Spent Carbon	Envirogen	S	16-Feb-01	OU1		SV-460	SV-460 MS/MSD		Sample	63				67									2				
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-01	1160-LAKEPOLY1-01		Sample	64													1				
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-01	1160-LAKEPOLY1-01		Sample					66							3		2				
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-02	1160-LAKEPOLY1-02		Sample	64													1				
C-RAM	GEI	S	08-May-01	OU1	Lake Poly	LAKEPOLY1-02	1160-LAKEPOLY1-02		Sample					66							3		2				
C-RAM	GEI	SS	09-May-01	Confirmatory	Central Pond	CP-C78	1140-CP-C78		Sample					66							1		1				
C-RAM	GEI	S	09-May-01	Excavated	Central Pond	CP-C79	1140-CP-C79		Sample					66							1		1				
C-RAM	GEI	S	09-May-01	Confirmatory	Central Pond	CP-C80	1140-CP-C80		Sample	64				66							7		1				
C-RAM	GEI	S	09-May-01	Confirmatory	Central Pond	CP-C81	1140-CP-C81		Sample					66							1		1				
C-RAM	GEI	S	09-May-01	Confirmatory	Central Pond	CP-C82	1140-CP-C82		Sample					66							1		1				
C-RAM	GEI	SS	09-May-01	Confirmatory	Central Pond	CP-C83	1140-CP-C83		Sample					66							1		1				
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C84	1140-CP-C84		Sample	64				67							7		1				
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C85	1140-CP-C85		Sample					67							1		1				
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C86	1140-CP-C86		Sample					67							1		1				
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C87	1140-CP-C87		Sample	64				67							7		1				
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C88	1140-CP-C88		Sample					67							1		1				
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C89	1140-CP-C89		Sample					67							1		1				
C-RAM	GEI	SS	10-May-01	Confirmatory	Central Pond	CP-C90	1140-CP-C90		Sample	64											7		1				
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C91	1140-CP-C91		Sample					67							1		1				
C-RAM	GEI	S	10-May-01	Confirmatory	Central Pond	CP-C92	1140-CP-C92		Sample					67							1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C44N	1140-SD-C44N		Sample					67							1		1				
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C44S	1140-SD-C44S		Sample					67							1		1				
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C45N	1140-SD-C45N		Sample					67							1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C45S	1140-SD-C45S		Sample					67							1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C46N	1140-SD-C46N		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C46S	1140-SD-C46S		Sample												1		1				
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C47N	1140-SD-C47N		Sample					67							1		1				
C-RAM	GEI	S	14-May-01	Confirmatory	South Ditch	SD-C47S	1140-SD-C47S		Sample					67							1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C48N	1140-SD-C48N		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C48S	1140-SD-C48S		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C49N	1140-SD-C49N		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C49S	1140-SD-C49S		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C50N	1140-SD-C50N		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C50S	1140-SD-C50S		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C51N	1140-SD-C51N		Sample												1		1				

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Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C51S	1140-SD-C51S		Sample												1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C52N	1140-SD-C52N		Sample	64											1		1				
C-RAM	GEI	SS	14-May-01	Confirmatory	South Ditch	SD-C52S	1140-SD-C52S		Sample	64											1		1				
C-RAM	GEI	SS	15-May-01	Confirmatory	South Ditch	SD-C53N	1140-SD-C53N		Sample												1		1				
C-RAM	GEI	SS	15-May-01	Confirmatory	South Ditch	SD-C53S	1140-SD-C53S		Sample												1		1				
C-RAM	GEI	SS	15-May-01	Excavated	South Ditch	SD-C54N	1140-SD-C54N		Sample					67							1		1				
C-RAM	GEI	SS	15-May-01	Confirmatory	South Ditch	SD-C54S	1140-SD-C54S		Sample					67							1		1				
C-RAM	GEI	S	16-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C33	1140-WDW-C33		Sample												1		1				
C-RAM	GEI	SS	16-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C34	1140-WDW-C34		Sample												1		1				
C-RAM	GEI	S	17-May-01	Confirmatory	Central Pond	CP-C79B	1140-CP-C79B		Sample												1		1				
C-RAM	GEI	SS	18-May-01	Confirmatory	South Ditch	SD-C55	1140-SD-C55		Sample												1		1				
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C50	1140-BD-C50		Sample					67									1				
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C50	1140-BD-C50		Sample	64																	
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C50	1140-BD-C50		Sample												1						
C-RAM	GEI	SS	19-May-01	Confirmatory	Buried Debris Area	BD-C51	1140-BD-C51		Sample					67									1				
C-RAM	GEI	SS	19-May-01	Confirmatory	Buried Debris Area	BD-C51	1140-BD-C51		Sample	64																	
C-RAM	GEI	SS	19-May-01	Confirmatory	Buried Debris Area	BD-C51	1140-BD-C51		Sample												1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C52	1140-BD-C52		Sample					67									1				
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C52	1140-BD-C52		Sample	64																	
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C52	1140-BD-C52		Sample												1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C53	1140-BD-C53		Sample					67									1				
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C53	1140-BD-C53		Sample	64																	
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C53	1140-BD-C53		Sample												1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C54	1140-BD-C54		Sample					67									1				
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C54	1140-BD-C54		Sample	64																	
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C54	1140-BD-C54		Sample												1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55		Sample					67									1				
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55D		Sample					67									1				
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55		Sample	64																	
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55		Sample												1						
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55D		Sample	64																	
C-RAM	GEI	S	19-May-01	Confirmatory	Buried Debris Area	BD-C55	1140-BD-C55D		Sample												1						
C-RAM	GEI	S	21-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35		Sample					67									1				
C-RAM	GEI	S	21-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35		Sample	64																	
C-RAM	GEI	S	21-May-01	Confirmatory	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35		Sample												1						
C-RAM	GEI	SS	09-Jul-01	Excavated	Lake Poly	LPB11	1160-LPB11-S1		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	Excavated	Lake Poly	LPB11	1160-LPB11-S2		Sample												1		2				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB11	1160-LPB11-S3		Sample												1		1				
C-RAM	GEI	SS	09-Jul-01	Excavated	Lake Poly	LPB13	1160-LPB13-S1		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB13	1160-LPB13-S2		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB13	1160-LPB13-S3		Sample												1		1				
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB17	1160-LPB17-S1		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB17	1160-LPB17-S2		Sample												1		1				

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB19	1160-LPB19-S1		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB19	1160-LPB19-S2		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB19	1160-LPB19-S3		Sample												1		1				
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB3	1160-LPB3-S1		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB3	1160-LPB3-S2		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB3	1160-LPB3-S3		Sample												1		1				
C-RAM	GEI	SS	09-Jul-01	OU1	Lake Poly	LPB9	1160-LPB9-S1		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB9	1160-LPB9-S2		Sample												1		1				
C-RAM	GEI	S	09-Jul-01	OU1	Lake Poly	LPB9	1160-LPB9-S3		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S1		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample												1		2				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S2-D		Duplicate					67				19			3		2				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB10	1160-LPB10-S3		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S1		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample												1		2				
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	Excavated	Lake Poly	LPB12	1160-LPB12-S2		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample									19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3		Sample													1					
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB15	1160-LPB15-S1		Sample													1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S2		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB15	1160-LPB15-S3		Sample													1					
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1		Sample												1		1				
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	Excavated	Lake Poly	LPB16	1160-LPB16-S1 RX (178582)		Sample					67									1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample												1		1				
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample					67				19	7		7		7				22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB16	1160-LPB16-S2		Sample													1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S1		Sample												1		1				

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S2		Sample											1		1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S2		Sample												1						
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB18	1160-LPB18-S3		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB4	1160-LPB4-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB4	1160-LPB4-S2		Sample											1		1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB4	1160-LPB4-S3		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample					67			19			3		2					22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S1		Sample												1						
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample											1		1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample					67			19	7		7		7					22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB5	1160-LPB5-S2		Sample												1						
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB6	1160-LPB6-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB6	1160-LPB6-S2		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB6	1160-LPB6-S2		Sample												1						
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S1		Sample					67			19			3		2					22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S1		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample											1		1					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample													2					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample	64															12		
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S1		Sample											1		1					
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S1		Sample					67			19			3		2					22
C-RAM	GEI	SS	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S1		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample											1		2					
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample					67			19	7		7		7					22
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample	64															12		
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S2		Sample												1						
C-RAM	GEI	S	10-Jul-01	OU1	Lake Poly	LPB8	1160-LPB8-S3		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB1	1160-LPB1-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB1	1160-LPB1-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB12	1160-LPB12-S3 RX (178578)		Sample					67								1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1		Sample								19			3		2					22
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1		Sample	64															12		
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S1 RX (178762)		Sample					67								1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample					67			19			3		2					22
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample													2					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB14	1160-LPB14-S2		Sample	64															12		
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB2	1160-LPB2-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB2	1160-LPB2-S2		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB22	1160-LPB22-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB22	1160-LPB22-S2		Sample											1		1					
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB23	1160-LPB23-S1		Sample											1		1					
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB23	1160-LPB23-S2		Sample											1		1					

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB24	1160-LPB24-S1		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB24	1160-LPB24-S2		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB24	1160-LPB24-S3		Sample												1		1				
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB25	1160-LPB25-S1		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB25	1160-LPB25-S2		Sample												1		2				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB25	1160-LPB25-S3		Sample												1		1				
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB26	1160-LPB26-S1		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB26	1160-LPB26-S2		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB26	1160-LPB26-S3		Sample												1		1				
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB27	1160-LPB27-S1		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB27	1160-LPB27-S2		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB27	1160-LPB27-S3		Sample												1		1				
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB 28-S1		Sample												1		1				
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S1		Sample					67				19			3		2				22
C-RAM	GEI	SS	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S1		Sample	64															12		
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB 28-S2		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S2		Sample					67				19			3		2				22
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S2		Sample														2				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB28-S2		Sample	64															12		
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB28	1160-LPB 28-S3		Sample												1		1				
C-RAM	GEI	S	11-Jul-01	OU1	Lake Poly	LPB7	1160-LPB7-S2		Sample					67				19			3		2				22
C-RAM	GEI	SS	12-Jul-01	Excavated	Lake Poly	LPB29	1160-LPB 29-S1		Sample												1		1				
C-RAM	GEI	S	12-Jul-01	Excavated	Lake Poly	LPB29	1160-LPB 29-S2		Sample												1		2				
C-RAM	GEI	S	12-Jul-01	Excavated	Lake Poly	LPB29	1160-LPB29-S2		Sample													1					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB29	1160-LPB 29-S3		Sample												1		1				
C-RAM	GEI	SS	12-Jul-01	Excavated	Lake Poly	LPB30	1160-LPB 30-S1		Sample												1		1				
C-RAM	GEI	S	12-Jul-01	Excavated	Lake Poly	LPB30	1160-LPB 30-S2		Sample												1		2				
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB30	1160-LPB 30-S3		Sample												1		1				
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB31	1160-LPB 31-S1		Sample												1		1				
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB31	1160-LPB 31-S2		Sample												1		1				
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB32	1160-LPB 32-S1		Sample												1		1				
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB32	1160-LPB 32-S2		Sample												1		1				
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB 33-S1		Sample												1		1				
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB 33-S2		Sample												1		1				
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB33-S2		Sample													1					
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB33	1160-LPB 33-S3		Sample												1		1				
C-RAM	GEI	SS	12-Jul-01	OU1	Lake Poly	LPB34	1160-LPB 34-S1		Sample												1		1				
C-RAM	GEI	S	12-Jul-01	OU1	Lake Poly	LPB34	1160-LPB 34-S2		Sample												1		1				
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-1	1010-SED-SDF-1S		Sample	64													1				
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-1	1010-SED-SDF-1S		Sample					67							9		4				22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-2	1010-SED-SDF-2S		Sample	64													1				
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-2	1010-SED-SDF-2S		Sample					67							9		4				22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-SDF-3S		Sample	64													1				
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-DUPE1		Duplicate	64													1				
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-SDF-3S		Sample					67							9		3				22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-3	1010-SED-DUPE1		Duplicate					67							9		3				22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-4	1010-SED-SDF-4S		Sample	64													1				
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-4	1010-SED-SDF-4S		Sample					67							9		3				22

Table 2.1-3
Soil Samples Collected To Date - By Date

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Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-5	1010-SED-SDF-5S		Sample	64				67							9	1	3				22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-5	1010-SED-SDF-5S		Sample					67							9	1	3				22
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-6	1010-SED-SDF-6S		Sample	64												1					
Phase II	GEI	SS	17-Sep-01	OU1	South Ditch	SDF-6	1010-SED-SDF-6S		Sample					67							9	1	3				22
Central Pond Test Pits	GEI	SS	18-Sep-01	Excavated	Central Pond	CP-TP14	1010-CP-TP14 MS/MSD		Sample									7		8	1						22
Central Pond Test Pits	GEI	SS	18-Sep-01	OU1	Central Pond	CP-TP15	1010-CP-TP15		Sample									7		8	1						22
Central Pond Test Pits	GEI	SS	18-Sep-01	OU1	Central Pond	CP-TP19	1010-CP-TP19		Sample									7		8	1						22
Central Pond Test Pits	GEI	SS	18-Sep-01	OU1	Central Pond	CP-TP8	1010-CP-TP8		Sample									7		8	1						22
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-06-01	0 - 0.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-C12-01	0 - 1.0 ft bgs	Sample	68				65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-12-01	0.5 - 1.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-18-01	1.0 - 1.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-C36-01	1.0 - 3.0 ft bgs	Sample	68				65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-24-01	1.5 - 2.0 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-30-01	2.0 - 2.5 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-36-01	2.5 - 3.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-06-01	0 - 0.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-C12-01	0 - 1.0 ft bgs	Sample	68				65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-12-01	0.5 - 1.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-18-01	1.0 - 1.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-C36-01	1.0 - 3.0 ft bgs	Sample	68				65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-24-01	1.5 - 2.0 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-30-01	2.0 - 2.5 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-36-01	2.5 - 3.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-06-01	0 - 0.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C12-01	0 - 1.0 ft bgs	Sample	68				65		1						1					

Table 2.1-3
Soil Samples Collected To Date - By Date

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Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C12-01	0 - 1.0 ft bgs	Sample					65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-12-01	0.5 - 1.0 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-18-01	1.0 - 1.5 ft bgs	Sample											22		3					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C36-01	1.0 - 3.0 ft bgs	Sample	68												1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C36-01	1.0 - 3.0 ft bgs	Sample					65		1						1					
OPWD	MACTEC	SS	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-24-01	1.5 - 2.0 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-30-01	2.0 - 2.5 ft bgs	Sample											22		3					
OPWD	MACTEC	S	17-Jun-03	OU1	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-36-01	2.5 - 3.0 ft bgs	Sample											22		3					
Central Pond Excavation	GEI	S	27-Aug-03	Confirmatory	Central Pond	CP-EX1	1170-CPEX1-BOT		Sample											8		1					22
Central Pond Excavation	GEI	S	27-Aug-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-BOT		Sample											8		1					22
Central Pond Excavation	GEI	S	27-Aug-03	Confirmatory	Central Pond	CP-EX3	1170-CPEX3-BOT		Sample											8		1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX1	1170-CPEX1-SIDE123		Sample											8		1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX1	1170-CPEX1-SIDE4		Sample											8		1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-SIDE123		Sample											8		1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-SIDE4		Sample											8		1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX3	1170-CPEX3-SIDE123		Sample											8		1					22
Central Pond Excavation	GEI	S	28-Aug-03	Confirmatory	Central Pond	CP-EX3	1170-CPEX3-SIDE4		Sample											8		1					22
Central Pond Excavation	GEI	S	10-Oct-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-Side1		Sample													1					22
Central Pond Excavation	GEI	S	10-Oct-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-Side2		Sample													1					22
Central Pond Excavation	GEI	S	10-Oct-03	Confirmatory	Central Pond	CP-EX2	1170-CPEX2-Side3		Sample													1					22
North Pond	MACTEC	SS	20-Nov-03	North Pond	North Pond	NPSB1	NPSB1-Fill1	0-2 ft	Sample											8		2					
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB1	NPSB1-SED1	6-7.5 ft	Sample	75				68		1		19		11	8		6				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB1	NPSB1-SOIL1	9-11 ft	Sample	75												6					
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB2	NPSB2-Fill1	2-3 ft	Sample											8		2					
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB3	NPSB3-Fill1	2-4 ft	Sample											8		2					
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB3	NPSB3-SED1	9.4-10.4 ft	Sample	75				68		1		19			8		6				
North Pond	MACTEC	S	20-Nov-03	North Pond	North Pond	NPSB3	NPSB3-SOIL1	10.4-12 ft	Sample	75												6					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-40	LPB-40-OVR	0-2.9 ft bgs	Sample			2	3			1						1					

Table 2.1-3
Soil Samples Collected To Date - By Date

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Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-40	LPB-40-VI	5-10 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-40	LPB-40-BLW	10-11 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-41	LPB-41-OVR	0-1.5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-41	LPB-41-VI	1.5-3.5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-41	LPB-41-BLW	5-9.5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-42	LPB-42-OVR	0-3.5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-42	LPB-42-VI	3.5-5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-42	LPB-42-BLW	9-10 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	SS	10-Dec-03	OU1	Lake Poly	LPB-43	LPB-43-OVR	1-3.5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-43	LPB-43-VI	3.5-5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-43	LPB-43-BLW	8.7-10 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-48	LPB-48-OVR	2.5-5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-48	LPB-48-VI	5-8 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-48	LPB-48-BLW	8-10 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-50	LPB-50-OVR	2.5-5 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-50	LPB-50-VI	7.5-8.4 ft bgs	Sample			2	3			1						1					
Lake Poly	MACTEC	S	10-Dec-03	OU1	Lake Poly	LPB-50	LPB-50-BLW	8.4-10 ft bgs	Sample			2	3			1						1					
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-1	ECS-1	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-2	ECS-2	10-12 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-3	ECS-3	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	29-Jan-04	OU1	51 Eames Street	ECS-5a	ECS-5	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-4	ECS-4	10-12 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-6	ECS-6	10-12 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-8	ECS-8	5-7 ft bgs	Sample													1			12		
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-C-1	ECS-C-1		Sample					74		1			9		8	6					21
Redevelopment	ECS Marin	S	30-Jan-04	OU1	51 Eames Street	ECS-C-2	ECS-C-2		Sample					72		1		2	9		8	6					21
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1		PLD-1	PLD1-5-8	5-8 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1		PLD-2	PLD2-5-8	5-8 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	SS	08-Mar-04	OU1		PLD-3	PLD3-0-4	0-4 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1		PLD-3	PLD3-5-8	5-8 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	SS	08-Mar-04	OU1	51 Eames Street	GW-306	PLD1A-0-4 (GW-306)	0-4 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	SS	08-Mar-04	OU1	51 Eames Street	GW-307	PLD2A-0-4 (GW-307)	0-4 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	S	08-Mar-04	OU1	Calcium Sulfate Landfill	CSL-1	CSL1-4-6	4-6 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	S	09-Mar-04	OU1		WSS-2	WSS2-2-4	2-4 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	S	09-Mar-04	OU1	51 Eames Street	GW-301	WSS1-2-4 (GW-301)	2-4 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	S	09-Mar-04	OU1	51 Eames Street	GW-302	WSS3-2-4 (GW-302)	2-4 ft	Sample			2	3			1						1					
Part 2 Phase II	MACTEC	S	10-Mar-04	OU1	51 Eames Street	GW-303	WSL1-6-10 (GW-303)	6-10 ft	Sample			2				1						1					
Part 2 Phase II	MACTEC	S	10-Mar-04	OU1	51 Eames Street	GW-303	WSL1-6-10 DUP (GW-303)	6-10 ft	Duplicate			2				1						1					
Part 2 Phase II	MACTEC	S	10-Mar-04	OU1	51 Eames Street	GW-304	WSL2-5-9 MS/MSD (GW-304)	5-9 ft	Duplicate			2				1						1					
Part 2 Phase II	MACTEC	S	11-Mar-04	OU1	51 Eames Street	GW-305	WSL3-5-9 (GW-305)	5-9 ft	Sample			2				1						1					
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS1		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS2		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS3		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS4		Sample				3	68		1						1		1			
Biocell	MACTEC	S	21-Apr-04	OU1	Biocell	BIOCELL	1140-BP-DS5		Sample				3	68		1						1		1			

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-BOT-A	LP-BOT-A	7.5-9.0	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-BOT-B	LP-BOT-B	7.0-9.0	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-BOT-C	LP-BOT-C	5.0-9.0	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Excavated	Lake Poly	LP-C01	LP-C01	5.5-7.5	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C02	LP-C02	5.0-6.5	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C03	LP-C03	5.0-7.0	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C04	LP-C04	5.0-7.0	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C05	LP-C05	4.5-5.5	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C06	LP-C06	4.0-6.0	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C07	LP-C07	4.5-6.5	Sample												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C07	LP-C07D	4.5-6.5	Duplicate												1		2				
Lake Poly Confirmatory Samples/Excavation	GEI	S	09-Jun-04	Confirmatory	Lake Poly	LP-C08	LP-C08	5.0-7.0	Sample												1		2				

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lake Poly Confirmatory Samples/Excavation	GEI	S	15-Jun-04	Confirmatory	Lake Poly	LP-C09	LP-C09	5.5-7.5 ft bgs	Sample												1		2				
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVEMW-9	SVESB-9-10-12	10-12 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-1	SVESB1-8-10	8-10 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-2	SVESB2-6-8	6-8 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-3	SVESB-3-6-8	6-8 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-4	SVESB4-4-6.5	4-6.5 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-5	SVESB-5-6-8	6-8 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-5	SVESB-5-8-11	8-11 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-6	SVESB-6-8-10	8-10 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-7	SVESB7-8-10	8-10 ft	Sample	2													1			14	
Plant B SVE Borings	MACTEC	S	16-Jul-04	OU1	Plant B	SVESB-8	SVESB-8-8-10	8-10 ft	Sample	2													1			14	
North Pond	MACTEC	SS	08-Sep-04	North Pond	North Pond	NPSB4	NPSB4-Fill	0-2 ft	Sample	75				68		1		21		11	7		5				
North Pond	MACTEC	S	08-Sep-04	North Pond	North Pond	NPSB4	NPSB4-Sed	5-7 ft	Sample	75				68		1		21		11	7		5				
North Pond	MACTEC	S	08-Sep-04	North Pond	North Pond	NPSB4	NPSB4-Soil	10-11.5 ft	Sample	75				68		1		21		11	7		5				
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS1-02		Sample				3	68		1							2		1		
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS2-02		Sample				3	68		1							2		1		
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS3-02		Sample				3	68		1							2		1		
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS4-02		Sample				3	68		1							2		1		
Biocell	MACTEC	S	19-May-05	OU1	Biocell	BIOCELL	1140-BP-DS5-02		Sample				3	68		1							2		1		
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS040	BS040LSD RE	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS040	BS040LSD	0-0.5 ft	Sample					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSD	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSD-DUP	0-0.5 ft	Duplicate					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSDRE	0-0.5 ft	Sample					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS041	BS041LSD-DUPRE	0-0.5 ft	Duplicate					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS042	BS042LSD	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS042	BS042LSDRE	0-0.5 ft	Sample					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS043	BS043LSD RE	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Lower South Ditch	BS043	BS043LSD	0-0.5 ft	Sample					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-02	BS021REF-02 ( )	0-0.5 ft	Sample					68			16	19			24		5				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-02	BS021REF-02 ( )RE	0-0.5 ft	Sample					68									1				
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-03	BS021REF-03 ( )	0-0.5 ft	Sample					68			16	19			24		5				

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-03	BS021REF-03 ( )RE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-04	BS021REF-04 ( )	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	22-Aug-05	OU1	Maple Meadow Brook	BS021-04	BS021REF-04 ( )RE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS044	BS044LSD	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS044	BS044LSD RE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS045	BS045LSD	0-0.5 ft	Sample					68			16	19			24	5					
Lower South Ditch	MACTEC	SS	23-Aug-05	OU1	Lower South Ditch	BS045	BS045LSD RE	0-0.5 ft	Sample					68								1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD17	SOLSD-17-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD17	SOLSD-17-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD18	SOLSD-18-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD18	SOLSD-18-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD18	SOLSD-18-12-18	1-1.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD19	SOLSD-19-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD19	SOLSD-19-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD20	SOLSD-20-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD20	SOLSD-20-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD21	SOLSD-21-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD22	SOLSD-22-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	20-Sep-05	OU1	Lower South Ditch	SOLSD23	SOLSD-23-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD01	SOLSD-1-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD02	SOLSD-2-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD03	SOLSD-3-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD04	SOLSD-4-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD05	SOLSD-5-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD06	SOLSD-6-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD06	SOLSD-6-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD06	SOLSD-6-12-18	1-1.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD07	SOLSD-7-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD07	SOLSD-7-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD08	SOLSD-8-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD09	SOLSD-9-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD10	SOLSD-10-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-6-12-D	0.5-1 ft	Duplicate												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD11	SOLSD-11-12-18	1-1.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD12	SOLSD-12-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD12	SOLSD-12-0-6-D	0-0.5 ft	Duplicate												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD13	SOLSD-13-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD13	SOLSD-13-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD13	SOLSD-13-12-18	1-1.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD14	SOLSD-14-0-6	0-0.5 ft	Sample												2	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD14	SOLSD-14-6-12	0.5-1 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD15	SOLSD-15-0-6	0-0.5 ft	Sample												1	1					
Lower South Ditch	MACTEC	SS	21-Sep-05	OU1	Lower South Ditch	SOLSD16	SOLSD-16-0-6	0-0.5 ft	Sample												1	1					

Table 2.1-3
Soil Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	RI Status	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-1	CS GPS-1	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-11	CS GPS-11	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-13	CS GPS-13	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-15	CS GPS-15	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-17	CS GPS-17	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-19	CS GPS-19	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-21	CS GPS-21	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-21	CS GPS-21DUP	0-1 ft	Duplicate													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-23	CS GPS-23	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-25	CS GPS-25	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-27	CS GPS-27	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-29	CS GPS-29	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-3	CS GPS-3	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-5	CS GPS-5	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-7	CS GPS-7	0-1 ft	Sample													2					
Calcium Sulfate Landfill	MACTEC	SS	24-Oct-06	OU1	Calcium Sulfate Landfill	CS GPS-9	CS GPS-9	0-1 ft	Sample													2					

Notes:
SS - Surface Soil
S - Subsurface Soil

Prepared/Date: KJC 07/27/07
Checked/Date: MJM 07/27/07

Table 2.1-4
Summary of Sediment Samples Collected To Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	Inorganics/Physical	Field - pH	Field	Oil & Grease	Extractable Petroleum Hydrocarbons
		SD		5/14/1990		SS-14 SED			SS-14 SED	Sample											1	1	
Jan2000	HLA	SD	OU1	1/18/2000	on-Property West Ditch	RSD-01			RSD-01	Sample		66											
Jan2000	HLA	SD	OU1	1/18/2000	on-Property West Ditch	RSD-01			RSD-01RE	Sample	37												
Jan2000	HLA	SD	OU1	1/18/2000	on-Property West Ditch	RSD-01			RSD-01	Sample								22	1				
Jan2000	HLA	SD	OU1	1/18/2000	on-Property West Ditch	RSD-02			RSD-02	Sample	37	66											
Jan2000	HLA	SD	OU1	1/18/2000	on-Property West Ditch	RSD-02			RSD-02	Sample								22	1				
Jan2000	HLA	SD	OU1	1/18/2000	Ephemeral Drainage	RSD-10			RSD-10	Sample	37	66											
Jan2000	HLA	SD	OU1	1/18/2000	Ephemeral Drainage	RSD-10			RSD-10	Sample								22	1				
Jan2000	HLA	SD	OU1	1/18/2000	Ephemeral Drainage	RSD-10			RSD-10	Sample								1					
Jan2000	HLA	SD	OU1	1/18/2000	Ephemeral Drainage	RSD-12			RSD-12	Sample	37	66											
Jan2000	HLA	SD	OU1	1/18/2000	Ephemeral Drainage	RSD-12			RSD-12	Sample								22	1				
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Drainage	RSD-09			RSD-09	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Drainage	RSD-09			RSD -09	Sample								22	1				
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Drainage	RSD-09			RSD-09 MS/MSD	Duplicate								22	1				
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Drainage	RSD-11			RSD-11	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Drainage	RSD-11			BLIND DUP	Duplicate	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Drainage	RSD-11			RSD -11	Sample								22	1				
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Drainage	RSD-11			BLIND DUP	Duplicate								22	1				
RAM Plan	LAW	SD		5/23/2000		RSD-36	3	3	RSD-36	Sample		67						1	1				
RAM Plan	LAW	SD		5/23/2000		RSD-37			RSD-37	Sample		67						1	1				
RAM Plan	LAW	SD		5/23/2000		RSD-38			RSD-38	Sample		67						1	1				
RAM Plan	LAW	SD		5/23/2000		RSD-39			RSD-39	Sample		67						1	1				
RAM Plan	LAW	SD		5/23/2000		RSD-39			DUPLICATE	Duplicate		67						1	1				
	ABB-ES	SD	SD Background	4/1/1996	Background	SDBK-001	0	0.3	SD001XXBKX	Background Sample	36	64						24	2				
	ABB-ES	SD	SD Background	4/1/1996	Background	SDBK-002	0	0.3	SD002XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	SD Background	4/2/1996	Background	SDBK-005	0	0.3	SD005XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/2/1996	Background	SDBK-006	0.25	0.3	SD006XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/2/1996	Background	SDBK-007	0.25	0.3	SD007XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/2/1996	Background	SDBK-013	0	0.25	SD013XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/3/1996	Background	SDBK-003	0.25	0.3	SD003XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	SD Background	4/3/1996	Background	SDBK-004	0.25	0.3	SD004XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	SD Background	4/3/1996	Background	SDBK-008	0.25	0.3	SD008XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/3/1996	Background	SDBK-009	0	0.3	SD009XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/4/1996	Background	SDBK-010	0	0.3	SD010XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/4/1996	Background	SDBK-011	0	0.5	SD011XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/4/1996	Background	SDBK-012	0	0.3	SD012XXBKX	Background Sample					21				2				
	ABB-ES	SD	SD Background	4/4/1996	Background	SDBK-014	0	0.5	SD014XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	SD Background	4/4/1996	Background	SDBK-014	0	0.5	SD014XXBKD	Background Duplicate	36	64			21			24	2				
	ABB-ES	SD	SD Background	5/24/1996	Background	SDBK-001	0	0.3	SD001XXBKR	Background Sample					21				1		1		
	CRA	SD	Excavated	9/2/1992	Buried Debris Area	SW-12			SW-12	Sample	36	65			21			23	4				
	CRA	SD	Excavated	12/1/1992	Buried Debris Area	SW-12			SW-12	Sample	36	65			21			23	4				
	HLA	SD	Excavated	10/11/1996	Buried Debris Area	BS001			BS001WDXXX	Sample					21	7		23					
	HLA	SD	Excavated	1/20/1997	Buried Debris Area	BS005			BS005WDX	Sample		65			21			23	1				
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-13			RAM-13	Sample		67											
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-13			RAM-13 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-14			RAM-14	Sample		67											
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-14			RAM-14 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-15			RAM-15	Sample		67											
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-15			RAM-15 ENCORE	Sample	64												
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-03			RSD-03	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-03			RSD-03	Sample								22	1				
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-04			RSD-04	Sample	37	66											
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-04			RSD-04	Sample								22	1				
RAM Plan	LAW	SD	Excavated	5/23/2000	Buried Debris Area	RSD-23	0.5	0.5	RSD-23	Sample								1	1				
C-RAM	GEI	SD	Confirmatory	10/27/2000	Buried Debris Area	BD-C17	0.2	0.2	1120-BD-C17	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/27/2000	Buried Debris Area	BD-C27	0.5	0.5	1120-BD-C27	Sample	64	67			19			8	1				

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C-RAM	GEI	SD	Confirmatory	10/27/2000	Buried Debris Area	BD-C32	0.6	0.6	1120-BD-C32	Sample	64	67			19		8	1					
	CRA	SD	Excavated	9/1/1992	Central Pond	SW-8			SW-08	Sample	36	65			21		23	4					
	CRA	SD	Excavated	12/1/1992	Central Pond	SW-8			SW-08	Sample	36	65			21		24	6					
		SD	Excavated	9/13/1995	Central Pond	POND			POND	Sample	36	64			21	7	23	1					
	HLA	SD	Excavated	1/20/1997	Central Pond	BS009			BS009PND	Sample		65			21		23	1					
	HLA	SD	Excavated	1/20/1997	Central Pond	BS010			BS010PND	Sample		65			21		23	1					
Jan2000	HLA	SD	Excavated	1/18/2000	Central Pond	RSD-08			RSD-08	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	Central Pond	RSD-08			RSD-08	Sample							22	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-24	0.5	0.5	RSD-24	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-25	1.2	1.2	RSD-25	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-26	0.75	0.75	RSD-26	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-27	0.67	0.67	RSD-27	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-28	0.5	0.5	RSD-28	Sample							1	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C1	5.6	5.6	1140-CP-C1	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C2	6	6	1140-CP-C2	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C3	5.4	5.4	1140-CP-C3	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C4	5	5	1140-CP-C4	Sample	64	67					8	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C5	4.8	4.8	1140-CP-C5	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C6	5.3	5.3	1140-CP-C6	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C7	4.9	4.9	1140-CP-C7	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C8	5.7	5.7	1140-CP-C8	Sample	64	67					8	1					
	CRA	SD	Excavated	9/1/1992	Delta	SW-7			SW-07	Sample	36	65			21		23	4					
	CRA	SD	Excavated	12/1/1992	Delta	SW-7			SW-07	Sample	36	65			21		23	4					
		SD	OU2	8/31/1992	East Ditch	SW-1			SW-01	Sample	36	65			21		23	4					
		SD	OU2	8/31/1992	East Ditch	SW-2			SW-02	Sample	36	65			21		23	4					
		SD	OU2	8/31/1992	East Ditch	SW-3			SW-03	Sample	36	65			21		23	4					
		SD	OU2	8/31/1992	East Ditch	SW-4			SW-04	Sample	36	65			21		23	4					
		SD	OU2	8/31/1992	East Ditch	SW-5			SW-05	Sample	36	65			21		23	4					
		SD	OU2	11/30/1992	East Ditch	SW-1			SW-01	Sample	36	65			21		23	4					
		SD	OU2	11/30/1992	East Ditch	SW-2			SW-02	Sample	36	65			21		23	4					
		SD	OU2	11/30/1992	East Ditch	SW-3			SW-03	Sample	36	65			21		23	4					
		SD	OU2	11/30/1992	East Ditch	SW-4			SW-04	Sample	36	65			21		23	4					
		SD	OU2	11/30/1992	East Ditch	SW-5			SW-05	Sample	36	65			21		23	4					
		SD	OU2	12/2/1992	East Ditch	SW-23			SW-23	Sample	36	65			21		24	6					
		SD	OU2	1/7/1993	East Ditch	SW-24			SW-24	Sample	36	65			21		23	3		1			
		SD	OU2	3/25/1993	East Ditch	SW-25			SW-25	Sample	36	65			21		23	3		1			
		SD	OU2	3/25/1993	East Ditch	SW-26			SW-26	Sample	36	65			21		23	3		1			
		SD	OU2	3/25/1993	East Ditch	SW-27			SW-27	Sample	36	65			21		23	3		1			
		SD	OU2	4/20/1993	East Ditch	SW-29			SW-29	Sample	36	65			21		23	3		1			
		SD	OU2	4/20/1993	East Ditch	SW-30			SW-30	Sample	36	65			21		23	3		1			
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			EDSD6-01	Sample	68						2	5					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			EDSD6-01	Sample		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			EDSD6-01	Sample			1					1					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			EDSD6-01	Sample				16				2					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			EDSD6-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			EDSD6-01	Sample							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			EDSD1-01	Sample	68						2	5					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			EDSD1-01	Sample		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			EDSD1-01	Sample			1					1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			EDSD1-01	Sample				16				2					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			EDSD1-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			EDSD1-01	Sample							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-01	Sample	68						2	5					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-DUP-01	Duplicate	68						2	5					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-01	Sample		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-DUP-01	Duplicate		65	1		20	9	22	1					

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Sample Event	Company Sampled By	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	Inorganics/Physical	Field - pH	Field	Oil & Grease	Extractable Petroleum Hydrocarbons
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-01	Sample			1					1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-DUP-01	Duplicate			1					1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-01	Sample				16				2					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-DUP-01	Duplicate				16				2					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-01	Sample							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-DUP-01	Duplicate							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			EDSD2-DUP-01	Duplicate							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			EDSD3-01	Sample	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			EDSD3-01	Sample		65	1		20	9		22	1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			EDSD3-01	Sample			1						1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			EDSD3-01	Sample				16					2				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			EDSD3-01	Sample							16						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			EDSD3-01	Sample							2						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			EDSD4-01	Sample	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			EDSD4-01	Sample		65	1		20	9		22	1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			EDSD4-01	Sample			1						1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			EDSD4-01	Sample				16					2				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			EDSD4-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			EDSD4-01	Sample							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			EDSD5-01	Sample	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			EDSD5-01	Sample		65	1		20	9		22	1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			EDSD5-01	Sample			1						1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			EDSD5-01	Sample				16					2				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			EDSD5-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			EDSD5-01	Sample							1						
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW7			EDSD7-01	Sample		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW7			EDSD7-01	Sample	75								1				
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW8			EDSD8-01	Sample		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW8			EDSD8-01	Sample	75								1				
East Ditch	MACTEC	SD	OU2	4/29/2004	East Ditch	EDSD/SW0			EDSD0-01	Sample		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/29/2004	East Ditch	EDSD/SW0			EDSD0DUP-01	Duplicate		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/29/2004	East Ditch	EDSD/SW0			EDSD0DUP-01	Duplicate	75								1				
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-13			RSD-13	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-13			RSD -13	Sample								22	1				
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-14			RSD-14	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-14			RSD -14	Sample								22	1				
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-15			RSD-15	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-15			RSD -15	Sample								22	1				
Lower South Ditch	MACTEC	SD	OU1-offsite	8/22/2005	Lower South Ditch	BS030	0	0.5	BS030LSD-02	Sample		68		16	19			24	5				
Lower South Ditch	MACTEC	SD	OU1-offsite	8/22/2005	Lower South Ditch	BS030	0	0.5	BS030LSD-02 RE	Sample		68							1				
Lower South Ditch	MACTEC	SD	OU1	8/22/2005	Lower South Ditch	BS031	0	0.5	BS031LSD-02	Sample		68		16	19			24	5				
Lower South Ditch	MACTEC	SD	OU1	8/22/2005	Lower South Ditch	BS032	0	0.5	BS032LSD-02	Sample		68		16	19			24	5				
Lower South Ditch	MACTEC	SD	OU1	8/22/2005	Lower South Ditch	BS032	0	0.5	BS032LSD-02 RE	Sample		68							1				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-1			MMB-SD1 D	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-1			MMB-SD1 MS/MSD	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-2			MMB-SD2	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-3			MMB-SD3	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-6			MMB-SD6	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-7			MMB-SD7	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/18/2001	Maple Meadow Brook	MMB-SW/SD-4			MMB-SD4	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/18/2001	Maple Meadow Brook	MMB-SW/SD-5			MMB-SD5	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	10/18/2001	Maple Meadow Brook	MMB-SW/SD-8A			MMB-SD8A	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-1			MMBSD1-02	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-2			MMBSD2-02	Sample									3				
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-3			MMBSD3-02	Sample									3				

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Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-6			MMBSD6-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-7			MMBSD7-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-4			MMB-SD04-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-4			MMB-SD04-02D	Duplicate								2					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-5			MMB-SD05-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-8A			MMB-SD8A-02	Sample								3					
North Pond	MACTEC	SD	OU2	11/20/2003	North Pond	NPSED1	0	1	NPSED1-SED1	Sample	75	68	1		19		11	8	6				
North Pond	MACTEC	SD	OU2	11/20/2003	North Pond	NPSED1	0	1	NPSED1-SED1 DUP	Duplicate	75	68	1		19		11	8	6				
		SD	OU2	9/1/1992	Off-Property West Ditch	SW-17			SW-17	Sample	36	65			21			24	4				
		SD	OU2	9/1/1992	Off-Property West Ditch	SW-17			SW-17	Duplicate	36	65			21			24	3				
		SD	OU2	9/2/1992	Off-Property West Ditch	SW-15			SW-15	Sample	36	65			21			23	4				
		SD	OU2	9/2/1992	Off-Property West Ditch	SW-16			SW-16	Sample	36	65			21			23	4				
		SD	OU2	9/2/1992	Off-Property West Ditch	SW-18			SW-18	Sample	36	65			21			23	4				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-15			SW-15	Sample	36	65			21			23	4				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-16			SW-16	Sample	36	65			21			24	6				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-17			SW-17	Sample	36	65			21			24	6				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-17			SW-17	Duplicate	36	65			21			24	5				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-18			SW-18	Sample	36	65			21			23	4				
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-N			OPWD-SD-N-01	Sample	68								1				
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-N			OPWD-SD-N-01	Sample		65	1					22	1				
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-S			OPWD-SD-S-01	Sample	68								1				
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-S			OPWD-SD-S-01	Sample		65	1					22	1				
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-WS			OPWD-SD-WS-01	Sample	68								1				
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-WS			OPWD-SD-WS-01	Sample		65	1					22	1				
		SD	OU1	5/14/1990	On-Property West Ditch	W-1 SED			W-1 SED	Sample	30	45	1					3	3		1		
		SD	OU1	5/14/1990	On-Property West Ditch	W-2 SED			W-2 SED	Sample	30	45	1					3	3		1		
	CRA	SD	Excavated	9/2/1992	On-Property West Ditch	SW-13			SW-13	Sample	36	65			21			23	4				
	CRA	SD	Excavated	12/1/1992	On-Property West Ditch	SW-13			SW-13	Sample	36	65			21			24	6				
	HLA	SD	Excavated	1/20/1997	On-Property West Ditch	BS006			BS006WDX	Sample		65			21			23	1				
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-1			RAM-1	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-10			RAM-10	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-10			RAM-10 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-11			RAM-11	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-12			RAM-12	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-2			RAM-2	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-2			RAM-2 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-3			RAM-3	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-4			RAM-4	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-5			RAM-5	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-6			RAM-6	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-7			RAM-7	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-7			RAM-7 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-8			RAM-8	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-9			RAM-9	Sample		67											
Jan2000	HLA	SD	Excavated	1/18/2000	On-Property West Ditch	RSD-05			RSD-05	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	On-Property West Ditch	RSD-05			RSD-05	Sample								22	1				
Jan2000	HLA	SD	Excavated	1/18/2000	On-Property West Ditch	RSD-05			RSD-05	Sample								1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-1			RAM #1	Sample		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-10			RAM #10	Sample		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-11			RAM #11	Sample		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-12			RAM #12	Sample		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-12			DUP	Duplicate		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-2			RAM #2	Sample		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-3			RAM #3	Sample		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-4			RAM #4	Sample		67							1				
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-5			RAM #5	Sample		67							1				

Table 2.1-4
Summary of Sediment Samples Collected To Date - By Area

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	Inorganics/Physical	Field - pH	Field	Oil & Grease	Extractable Petroleum Hydrocarbons
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-6			RAM #6	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-7			RAM #7	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-8			RAM #8	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-9			RAM #9	Sample		67						1					
South Ditch	MACTEC	SD	OU1	6/17/2003	On-Property West Ditch	SD-SD1	0	0.25	SD-SD1-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	On-Property West Ditch	SD-SD1	0.25	1.25	SD-SD1-15-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	8/10/2004	On-Property West Ditch	SD-SD1	0	0.25	SD-SD1-03-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	On-Property West Ditch	SD-SD1	0.25	1.25	SD-SD1-15-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	5/19/2005	On-Property West Ditch	SD-SD1			SD-SD1-(15)-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	On-Property West Ditch	SD-SD1			SD-SD1-03-03	Sample							3	1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-1	2.1	2.6	1140-WDW-1S	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-1	2.6	4.2	1140-WDW-1D	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/25/2000	On-Property West Ditch Wetland	WDW-11	0	0.5	1140-WDW-11S	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/25/2000	On-Property West Ditch Wetland	WDW-11	0.5	2.1	1140-WDW-11D	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-2	2.1	2.6	1140-WDW-2S	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-2	2.6	4.2	1140-WDW-2D	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-4	2.5	3	1140-WDW-4S	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-4	3	4.1	1140-WDW-4D	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-5	1.6	2.1	1140-WDW-5S	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-5	2.1	3.2	1140-WDW-5D	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-7	-0.8	-0.3	1140-WDW-7S	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-7	-0.3	0.6	1140-WDW-7D	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-9	-0.7	-0.2	1140-WDW-9S	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-9	-0.2	0.8	1140-WDW-9D	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-12	0	0.5	1120-WDW-12S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-12	0.5	2.5	1120-WDW-12D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-13	0	0.5	1120-WDW-13S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-13	0.5	2.5	1120-WDW-13D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-15	0.6	1.1	1120-WDW-15S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-15	1.1	3.1	1120-WDW-15D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-17	0	0.5	1120-WDW-17S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-17	0.5	2.5	1120-WDW-17D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-18	-0.7	-0.2	1120-WDW-18S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-18	-0.2	1.8	1120-WDW-18D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-19	0	0.5	1120-WDW-19S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-19	0.5	2.5	1120-WDW-19D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21A	0	0.5	1120-WDW-21AS (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21A	0.5	2.5	1120-WDW-21AD (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21B	0	0.5	1120-WDW-21BS (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21B	0.5	2.5	1120-WDW-21BD (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-21C	0	0.5	1120-WDW-21CS (0-6)	Sample		67					8	1					
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-21C	0.5	2.5	1120-WDW-21CD (6-30)	Sample		67					8	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-22	0	0.5	1120-WDW-22S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-22	0.5	2.5	1120-WDW-22D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-24	0	0.5	1120-WDW-24S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-24	0.5	2	1120-WDW-24D (6-24)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-25	0	0.5	1120-WDW-25S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-25	0.5	2.5	1120-WDW-25D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-26	0	0.5	1120-WDW-26S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-26	0.5	2	1120-WDW-26D (6-24)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-28	0	0.5	1120-WDW-28S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-28	0.5	2	1120-WDW-28D (6-24)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-29	0	0.5	1120-WDW-29S (0-6)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-29	0.5	2.5	1120-WDW-29D (6-30)	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-30	0	0.5	1120-WDW-30S	Sample		67					1	1					
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-30	0.5	2.5	1120-WDW-30D	Sample		67					1	1					

Table 2.1-4
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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	Inorganics/Physical	Field - pH	Field	Oil & Grease	Extractable Petroleum Hydrocarbons
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-31	0	0.5	1120-WDW-31S	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-31	0.5	2.5	1120-WDW-31D	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-10	0.4	0.9	1120-WDW-10S (0-6)	Sample		67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-10	0.9	2.9	1120-WDW-10D (6-30)	Sample		67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-14	0	0.5	1120-WDW-14S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-14	0.5	2.5	1120-WDW-14D (6-30)	Sample	62	66						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-16	0	0.5	1120-WDW-16S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-16	0.5	2.5	1120-WDW-16D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-20	0	0.5	1120-WDW-20S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-20	0.5	2.5	1120-WDW-20D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-23	0	0.5	1120-WDW-23S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-23	0.5	2.5	1120-WDW-23D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-27	0	0.5	1120-WDW-27S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-27	0.5	2.5	1120-WDW-27D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-3	2.3	2.8	1120-WDW-3S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-3	2.8	4.8	1120-WDW-3D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-32	0	0.5	1120-WDW-32S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-32	0.5	2.5	1120-WDW-32D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-8	-1.1	-0.6	1120-WDW-8S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-8	-0.6	1.4	1120-WDW-8D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C12	2.1	2.1	1140-WDW-C12	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C15	1.5	1.5	1140-WDW-C15	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C3	2.5	2.5	1140-WDW-C3	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C6	2.5	2.5	1140-WDW-C6	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C9	3.5	3.5	1140-WDW-C9	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C1	0.5	0.5	1140-WDW-C1	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	10/18/2000	On-Property West Ditch Wetland	WDW-C10	0.5	0.5	1140-WDW-C10	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C11	2.2	2.2	1140-WDW-C11	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C13	0.5	0.5	1140-WDW-C13	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C14	0.5	0.5	1140-WDW-C14	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C16	0.5	0.5	1140-WDW-C16	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C2	0.5	0.5	1140-WDW-C2	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C4	0.4	0.4	1140-WDW-C4	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C5	0.7	0.7	1140-WDW-C5	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C7	2.7	2.7	1140-WDW-C7	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C8	0.2	0.2	1140-WDW-C8	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/1/2000	On-Property West Ditch Wetland	WDW-C17	0.5	0.5	1140-WDW-C17	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/1/2000	On-Property West Ditch Wetland	WDW-C19	0.5	0.5	1140-WDW-C19	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/1/2000	On-Property West Ditch Wetland	WDW-C19	0.5	0.5	1140-WDW-C19-D	Duplicate		67						1	1				
C-RAM	GEI	SD	Excavated	11/1/2000	On-Property West Ditch Wetland	WDW-C21	0.5	0.5	1140-WDW-C21	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	11/1/2000	On-Property West Ditch Wetland	WDW-C22	-0.6	-0.6	1140-WDW-C22	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	11/1/2000	On-Property West Ditch Wetland	WDW-C25	-0.1	-0.1	1140-WDW-C25	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C18	2.7	2.7	1140-WDW-C18	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C20	3.1	3.1	1140-WDW-C20	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C23	3	3	1140-WDW-C23	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C24	1.5	1.5	1140-WDW-C24	Sample		67						1	1				
		SD	OU1	5/14/1990	South Ditch	S-3 SED			S-3 SED	Sample										1	1		
		SD	OU1	5/14/1990	South Ditch	S-4 SED			S-4 SED	Sample	30	45	1							1	1		
		SD	OU1	5/14/1990	South Ditch	SW-1 SED			SW-1 SED	Sample								3		1			
		SD	OU1-offsite	8/31/1992	South Ditch	SW-6	0	0.5	SW-06	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-10			SW-10	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-11			SW-11	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-14			SW-14	Sample	36	65			21			23	4				
		SD	OU1	9/1/1992	South Ditch	SW-20			SW-20	Sample	36	65			21			23	4				
		SD	OU1	9/1/1992	South Ditch	SW-21			SW-21	Sample	36	65			21			23	4				
		SD	OU1	9/1/1992	South Ditch	SW-22			SW-22	Sample	36	65			21			23	4				

Table 2.1-4
Summary of Sediment Samples Collected To Date - By Area

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Wilmington, MA

Sample Event	Company Sampled By	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	Inorganics/Physical	Field - pH	Field	Oil & Grease	Extractable Petroleum Hydrocarbons
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-9			SW-09	Sample	36	65			21		23	4					
		SD	OU1	9/2/1992	South Ditch	SW-19			SW-19	Sample	36	65			21		23	4					
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-10			SW-10	Sample	36	65			21		23	4					
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-11			SW-11	Sample	36	65			21		23	4					
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-14			SW-14	Sample	36	65			21		23	4					
		SD	OU1	12/1/1992	South Ditch	SW-20			SW-20	Sample	36	65			21		23	4					
		SD	OU1	12/1/1992	South Ditch	SW-21			SW-21	Sample	36	65			21		23	4					
		SD	OU1	12/1/1992	South Ditch	SW-22			SW-22	Sample	36	65			21		23	4					
		SD	OU1-offsite	12/1/1992	South Ditch	SW-6	0	0.5	SW-06	Sample	36	65			21		24	5		1			
		SD	OU1-offsite	12/1/1992	South Ditch	SW-6	0	0.5	SW-06	Duplicate	36	65			21		24	5		1			
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-9			SW-09	Sample	36	65			21		23	4					
		SD	OU1	12/3/1992	South Ditch	SW-19			SW-19	Sample	36	65			21		23	4					
		SD	Excavated	2/2/1995	South Ditch	SED-17			SED-17,11"	Sample								1					
		SD	Excavated	2/2/1995	South Ditch	SED-17			SED-17,11"	Sample							12	4		1			
	HLA	SD	Excavated	1/20/1997	South Ditch	BS008			BS008SD	Sample		65			21		23	1					
		SD	OU1	1/20/1997	South Ditch	BS011			BS011WMD	Sample		65			21		23	1					
		SD	OU1-offsite	1/20/1997	South Ditch	SDREF-012			BS012REF	Background Sample		65			21		23	1					
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-06			RSD-06	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-06			RSD-06	Sample							22	1					
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-07			RSD-07	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-07			RSD-07	Sample							22	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-29	0.75	0.75	RSD-29	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-30	0.5	0.5	RSD-30	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-31	0.17	0.17	RSD-31	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-32	0.5	0.5	RSD-32	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-33	2.1	2.1	RSD-33	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-34	0.33	0.33	RSD-34	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-35	0.5	0.5	RSD-35	Sample							1	1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0	0.5	1010-SED-SDC-1S	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0	0.5	1010-SED-SDC-1S	Sample		67					9	3					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0.5	1.3	1010-SED-SDC-1D	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0.5	1.3	1010-SED-SDC-1D	Sample		67					9	4					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-2	0	0.5	1010-SED-SDC-2S	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-2	0	0.5	1010-SED-SDC-2S	Sample		67					9	3					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0	0.5	1010-SED-SDC-3S	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0	0.5	1010-SED-SDC-3S	Sample		67					9	3					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0.5	1.3	1010-SED-SDC-3D	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0.5	1.3	1010-SED-SDC-3D	Sample		67					9	4					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0	0.5	1010-SED-SDC-4S	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0	0.5	1010-SED-SDC-4S	Sample		67					9	3					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0.5	1.8	1010-SED-SDC-4D	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0.5	1.8	1010-SED-SDC-4D	Sample		67					9	3					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0	0.5	1010-SED-SDC-5S	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0	0.5	1010-SED-SDC-5S	Sample		67					9	3					22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0.5	2	1010-SED-SDC-5D	Sample	64							1					
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0.5	2	1010-SED-SDC-5D	Sample		67					9	3					22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0	0.5	1010-SED-SDC-6S	Sample	64							1					
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0	0.5	1010-SED-SDC-6S	Sample		67					9	3					22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0.5	1.4	1010-SED-SDC-6D	Sample	64							1					
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0.5	1.4	1010-SED-SDC-6D	Sample		67					9	3					22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0	0.5	1010-SED-SDC-7S	Sample	64							1					
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0	0.5	1010-SED-SDC-7S	Sample		67					9	3					22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0.5	1.1	1010-SED-SDC-7D	Sample	64							1					
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0.5	1.1	1010-SED-SDC-7D	Sample		67					9	3					22

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Wilmington, MA

Sample Event	Company Sampled By	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	Inorganics/Physical	Field - pH	Field	Oil & Grease	Extractable Petroleum Hydrocarbons
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0	0.5	1010-SED-SDC-8S	Sample	64							1					
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0	0.5	1010-SED-SDC-8S	Sample		67					9	3					22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0.5	1.1	1010-SED-SDC-8D	Sample	64							1					
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0.5	1.1	1010-SED-SDC-8D	Sample		67					9	4					22
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD2	0	0.25	SD-SD2-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD2	0.25	1.25	SD-SD2-15-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD3	0	0.25	SD-SD3-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD3	0.25	1.25	SD-SD3-15-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD4	0	0.25	SD-SD4-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD4	0.25	1	SD-SD4-12-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD5	0	0.25	SD-SD5-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD5	0.25	1.08	SD-SD5-13-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD2	0	0.25	SD-SD2-03-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD2	0.25	1	SD-SD2-12-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD3	0	0.25	SD-SD3-03-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD3	0.25	1	SD-SD3-12-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD4	0	0.25	SD-SD4-03-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD4	0.25	1	SD-SD4-12-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD5	0	0.25	SD-SD5-03-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD5	0.25	1.25	SD-SD5-15-02	Sample							3	2					
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD2			SD-SD2-(12)-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD2			SD-SD2-03-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD3			SD-SD3-(15)-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD3			SD-SD3-03-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD4			SD-SD4-(10)-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD4			SD-SD4-03-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD5			SD-SD5-(15)-03	Sample							3	1	1				
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD5			SD-SD5-03-03	Sample							3	1	1				
		SD	OU2	1/20/1997	West Ditch	BS007			BS007WDO	Sample		65			21		23	1					
	HLA	SD	Excavated	10/11/1996	West Ditch Wetland	BS002			BS002WDXXX	Sample					21	7	23						
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-16	1.5	1.5	RSD-16	Sample							1	1					
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-17	1.3	1.3	RSD-17	Sample							1	1					
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-18	1.4	1.4	RSD-18	Sample							1	1					
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-19	1.3	1.3	RSD-19	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	West Ditch Wetland	RSD-20	3.6	3.6	RSD-20	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	West Ditch Wetland	RSD-21	5.3	5.3	RSD-21	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	West Ditch Wetland	RSD-22	1.2	1.2	RSD-22	Sample							1	1					
	HLA	SD	OU1	10/11/1996	Wet Meadow	BS003			BS003WMDXX	Sample					21	7	23						
	HLA	SD	OU1	10/11/1996	Wet Meadow	BS004			BS004WMDXX	Sample					21	7	23						

Prepared/Date: KJC 07/27/07
Checked/Date: MJM 07/27/07

Table 2.1-5
Summary of Sediment Samples Collected To Date - By Date

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Wilmington, MA

Sample Event	ompany Sampled B	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Lab Sample Number	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals- Total	Inorganics/Physical	Field pH	Field	Oil &Gr ease	Extractablep etroleum Hydrocarbons
		SD	OU1	5/14/1990	South Ditch	S-3 SED			90134017	S-3 SED	Sample											1	1	
		SD	OU1	5/14/1990	South Ditch	S-4 SED			90134018	S-4 SED	Sample	30	45	1								1	1	
		SD		5/14/1990		SS-14 SED			90134021	SS-14 SED	Sample											1	1	
		SD	OU1	5/14/1990	South Ditch	SW-1 SED			90134023	SW-1 SED	Sample								3			1		
		SD	OU1	5/14/1990	On-Property West Ditch	W-1 SED			90134019	W-1 SED	Sample	30	45	1					3	3		1		
		SD	OU1	5/14/1990	On-Property West Ditch	W-2 SED			90134020	W-2 SED	Sample	30	45	1					3	3		1		
		SD	OU2	8/31/1992	East Ditch	SW-1				SW-01	Sample	36	65			21			23	4				
		SD	OU2	8/31/1992	East Ditch	SW-2				SW-02	Sample	36	65			21			23	4				
		SD	OU2	8/31/1992	East Ditch	SW-3				SW-03	Sample	36	65			21			23	4				
		SD	OU2	8/31/1992	East Ditch	SW-4				SW-04	Sample	36	65			21			23	4				
		SD	OU2	8/31/1992	East Ditch	SW-5				SW-05	Sample	36	65			21			23	4				
	CRA	SD	OU1-offsite	8/31/1992	South Ditch	SW-6	0	0.5		SW-06	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-10				SW-10	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-11				SW-11	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-14				SW-14	Sample	36	65			21			23	4				
		SD	OU2	9/1/1992	Off-Property West Ditch	SW-17				SW-17	Sample	36	65			21			24	4				
		SD	OU2	9/1/1992	Off-Property West Ditch	SW-17				SW-17	Duplicate	36	65			21			24	3				
		SD	OU1	9/1/1992	South Ditch	SW-20				SW-20	Sample	36	65			21			23	4				
		SD	OU1	9/1/1992	South Ditch	SW-21				SW-21	Sample	36	65			21			23	4				
		SD	OU1	9/1/1992	South Ditch	SW-22				SW-22	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	Delta	SW-7				SW-07	Sample	36	65			21			23	4				
	CRA	SD	Excavated	9/1/1992	Central Pond	SW-8				SW-08	Sample	36	65			21			24	6				
	CRA	SD	Excavated	9/1/1992	South Ditch	SW-9				SW-09	Sample	36	65			21			23	4				
		SD	OU2	9/2/1992	Off-Property West Ditch	SW-15				SW-15	Sample	36	65			21			23	4				
		SD	OU2	9/2/1992	Off-Property West Ditch	SW-16				SW-16	Sample	36	65			21			23	4				
		SD	OU2	9/2/1992	Off-Property West Ditch	SW-18				SW-18	Sample	36	65			21			23	4				
		SD	OU1	9/2/1992	South Ditch	SW-19				SW-19	Sample	36	65			21			23	4				
		SD	OU2	11/30/1992	East Ditch	SW-1				SW-01	Sample	36	65			21			23	4				
		SD	OU2	11/30/1992	East Ditch	SW-2				SW-02	Sample	36	65			21			23	4				
		SD	OU2	11/30/1992	East Ditch	SW-3				SW-03	Sample	36	65			21			23	4				
		SD	OU2	11/30/1992	East Ditch	SW-4				SW-04	Sample	36	65			21			23	4				
		SD	OU2	11/30/1992	East Ditch	SW-5				SW-05	Sample	36	65			21			23	4				
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-10				SW-10	Sample	36	65			21			23	4				
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-11				SW-11	Sample	36	65			21			23	4				
	CRA	SD	Excavated	12/1/1992	Buried Debris Area	SW-12				SW-12	Sample	36	65			21			23	4				
	CRA	SD	Excavated	12/1/1992	On-Property West Ditch	SW-13				SW-13	Sample	36	65			21			24	6				
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-14				SW-14	Sample	36	65			21			23	4				
		SD	OU1	12/1/1992	South Ditch	SW-20				SW-20	Sample	36	65			21			23	4				
		SD	OU1	12/1/1992	South Ditch	SW-21				SW-21	Sample	36	65			21			23	4				
		SD	OU1	12/1/1992	South Ditch	SW-22				SW-22	Sample	36	65			21			23	4				
		SD	OU1-offsite	12/1/1992	South Ditch	SW-6	0	0.5		SW-06	Sample	36	65			21			24	5		1		
		SD	OU1-offsite	12/1/1992	South Ditch	SW-6	0	0.5		SW-06	Duplicate	36	65			21			24	5		1		
	CRA	SD	Excavated	12/1/1992	Delta	SW-7				SW-07	Sample	36	65			21			23	4				
	CRA	SD	Excavated	12/1/1992	Central Pond	SW-8				SW-08	Sample	36	65			21			24	6				
	CRA	SD	Excavated	12/1/1992	South Ditch	SW-9				SW-09	Sample	36	65			21			23	4				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-15				SW-15	Sample	36	65			21			23	4				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-16				SW-16	Sample	36	65			21			24	6				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-17				SW-17	Sample	36	65			21			24	6				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-17				SW-17	Duplicate	36	65			21			24	5				
		SD	OU2	12/2/1992	Off-Property West Ditch	SW-18				SW-18	Sample	36	65			21			23	4				
		SD	OU2	12/2/1992	East Ditch	SW-23				SW-23	Sample	36	65			21			24	6				
		SD	OU1	12/3/1992	South Ditch	SW-19				SW-19	Sample	36	65			21			23	4				
		SD	OU2	1/7/1993	East Ditch	SW-24				SW-24	Sample	36	65			21			23	3		1		
		SD	OU2	3/25/1993	East Ditch	SW-25				SW-25	Sample	36	65			21			23	3		1		
		SD	OU2	3/25/1993	East Ditch	SW-26				SW-26	Sample	36	65			21			23	3		1		
		SD	OU2	3/25/1993	East Ditch	SW-27				SW-27	Sample	36	65			21			23	3		1		
		SD	OU2	4/20/1993	East Ditch	SW-29				SW-29	Sample	36	65			21			23	3		1		
		SD	OU2	4/20/1993	East Ditch	SW-30				SW-30	Sample	36	65			21			23	3		1		
		SD	Excavated	2/2/1995	South Ditch	SED-17			43026-001 WL-0226-1	SED-17,11"	Sample									1				
		SD	Excavated	2/2/1995	South Ditch	SED-17			WL-0202-1	SED-17,11"	Sample								12	4		1		
		SD	Excavated	9/13/1995	Central Pond	POND			WL-1389-3	POND	Sample	36	64			21	7		23	1				
	ABB-ES	SD	Background	4/1/1996	Background	SDBK-001	0	0.3	WM-0593-2	SD001XXBKX	Background Sample	36	64						24	2				

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Sample Event	ompany Sampled B	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Lab Sample Number	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals- Total	Inorganics/physical	Field_ pH	Field	Oil &Gr ease	Extractablep etroleum Hydrocarbons
	ABB-ES	SD	Background	4/1/1996	Background	SDBK-002	0	0.3	WM-0593-5	SD002XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	Background	4/2/1996	Background	SDBK-005	0	0.3	WM-0607-2	SD005XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/2/1996	Background	SDBK-006	0.25	0.3	WM-0607-3	SD006XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/2/1996	Background	SDBK-007	0.25	0.3	WM-0607-4	SD007XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/2/1996	Background	SDBK-013	0	0.25	WM-0607-1	SD013XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/3/1996	Background	SDBK-003	0.25	0.3	WM-0625-7	SD003XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	Background	4/3/1996	Background	SDBK-004	0.25	0.3	WM-0625-8	SD004XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	Background	4/3/1996	Background	SDBK-008	0.25	0.3	WM-0625-3	SD008XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/3/1996	Background	SDBK-009	0	0.3	WM-0625-4	SD009XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/4/1996	Background	SDBK-010	0	0.3	WM-0891-1	SD010XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/4/1996	Background	SDBK-011	0	0.5	WM-0891-2	SD011XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/4/1996	Background	SDBK-012	0	0.3	WM-0891-3	SD012XXBKX	Background Sample					21				2				
	ABB-ES	SD	Background	4/4/1996	Background	SDBK-014	0	0.5	WM-0891-4	SD014XXBKX	Background Sample	36	64			21			24	2				
	ABB-ES	SD	Background	4/4/1996	Background	SDBK-014	0	0.5	WM-0640-11	SD014XXBKD	Background Duplicate	36	64			21			24	2				
	ABB-ES	SD	Background	5/24/1996	Background	SDBK-001	0	0.3	WM-0992-1	SD001XXBKR	Background Sample					21				1		1		
	HLA	SD	Excavated	10/11/1996	Buried Debris Area	BS001				BS001WDXXX	Sample					21	7		23					
	HLA	SD	Excavated	10/11/1996	West Ditch Wetland	BS002				BS002WDXXX	Sample					21	7		23					
	HLA	SD	OU1	10/11/1996	Wet Meadow	BS003				BS003WMDXX	Sample					21	7		23					
	HLA	SD	OU1	10/11/1996	Wet Meadow	BS004				BS004WMDXX	Sample					21	7		23					
	HLA	SD	Excavated	1/20/1997	Buried Debris Area	BS005			970135A-01-ABB	BS005WDX	Sample		65			21			23	1				
	HLA	SD	Excavated	1/20/1997	On-Property West Ditch	BS006			970135A-02-ABB	BS006WDX	Sample		65			21			23	1				
		SD	OU2	1/20/1997	West Ditch	BS007			970135A-03-ABB	BS007WDO	Sample		65			21			23	1				
	HLA	SD	Excavated	1/20/1997	South Ditch	BS008			970135A-04-ABB	BS008SD	Sample		65			21			23	1				
	HLA	SD	Excavated	1/20/1997	Central Pond	BS009			970135A-05-ABB	BS009PND	Sample		65			21			23	1				
	HLA	SD	Excavated	1/20/1997	Central Pond	BS010			970135A-06-ABB	BS010PND	Sample		65			21			23	1				
		SD	OU1	1/20/1997	South Ditch	BS011			970135A-07-ABB	BS011WMD	Sample		65			21			23	1				
		SD	OU1-offsite	1/20/1997	South Ditch	SDREF-012			970135A-08-ABB	BS012REF	Background Sample		65			21			23	1				
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-1			130356	RAM-1	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-10			130365	RAM-10	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-10			130373	RAM-10 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-11			130366	RAM-11	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-12			130367	RAM-12	Sample		67											
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-13			130368	RAM-13	Sample		67											
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-13			130374	RAM-13 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-14			130369	RAM-14	Sample		67											
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-14			130375	RAM-14 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-15			130370	RAM-15	Sample		67											
	LAW	SD	Excavated	8/4/1999	Buried Debris Area	RAM-15			130376	RAM-15 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-2			130357	RAM-2	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-2			130371	RAM-2 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-3			130358	RAM-3	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-4			130359	RAM-4	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-5			130360	RAM-5	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-6			130361	RAM-6	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-7			130362	RAM-7	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-7			130372	RAM-7 ENCORE	Sample	64												
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-8			130363	RAM-8	Sample		67											
	LAW	SD	Excavated	8/4/1999	On-Property West Ditch	RAM-9			130364	RAM-9	Sample		67											
Jan2000	HLA	SD	OU1	1/18/2000		RSD-01			000164A-01	RSD-01	Sample		66											
Jan2000	HLA	SD	OU1	1/18/2000		RSD-01			000164A-01RE	RSD-01RE	Sample	37												
Jan2000	HLA	SD	OU1	1/18/2000		RSD-01			140442	RSD-01	Sample								22	1				
Jan2000	HLA	SD	OU1	1/18/2000		RSD-02			000164A-02	RSD-02	Sample	37	66											
Jan2000	HLA	SD	OU1	1/18/2000		RSD-02			140443	RSD-02	Sample								22	1				
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-03			000164A-03	RSD-03	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-03			140444	RSD-03	Sample								22	1				
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-04			000164A-04	RSD-04	Sample	37	66											
Jan2000	HLA	SD	Excavated	1/18/2000	Buried Debris Area	RSD-04			140445	RSD-04	Sample								22	1				
Jan2000	HLA	SD	Excavated	1/18/2000	On-Property West Ditch	RSD-05			000164A-05	RSD-05	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	On-Property West Ditch	RSD-05			140446	RSD-05	Sample								22	1				
Jan2000	HLA	SD	Excavated	1/18/2000	On-Property West Ditch	RSD-05			140456	RSD-05	Sample								1					
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-06			000164A-06	RSD-06	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-06			140447	RSD-06	Sample								22	1				
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-07			000164A-07	RSD-07	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	South Ditch	RSD-07			140448	RSD-07	Sample								22	1				

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Sample Event	ompany Sampled B	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Lab Sample Number	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals- Total	Inorganics/physical	Field_ pH	Field	Oil &Gr ease	Extractablep etroleum Hydrocarbons
Jan2000	HLA	SD	Excavated	1/18/2000	Central Pond	RSD-08			000164A-08	RSD-08	Sample	37	66				7							
Jan2000	HLA	SD	Excavated	1/18/2000	Central Pond	RSD-08			140449	RSD-08	Sample							22	1					
Jan2000	HLA	SD	OU1	1/18/2000		RSD-10			000164A-09	RSD-10	Sample	37	66											
Jan2000	HLA	SD	OU1	1/18/2000		RSD-10			140450	RSD-10	Sample							22	1					
Jan2000	HLA	SD	OU1	1/18/2000		RSD-10			140460	RSD-10	Sample							1						
Jan2000	HLA	SD	OU1	1/18/2000		RSD-12			000164A-10	RSD-12	Sample	37	66											
Jan2000	HLA	SD	OU1	1/18/2000		RSD-12			140451	RSD-12	Sample							22	1					
Jan2000	HLA	SD	OU1	1/19/2000		RSD-09			000164A-11	RSD-09	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000		RSD-09			140625	RSD -09	Sample							22	1					
Jan2000	HLA	SD	OU1	1/19/2000		RSD-09			140631	RSD-09 MS/MSD	Duplicate							22	1					
Jan2000	HLA	SD	OU1	1/19/2000		RSD-11			000164A-15	RSD-11	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000		RSD-11			000164A-16	BLIND DUP	Duplicate	37	66											
Jan2000	HLA	SD	OU1	1/19/2000		RSD-11			140629	RSD -11	Sample							22	1					
Jan2000	HLA	SD	OU1	1/19/2000		RSD-11			140630	BLIND DUP	Duplicate							22	1					
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-13			000164A-12	RSD-13	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-13			140626	RSD -13	Sample							22	1					
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-14			000164A-13	RSD-14	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-14			140627	RSD -14	Sample							22	1					
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-15			000164A-14	RSD-15	Sample	37	66											
Jan2000	HLA	SD	OU1	1/19/2000	Ephemeral Ditch	RSD-15			140628	RSD -15	Sample							22	1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-1			148624	RAM #1	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-10			148633	RAM #10	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-11			148634	RAM #11	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-12			148635	RAM #12	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-12			148636	DUP	Duplicate		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-2			148625	RAM #2	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-3			148626	RAM #3	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-4			148627	RAM #4	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-5			148628	RAM #5	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-6			148629	RAM #6	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-7			148630	RAM #7	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-8			148631	RAM #8	Sample		67						1					
RAM Plan	LAW	SD	Excavated	5/22/2000	On-Property West Ditch	RAM-9			148632	RAM #9	Sample		67						1					
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-16	1.5	1.5	148637	RSD-16	Sample							1	1					
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-17	1.3	1.3	148638	RSD-17	Sample							1	1					
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-18	1.4	1.4	148639	RSD-18	Sample							1	1					
RAM Plan	LAW	SD	OU1	5/23/2000	West Ditch Wetland	RSD-19	1.3	1.3	148640	RSD-19	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	West Ditch Wetland	RSD-20	3.6	3.6	148641	RSD-20	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	West Ditch Wetland	RSD-21	5.3	5.3	148642	RSD-21	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	West Ditch Wetland	RSD-22	1.2	1.2	148643	RSD-22	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Buried Debris Area	RSD-23	0.5	0.5	148644	RSD-23	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-24	0.5	0.5	148645	RSD-24	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-25	1.2	1.2	148646	RSD-25	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-26	0.75	0.75	148647	RSD-26	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-27	0.67	0.67	148648	RSD-27	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	Central Pond	RSD-28	0.5	0.5	148649	RSD-28	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-29	0.75	0.75	148650	RSD-29	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-30	0.5	0.5	148651	RSD-30	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-31	0.17	0.17	148652	RSD-31	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-32	0.5	0.5	148653	RSD-32	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-33	2.1	2.1	148654	RSD-33	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-34	0.33	0.33	148655	RSD-34	Sample							1	1					
RAM Plan	LAW	SD	Excavated	5/23/2000	South Ditch	RSD-35	0.5	0.5	148656	RSD-35	Sample							1	1					
RAM Plan	LAW	SD		5/23/2000		RSD-36	3	3	148657	RSD-36	Sample		67						1					
RAM Plan	LAW	SD		5/23/2000		RSD-37			148658	RSD-37	Sample		67						1					
RAM Plan	LAW	SD		5/23/2000		RSD-38			148659	RSD-38	Sample		67						1					
RAM Plan	LAW	SD		5/23/2000		RSD-39			148660	RSD-39	Sample		67						1					
RAM Plan	LAW	SD		5/23/2000		RSD-39			148661	DUPLICATE	Duplicate		67						1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-1	2.1	2.6	155277	1140-WDW-1S	Sample		67						1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-1	2.6	4.2	155278	1140-WDW-1D	Sample		67						1					
C-RAM	GEI	SD	OU1	8/25/2000	On-Property West Ditch Wetland	WDW-11	0	0.5	155289	1140-WDW-11S	Sample		67						1					
C-RAM	GEI	SD	OU1	8/25/2000	On-Property West Ditch Wetland	WDW-11	0.5	2.1	155290	1140-WDW-11D	Sample		67						1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-2	2.1	2.6	155279	1140-WDW-2S	Sample		67						1					
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-2	2.6	4.2	155280	1140-WDW-2D	Sample		67						1					

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	ompany Sampled E	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Lab Sample Number	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals- Total	Inorganics/physical	Field_ pH	Field	Oil &Gr ease	Extractablep etroleum Hydrocarbons
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-4	2.5	3	155281	1140-WDW-4S	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-4	3	4.1	155282	1140-WDW-4D	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-5	1.6	2.1	155283	1140-WDW-5S	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-5	2.1	3.2	155284	1140-WDW-5D	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-7	-0.8	-0.3	155285	1140-WDW-7S	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-7	-0.3	0.6	155286	1140-WDW-7D	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-9	-0.7	-0.2	155287	1140-WDW-9S	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/25/2000	On-Property West Ditch Wetland	WDW-9	-0.2	0.8	155288	1140-WDW-9D	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-12	0	0.5	155552	1120-WDW-12S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-12	0.5	2.5	155553	1120-WDW-12D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-13	0	0.5	155554	1120-WDW-13S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-13	0.5	2.5	155555	1120-WDW-13D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-15	0.6	1.1	155556	1120-WDW-15S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-15	1.1	3.1	155557	1120-WDW-15D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-17	0	0.5	155558	1120-WDW-17S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-17	0.5	2.5	155559	1120-WDW-17D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-18	-0.7	-0.2	155560	1120-WDW-18S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-18	-0.2	1.8	155561	1120-WDW-18D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-19	0	0.5	155562	1120-WDW-19S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-19	0.5	2.5	155563	1120-WDW-19D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21A	0	0.5	155564	1120-WDW-21AS (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21A	0.5	2.5	155565	1120-WDW-21AD (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21B	0	0.5	155566	1120-WDW-21BS (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-21B	0.5	2.5	155567	1120-WDW-21BD (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-21C	0	0.5	155568	1120-WDW-21CS (0-6)	Sample		67						8	1				
C-RAM	GEI	SD	Excavated	8/30/2000	On-Property West Ditch Wetland	WDW-21C	0.5	2.5	155569	1120-WDW-21CD (6-30)	Sample		67						8	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-22	0	0.5	155570	1120-WDW-22S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-22	0.5	2.5	155571	1120-WDW-22D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-24	0	0.5	155572	1120-WDW-24S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-24	0.5	2	155573	1120-WDW-24D (6-24)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-25	0	0.5	155574	1120-WDW-25S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-25	0.5	2.5	155575	1120-WDW-25D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-26	0	0.5	155576	1120-WDW-26S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-26	0.5	2	155577	1120-WDW-26D (6-24)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-28	0	0.5	155578	1120-WDW-28S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-28	0.5	2	155579	1120-WDW-28D (6-24)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-29	0	0.5	155580	1120-WDW-29S (0-6)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-29	0.5	2.5	155581	1120-WDW-29D (6-30)	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-30	0	0.5	155582	1120-WDW-30S	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-30	0.5	2.5	155583	1120-WDW-30D	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-31	0	0.5	155584	1120-WDW-31S	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/30/2000	On-Property West Ditch Wetland	WDW-31	0.5	2.5	155585	1120-WDW-31D	Sample		67						1	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-10	0.4	0.9	155546	1120-WDW-10S (0-6)	Sample		67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-10	0.9	2.9	155547	1120-WDW-10D (6-30)	Sample		67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-14	0	0.5	155548	1120-WDW-14S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-14	0.5	2.5	155549	1120-WDW-14D (6-30)	Sample	62	66						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-16	0	0.5	155550	1120-WDW-16S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-16	0.5	2.5	155551	1120-WDW-16D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-20	0	0.5	155534	1120-WDW-20S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-20	0.5	2.5	155535	1120-WDW-20D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-23	0	0.5	155536	1120-WDW-23S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-23	0.5	2.5	155537	1120-WDW-23D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-27	0	0.5	155538	1120-WDW-27S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-27	0.5	2.5	155539	1120-WDW-27D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-3	2.3	2.8	155542	1120-WDW-3S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-3	2.8	4.8	155543	1120-WDW-3D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-32	0	0.5	155540	1120-WDW-32S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	OU1	8/31/2000	On-Property West Ditch Wetland	WDW-32	0.5	2.5	155541	1120-WDW-32D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-8	-1.1	-0.6	155544	1120-WDW-8S (0-6)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	8/31/2000	On-Property West Ditch Wetland	WDW-8	-0.6	1.4	155545	1120-WDW-8D (6-30)	Sample	62	67						8	1				
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C1	5.6	5.6	156773	1140-CP-C1	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C2	6	6	156774	1140-CP-C2	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C3	5.4	5.4	156775	1140-CP-C3	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C4	5	5	156779	1140-CP-C4	Sample	64	67						8	1				

Table 2.1-5
Summary of Sediment Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	ompany Sampled B	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Lab Sample Number	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals- Total	Inorganics/physical	Field_ pH	Field	Oil &Gr ease	Extractablep etroleum Hydrocarbons
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C5	4.8	4.8	156776	1140-CP-C5	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C6	5.3	5.3	156777	1140-CP-C6	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C7	4.9	4.9	156778	1140-CP-C7	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	9/19/2000	Central Pond	CP-C8	5.7	5.7	156780	1140-CP-C8	Sample	64	67						8	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C12	2.1	2.1	158652	1140-WDW-C12	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C15	1.5	1.5	158653	1140-WDW-C15	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C3	2.5	2.5	158649	1140-WDW-C3	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C6	2.5	2.5	158650	1140-WDW-C6	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/11/2000	On-Property West Ditch Wetland	WDW-C9	3.5	3.5	158651	1140-WDW-C9	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C1	0.5	0.5	159307	1140-WDW-C1	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	10/18/2000	On-Property West Ditch Wetland	WDW-C10	0.5	0.5	159304	1140-WDW-C10	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C11	2.2	2.2	159305	1140-WDW-C11	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C13	0.5	0.5	159311	1140-WDW-C13	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C14	0.5	0.5	159312	1140-WDW-C14	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C16	0.5	0.5	159313	1140-WDW-C16	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C2	0.5	0.5	159308	1140-WDW-C2	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C4	0.4	0.4	159302	1140-WDW-C4	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C5	0.7	0.7	159303	1140-WDW-C5	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C7	2.7	2.7	159309	1140-WDW-C7	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/18/2000	On-Property West Ditch Wetland	WDW-C8	0.2	0.2	159310	1140-WDW-C8	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	10/27/2000	Buried Debris Area	BD-C17	0.2	0.2	160160	1120-BD-C17	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/27/2000	Buried Debris Area	BD-C27	0.5	0.5	160116	1120-BD-C27	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	10/27/2000	Buried Debris Area	BD-C32	0.6	0.6	160121	1120-BD-C32	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	11/1/2000	On-Property West Ditch Wetland	WDW-C17	0.5	0.5	160349	1140-WDW-C17	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/1/2000	On-Property West Ditch Wetland	WDW-C19	0.5	0.5	160350	1140-WDW-C19	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/1/2000	On-Property West Ditch Wetland	WDW-C19	0.5	0.5	160354	1140-WDW-C19-D	Duplicate		67						1	1				
C-RAM	GEI	SD	Excavated	11/1/2000	On-Property West Ditch Wetland	WDW-C21	0.5	0.5	160351	1140-WDW-C21	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	11/1/2000	On-Property West Ditch Wetland	WDW-C22	-0.6	-0.6	160352	1140-WDW-C22	Sample		67						1	1				
C-RAM	GEI	SD	Excavated	11/1/2000	On-Property West Ditch Wetland	WDW-C25	-0.1	-0.1	160353	1140-WDW-C25	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C18	2.7	2.7	160495	1140-WDW-C18	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C20	3.1	3.1	160496	1140-WDW-C20	Sample	64	67			19			8	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C23	3	3	160497	1140-WDW-C23	Sample		67						1	1				
C-RAM	GEI	SD	Confirmatory	11/2/2000	On-Property West Ditch Wetland	WDW-C24	1.5	1.5	160498	1140-WDW-C24	Sample		67						1	1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0	0.5	183306	1010-SED-SDC-1S	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0	0.5	183329	1010-SED-SDC-1S	Sample		67						9	3				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0.5	1.3	183307	1010-SED-SDC-1D	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-1	0.5	1.3	183330	1010-SED-SDC-1D	Sample		67						9	4				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-2	0	0.5	183308	1010-SED-SDC-2S	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-2	0	0.5	183331	1010-SED-SDC-2S	Sample		67						9	3				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0	0.5	183309	1010-SED-SDC-3S	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0	0.5	183332	1010-SED-SDC-3S	Sample		67						9	3				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0.5	1.3	183310	1010-SED-SDC-3D	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-3	0.5	1.3	183333	1010-SED-SDC-3D	Sample		67						9	4				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0	0.5	183311	1010-SED-SDC-4S	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0	0.5	183334	1010-SED-SDC-4S	Sample		67						9	3				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0.5	1.8	183312	1010-SED-SDC-4D	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-4	0.5	1.8	183335	1010-SED-SDC-4D	Sample		67						9	3				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0	0.5	183320	1010-SED-SDC-5S	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0	0.5	183343	1010-SED-SDC-5S	Sample		67						9	3				22
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0.5	2	183324	1010-SED-SDC-5D	Sample	64								1				
Phase II	GEI	SD	OU1	9/17/2001	South Ditch	SDC-5	0.5	2	183347	1010-SED-SDC-5D	Sample		67						9	3				22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0	0.5	183321	1010-SED-SDC-6S	Sample	64								1				
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0	0.5	183344	1010-SED-SDC-6S	Sample		67						9	3				22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0.5	1.4	183325	1010-SED-SDC-6D	Sample	64								1				
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-6	0.5	1.4	183348	1010-SED-SDC-6D	Sample		67						9	3				22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0	0.5	183322	1010-SED-SDC-7S	Sample	64								1				
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0	0.5	183345	1010-SED-SDC-7S	Sample		67						9	3				22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0.5	1.1	183326	1010-SED-SDC-7D	Sample	64								1				
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-7	0.5	1.1	183349	1010-SED-SDC-7D	Sample		67						9	3				22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0	0.5	183323	1010-SED-SDC-8S	Sample	64								1				
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0	0.5	183346	1010-SED-SDC-8S	Sample		67						9	3				22
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0.5	1.1	183327	1010-SED-SDC-8D	Sample	64								1				
Phase II	GEI	SD	OU1-offsite	9/17/2001	South Ditch	SDC-8	0.5	1.1	183350	1010-SED-SDC-8D	Sample		67						9	4				22
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-1			185882	MMB-SD1 D	Sample									3				

Table 2.1-5
Summary of Sediment Samples Collected To Date - By Date

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Sample Event	ompany Sampled B	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Lab Sample Number	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals- Total	Inorganics/physical	Field_ pH	Field	Oil &Gr ease	Extractablep etroleum Hydrocarbons
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-1			185883	MMB-SD1 MS/MSD	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-2			185884	MMB-SD2	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-3			185885	MMB-SD3	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-6			185886	MMB-SD6	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	10/17/2001	Maple Meadow Brook	MMB-SW/SD-7			185887	MMB-SD7	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	10/18/2001	Maple Meadow Brook	MMB-SW/SD-4			185888	MMB-SD4	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	10/18/2001	Maple Meadow Brook	MMB-SW/SD-5			185889	MMB-SD5	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	10/18/2001	Maple Meadow Brook	MMB-SW/SD-8A			185890	MMB-SD8A	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-1			200802-008	MMBSD1-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-2			200802-010	MMBSD2-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-3			200802-009	MMBSD3-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-6			200802-007	MMBSD6-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/12/2002	Maple Meadow Brook	MMB-SW/SD-7			200802-006	MMBSD7-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-4			200802-017	MMB-SD04-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-4			200802-018	MMB-SD04-02D	Duplicate								2					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-5			200802-016	MMB-SD05-02	Sample								3					
Maple Meadow Brook	HARDING ESE	SD	OU2	6/13/2002	Maple Meadow Brook	MMB-SW/SD-8A			200802-015	MMB-SD8A-02	Sample								3					
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-N			207655-001	OPWD-SD-N-01	Sample	68							1					
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-N			207655-004	OPWD-SD-N-01	Sample		65	1				22	1					
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-S			207655-002	OPWD-SD-S-01	Sample	68							1					
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-S			207655-005	OPWD-SD-S-01	Sample		65	1				22	1					
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-WS			207655-003	OPWD-SD-WS-01	Sample	68							1					
OPWD	MACTEC	SD	OU2	6/17/2003	Off-property West Ditch	OPWD-SD/SO/SW-WS			207655-006	OPWD-SD-WS-01	Sample		65	1				22	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	On-Property West Ditch	SD-SD1	0	0.25	207659-001	SD-SD1-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	On-Property West Ditch	SD-SD1	0.25	1.25	207659-006	SD-SD1-15-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD2	0	0.25	207659-002	SD-SD2-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD2	0.25	1.25	207659-007	SD-SD2-15-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD3	0	0.25	207659-003	SD-SD3-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD3	0.25	1.25	207659-008	SD-SD3-15-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD4	0	0.25	207659-004	SD-SD4-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD4	0.25	1	207659-009	SD-SD4-12-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD5	0	0.25	207659-005	SD-SD5-03-01	Sample			1				15	1					
South Ditch	MACTEC	SD	OU1	6/17/2003	South Ditch	SD-SD5	0.25	1.08	207659-010	SD-SD5-13-01	Sample			1				15	1					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			207785-006	EDSD6-01	Sample	68						2	5					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			207785-027	EDSD6-01	Sample		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			207785-034	EDSD6-01	Sample			1					1					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			218720-006	EDSD6-01	Sample				16				2					
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			533052	EDSD6-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/18/2003	East Ditch	EDSD/SW6			533052R1	EDSD6-01	Sample							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			207785-001	EDSD1-01	Sample	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			207785-022	EDSD1-01	Sample		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			207785-029	EDSD1-01	Sample			1					1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			218720-001	EDSD1-01	Sample				16				2					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			533047	EDSD1-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)			533047R1	EDSD1-01	Sample							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			207785-002	EDSD2-01	Sample	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			207785-009	EDSD2-DUP-01	Duplicate	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			207785-023	EDSD2-01	Sample		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			207785-028	EDSD2-DUP-01	Duplicate		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			207785-030	EDSD2-01	Sample			1					1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			207785-035	EDSD2-DUP-01	Duplicate			1					1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			218720-002	EDSD2-01	Sample				16				2					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			218720-007	EDSD2-DUP-01	Duplicate				16				2					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			533048	EDSD2-01	Sample							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			533048R1	EDSD2-01	Sample							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			533053	EDSD2-DUP-01	Duplicate							17						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)			533053R1	EDSD2-DUP-01	Duplicate							1						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			207785-003	EDSD3-01	Sample	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			207785-024	EDSD3-01	Sample		65	1		20	9	22	1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			207785-031	EDSD3-01	Sample			1					1					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			218720-003	EDSD3-01	Sample				16				2					
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			533049	EDSD3-01	Sample							16						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)			533049R1	EDSD3-01	Sample							2						
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			207785-004	EDSD4-01	Sample	68							2	5				

Table 2.1-5
Summary of Sediment Samples Collected To Date - By Date

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Wilmington, MA

Sample Event	ompany Sampled B	Matrix	RI Status	Date Sampled	Area	Location	Upper Depth	Lower Depth	Lab Sample Number	Chain of Custody Sample ID	Sample Type	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals- Total	Inorganics/physical	Field_ pH	Field	Oil &Gr ease	Extractablep etroleum Hydrocarbons
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			207785-025	EDSD4-01	Sample		65	1		20	9		22	1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			207785-032	EDSD4-01	Sample			1						1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			218720-004	EDSD4-01	Sample				16					2				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			533050	EDSD4-01	Sample						17							
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)			533050R1	EDSD4-01	Sample						1							
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			207785-005	EDSD5-01	Sample	68							2	5				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			207785-026	EDSD5-01	Sample		65	1		20	9		22	1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			207785-033	EDSD5-01	Sample			1						1				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			218720-005	EDSD5-01	Sample				16					2				
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			533051	EDSD5-01	Sample						17							
East Ditch	MACTEC	SD	OU2	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)			533051R1	EDSD5-01	Sample						1							
North Pond	MACTEC	SD	OU2	11/20/2003	North Pond	NPSED1	0	1	211584-006	NPSED1-SED1	Sample	75	68	1		19		11	8	6				
North Pond	MACTEC	SD	OU2	11/20/2003	North Pond	NPSED1	0	1	211584-009	NPSED1-SED1 DUP	Duplicate	75	68	1		19		11	8	6				
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW7			214753-013	EDSD7-01	Sample		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW7			214753-017	EDSD7-01	Sample	75								1				
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW8			214753-014	EDSD8-01	Sample		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/28/2004	East Ditch	EDSD/SW8			214753-018	EDSD8-01	Sample	75								1				
East Ditch	MACTEC	SD	OU2	4/29/2004	East Ditch	EDSD/SW0			214753-011	EDSD0-01	Sample		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/29/2004	East Ditch	EDSD/SW0			214753-012	EDSD0DUP-01	Duplicate		68	1		19	9		25	14				
East Ditch	MACTEC	SD	OU2	4/29/2004	East Ditch	EDSD/SW0			214753-016	EDSD0DUP-01	Duplicate	75								1				
South Ditch	MACTEC	SD	OU1	8/10/2004	On-Property West Ditch	SD-SD1	0	0.25	217717-001	SD-SD1-03-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	On-Property West Ditch	SD-SD1	0.25	1.25	217717-006	SD-SD1-15-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD2	0	0.25	217717-002	SD-SD2-03-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD2	0.25	1	217717-007	SD-SD2-12-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD3	0	0.25	217717-003	SD-SD3-03-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD3	0.25	1	217717-008	SD-SD3-12-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD4	0	0.25	217717-004	SD-SD4-03-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD4	0.25	1	217717-009	SD-SD4-12-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD5	0	0.25	217717-005	SD-SD5-03-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	8/10/2004	South Ditch	SD-SD5	0.25	1.25	217717-010	SD-SD5-15-02	Sample								3	2				
South Ditch	MACTEC	SD	OU1	5/19/2005	On-Property West Ditch	SD-SD1			224893-001	SD-SD1-(15)-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	On-Property West Ditch	SD-SD1			224893-006	SD-SD1-03-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD2			224893-002	SD-SD2-(12)-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD2			224893-007	SD-SD2-03-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD3			224893-003	SD-SD3-(15)-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD3			224893-008	SD-SD3-03-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD4			224893-004	SD-SD4-(10)-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD4			224893-009	SD-SD4-03-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD5			224893-005	SD-SD5-(15)-03	Sample								3	1	1			
South Ditch	MACTEC	SD	OU1	5/19/2005	South Ditch	SD-SD5			224893-010	SD-SD5-03-03	Sample								3	1	1			
Lower South Ditch	MACTEC	SD	OU1-offsite	8/22/2005	Lower South Ditch	BS030	0	0.5	228370-001	BS030LSD-02	Sample		68		16	19			24	5				
Lower South Ditch	MACTEC	SD	OU1-offsite	8/22/2005	Lower South Ditch	BS030	0	0.5	228370-014	BS030LSD-02 RE	Sample		68							1				
Lower South Ditch	MACTEC	SD	OU1	8/22/2005	Lower South Ditch	BS031	0	0.5	228370-002	BS031LSD-02	Sample		68		16	19			24	5				
Lower South Ditch	MACTEC	SD	OU1	8/22/2005	Lower South Ditch	BS032	0	0.5	228370-003	BS032LSD-02	Sample		68		16	19			24	5				
Lower South Ditch	MACTEC	SD	OU1	8/22/2005	Lower South Ditch	BS032	0	0.5	228370-015	BS032LSD-02 RE	Sample		68							1				

Prepared/Date: KJC 07/27/07
Checked/Date: MJM 07/27/07

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

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Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
	GEI	08-Dec-77		SS-10	SS-10	Sample															5						
	GEI	08-Dec-77		SS-3	SS-03	Sample															5						
	GEI	08-Dec-77		SS-4	SS-04	Sample															5						
	GEI	08-Dec-77		SS-6	SS-06	Sample															5						
	GEI	08-Dec-77		SS-7	SS-07	Sample															5						
	GEI	08-Dec-77		SS-8	SS-08	Sample															5						
	GEI	19-Jan-78		SS-10	SS-10	Sample															5						
	GEI	19-Jan-78		SS-3	SS-03	Sample															5						
	GEI	19-Jan-78		SS-4	SS-04	Sample															5						
	GEI	19-Jan-78		SS-6	SS-06	Sample															5						
	GEI	19-Jan-78		SS-7	SS-07	Sample															5						
	GEI	21-Feb-78		SS-10	SS-10	Sample															5						
	GEI	21-Feb-78		SS-3	SS-03	Sample															5						
	GEI	21-Feb-78		SS-6	SS-06	Sample															5						
	GEI	21-Feb-78		SS-7	SS-07	Sample															5						
	GEI	15-Mar-78		SS-10	SS-10	Sample															5						
	GEI	15-Mar-78		SS-15	SS-15	Sample															5						
	GEI	15-Mar-78		SS-17	SS-17	Sample															5						
	GEI	15-Mar-78		SS-3	SS-03	Sample															5						
	GEI	15-Mar-78		SS-4	SS-04	Sample															5						
	GEI	15-Mar-78		SS-6	SS-06	Sample															5						
	GEI	15-Mar-78		SS-7	SS-07	Sample															5						
	GEI	15-Mar-78		SS-8	SS-08	Sample															5						
	GEI	10-Apr-78		SS-10	SS-10	Sample															5						
	GEI	10-Apr-78		SS-13	SS-13	Sample															5						
	GEI	10-Apr-78		SS-14	SS-14	Sample															5						
	GEI	10-Apr-78		SS-15	SS-15	Sample															5						
	GEI	10-Apr-78		SS-3	SS-03	Sample															5						
	GEI	10-Apr-78		SS-4	SS-04	Sample															5						
	GEI	10-Apr-78		SS-6	SS-06	Sample															5						
	GEI	10-Apr-78		SS-7	SS-07	Sample															5						
	GEI	10-Apr-78		SS-8	SS-08	Sample															5						
	GEI	10-Apr-78		SS-9	SS-09	Sample															5						
		27-Jun-86		SS-14	SS-14	Sample												1			4	1					
		27-Jun-86		SS-17	SS-17	Sample												1			4	1					
		01-Jul-86		SS-13	SS-13	Sample												1			4	1					
		01-Oct-86		SS-14	SS-14	Sample												1			3	1					
		01-Dec-86		SS-13	SS-13	Sample															3	1					
		01-Dec-86		SS-14	SS-14	Sample												1			3	1					
		01-Dec-86		SS-17	SS-17	Sample												1			3	1					
		01-Jun-87		SS-17	SS-17	Sample												1			3	1					
		01-Dec-87		SS-13	SS-13	Sample												1			3	1					
		01-Dec-87		SS-14	SS-14	Sample												1			3	1					
		01-Dec-87		SS-17	SS-17	Sample												1			3						
		02-Feb-95		GSW-11	SW-11	Sample	FILTERED 1460308												14		13	2					
		02-Feb-95		GSW-11	SW-11	Sample												14			13	4	1				
		02-Feb-95		GSW-14	SW-14	Sample	FILTERED 1460304												14		13	2					
		02-Feb-95		GSW-14	SW-14	Duplicate	FILTDUP 1460295												12		13	1					
		02-Feb-95		GSW-14	SW-14	Sample												14			13	4	1				
		02-Feb-95		GSW-14	SW-14	Duplicate	DUP OF 1460304											12			13	1					
		02-Feb-95		GSW-16	SW-16	Sample	FILTERED 1460311												14		13	2					
		02-Feb-95		GSW-16	SW-16	Sample												14			13	4	1				
		02-Feb-95		GSW-17	SW-17	Sample	FILTERED 1460310												14		13	2					
		02-Feb-95		GSW-17	SW-17	Sample												14			13	4	1				
		03-May-95		GSW-11	SW-11	Sample	FILTERED 1460406												14		14	2					
		03-May-95		GSW-11	SW-11	Sample												14			13	5	1				
		03-May-95		GSW-14	SW-14	Sample	FILTERED 1460407												14		14	2					
		03-May-95		GSW-14	SW-14	Duplicate	FILTDUP 1460408												14		13	1					
		03-May-95		GSW-14	SW-14	Sample												14			13	5	1				
		03-May-95		GSW-14	SW-14	Duplicate	DUP OF 1460407												14		13	1					
		03-May-95		GSW-16	SW-16	Sample	FILTERED 1460401												14		14	2					
		03-May-95		GSW-16	SW-16	Sample												14			13	5	1				
		03-May-95		GSW-17	SW-17	Sample	FILTERED 1460402												14		14	2					
		03-May-95		GSW-17	SW-17	Sample												14			13	5	1				
		19-Jul-95		GSW-14	SW-14	Sample	FILTERED 1460481												14		13	2					

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Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
		19-Jul-95		GSW-14	SW-14	Sample	FILTERED 1460482												14		13	1					
		19-Jul-95		GSW-14	SW-14	Sample												14			13	5	1					
		19-Jul-95		GSW-14	SW-14	Sample												14			13	1						
		19-Jul-95		GSW-16	SW-16	Sample	FILTERED 1460480												14		13	2					
		19-Jul-95		GSW-16	SW-16	Sample												14			13	5	1					
		19-Jul-95		GSW-17	SW-17	Sample	FILTERED 1460479												14		13	2					
		19-Jul-95		GSW-17	SW-17	Sample												14			13	5	1					
		18-Oct-95		GSW-11	SW-17	Sample	FILTERED 1460659												14		13	2					
		18-Oct-95		GSW-11	SW-17	Duplicate	FILTDUP 1460642												14		13	1					
		18-Oct-95		GSW-11	SW-17	Sample												14			13	4	1					
		18-Oct-95		GSW-11	SW-17	Duplicate	DUP OF 1460659											14			13	1						
		18-Oct-95		GSW-14	SW-14	Sample	FILTERED 1460655												14		13	2					
		18-Oct-95		GSW-14	SW-14	Sample												14			13	5	1					
		18-Oct-95		GSW-16	SW-16	Sample	FILTERED 1460661												14		13	2					
		18-Oct-95		GSW-16	SW-16	Sample												14			13	5	1					
		24-Jan-97		FETAX WATER	FETAX WATER	Sample												23										
1998 Floc	Geomega	13-Jan-98		EDB	EDB1 WATER	Sample												28			4							
1998 Floc	Geomega	13-Jan-98		EDC	EDC2 WATER	Sample												28			4							
1998 Floc	Geomega	13-Jan-98		EDS	EDS3 WATER	Sample												28			4							
DISPOSAL	GEI	08-Oct-01		DRUM	1140-DR-L1 MS/MSD	Sample		65			65								23		3							
DISPOSAL	GEI	08-Oct-01		DRUM	1140-DR-G1	Sample		65			65								23		3							
		01-Apr-96	Background	SDBK-001	SW001XXBKX	Background Sample		36			64				21				24		5							
		01-Apr-96	Background	SDBK-002	SW002XXBKX	Background Sample		36			64				21				24		5							
		02-Apr-96	Background	SDBK-005	SW005XXBKX	Background Sample									21													
		02-Apr-96	Background	SDBK-006	SW006XXBKX	Background Sample									21													
		02-Apr-96	Background	SDBK-007	SW007XXBKX	Background Sample									21													
		02-Apr-96	Background	SDBK-013	SW013XXBKX	Background Sample									21													
		03-Apr-96	Background	SDBK-003	SW003XXBKX	Background Sample		36			64				21				24		5							
		03-Apr-96	Background	SDBK-004	SW004XXBKX	Background Sample		36			64				21				24		5							
		03-Apr-96	Background	SDBK-008	SW008XXBKX	Background Sample									21													
		03-Apr-96	Background	SDBK-009	SW009XXBKX	Background Sample									21													
		04-Apr-96	Background	SDBK-010	SW010XXBKX	Background Sample									21													
		04-Apr-96	Background	SDBK-011	SW011XXBKX	Background Sample									21													
		04-Apr-96	Background	SDBK-012	SW012XXBKX	Background Sample									21													
		04-Apr-96	Background	SDBK-014	SW014XXBKX	Background Sample		36			64				21				24		1							
		04-Apr-96	Background	SDBK-014	SW014XXBKD	Background Duplicate		36			64				21				24		1							
Biocell Management	GEI	15-Mar-02	Biocell	BIOCELL	1140-BIO-COMP MS/MSD	Sample																		6				
Biocell Management	GEI	15-Mar-02	Biocell	BIOCELL	1140-BIO-COMP MS/MSD	Sample						68																
		02-Sep-92	Buried Debris Area	SW-12	SW-12	Sample		36			65				21				23		3	2	1					
		01-Dec-92	Buried Debris Area	SW-12	SW-12	Sample		36			65				21				23		3	2	1					
C-RAM	GEI	16-Nov-00	Buried Debris Area	Buried Debris Area	1150-BD-SWC18	Sample	GEI Imported Data						17						1									
C-RAM	GEI	16-Nov-00	Buried Debris Area	Buried Debris Area	1150-BD-SWC18	Sample	GEI Imported Data													1								
C-RAM	GEI	08-May-01	Buried Debris Area	Buried Debris Area	1150-BD-PH1	Sample	GEI Imported Data													4								
C-RAM	GEI	08-May-01	Buried Debris Area	Buried Debris Area	1150-BD-PH2	Sample	GEI Imported Data													4								
		01-Sep-92	Central Pond	SW-8	SW-08	Sample		36			65				21				23		3	2	1					
		01-Dec-92	Central Pond	SW-8	SW-08	Sample		36			65				21				24		5	2	1					
C-RAM	GEI	09-Oct-00	Central Pond	Central Pond	1150-CP-SW1	Sample	GEI Imported Data													1								
C-RAM	GEI	09-Oct-00	Central Pond	Central Pond	1150-CP-SW1	Sample	GEI Imported Data	6					17						6									
C-RAM	GEI	09-Oct-00	Central Pond	Central Pond	1150-CP-SW1	Sample	GEI Imported Data																	5				
C-RAM	GEI	16-Nov-00	Central Pond	Central Pond	1150-CP-SWC18	Sample	GEI Imported Data												1									
C-RAM	GEI	16-Nov-00	Central Pond	Central Pond	1150-CP-SWC18	Sample	GEI Imported Data													1								
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data	6																				
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data				17																	
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data																	1				
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data												6									
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data													1								
C-RAM	GEI	13-Nov-00	Containment Wall	Containment Wall	1150-CW-SW1	Sample	GEI Imported Data	6					17						6									
C-RAM	GEI	13-Nov-00	Containment Wall	Containment Wall	1150-CW-SW1	Sample	GEI Imported Data													1								
C-RAM	GEI	13-Nov-00	Containment Wall	Containment Wall	1150-CW-SW1	Sample	GEI Imported Data																	5				
C-RAM	GEI	27-Nov-00	Containment Wall	Containment Wall	1150-CW-SW2	Sample	GEI Imported Data												1									
C-RAM	GEI	27-Nov-00	Containment Wall	Containment Wall	1150-CW-SW2	Sample	GEI Imported Data													1								
C-RAM	GEI	18-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-0	Sample	GEI Imported Data	6					18						6									
C-RAM	GEI	18-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-0	Sample	GEI Imported Data																	5				
C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-1	Sample	GEI Imported Data	9					18						6									
C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-2	Sample	GEI Imported Data	9					18						6									

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C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-1	Sample	GEI Imported Data																5				
C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-2	Sample	GEI Imported Data																5				
C-RAM	GEI	27-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-3	Sample	GEI Imported Data	10					17					6									
C-RAM	GEI	27-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-3	Sample	GEI Imported Data																5				
C-RAM	GEI	04-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-4	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	04-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-4	Sample	GEI Imported Data																5				
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-TEST A	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT - A1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-TEST A	Sample	GEI Imported Data												1								
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT- A1	Sample	GEI Imported Data												1								
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-TEST A	Sample	GEI Imported Data																5				
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A1	Sample	GEI Imported Data																5				
C-RAM	GEI	09-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A2	Sample	GEI Imported Data												1								
C-RAM	GEI	09-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A2	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	09-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A2	Sample	GEI Imported Data																5				
C-RAM	GEI	12-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A3	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	12-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A3	Sample	GEI Imported Data												1								
C-RAM	GEI	12-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A3	Sample	GEI Imported Data																5				
C-RAM	GEI	24-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT B1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	24-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT B1	Sample	GEI Imported Data												1								
C-RAM	GEI	24-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT B1	Sample	GEI Imported Data																5				
C-RAM	GEI	25-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	25-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C1	Sample	GEI Imported Data												1								
C-RAM	GEI	25-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C1	Sample	GEI Imported Data																5				
C-RAM	GEI	27-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C2	Sample	GEI Imported Data	6										6									
C-RAM	GEI	27-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C2	Sample	GEI Imported Data												1								
C-RAM	GEI	27-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C2	Sample	GEI Imported Data																5				
C-RAM	GEI	30-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C3	Sample	GEI Imported Data	6										6									
C-RAM	GEI	30-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C3	Sample	GEI Imported Data												1								
C-RAM	GEI	30-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C3	Sample	GEI Imported Data																5				
C-RAM	GEI	03-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C4	Sample	GEI Imported Data											1									
C-RAM	GEI	03-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C4	Sample	GEI Imported Data												1								
C-RAM	GEI	08-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C5	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	08-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C5	Sample	GEI Imported Data												1								
C-RAM	GEI	08-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C5	Sample	GEI Imported Data																5				
C-RAM	GEI	13-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C6	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	13-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C6	Sample	GEI Imported Data												1								
C-RAM	GEI	13-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C6	Sample	GEI Imported Data																5				
C-RAM	GEI	20-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C7	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	20-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C7	Sample	GEI Imported Data																5				
C-RAM	GEI	20-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C7	Sample	GEI Imported Data												1								
C-RAM	GEI	27-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C8	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	27-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C8	Sample	GEI Imported Data																5				
C-RAM	GEI	27-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C8	Sample	GEI Imported Data												1								
C-RAM	GEI	16-Dec-00	C-RAM NPDES	NPDES-OUT	1150-OUT-D1	Sample	GEI Imported Data	6					18					6									
C-RAM	GEI	16-Dec-00	C-RAM NPDES	NPDES-OUT	1150-OUT-D1	Sample	GEI Imported Data												1								
C-RAM	GEI	16-Dec-00	C-RAM NPDES	NPDES-OUT	1150-OUT-D1	Sample	GEI Imported Data																5				
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data	6																			
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data																1				
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data						17														
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data											5	1								
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data											1									
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data	6																			
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data						17														
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data																1				
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data											6									
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data												1								
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data	6																			
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data						17														
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data																1				
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data											6									
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data												1								
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data	6																			
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data						17														
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data																1				

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C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data												6								
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data													1							
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data	6																			
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data						17														
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data																1				
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data												6								
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data													1							
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data	6																			
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data						17														
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data																1				
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data												6								
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data													1							
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data	6																			
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data						17														
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data																1				
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data												6								
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data													1							
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data	6																			
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data						17														
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data																1				
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data												6								
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data													1							
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data						17														
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data																1				
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data												6								
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data													1							
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data	6																			
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data	6																			
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data						17														
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data																1				
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data												6								
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data													1							
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data	6																			
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data						17														
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data																1				
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data												6								
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data													1							
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data	6																			
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data																1				
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data												6	2							
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data													1							
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data	6																			
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data						17														
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data																1				
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data												6	2							
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data													1							
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data						17														
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data																1				
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data	6																			
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data												6	2							
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data													1							
PCMP-RAM SW	GEI	04-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-N1 MS/MSD	Sample		6		17									6								
PCMP-RAM SW	GEI	04-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-N1 DISSOLVED MS/MSD	Sample														1							
PCMP-RAM SW	GEI	04-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-N1 DRO MS/MSD	Sample																	6				
PCMP-RAM SW	GEI	28-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-P1 MS/MSD	Sample				67																12	22
		01-Sep-92	Delta	SW-7	SW-07	Sample		36		65				21				23			3	2	1				
		01-Dec-92	Delta	SW-7	SW-07	Sample		36		65				21				23			3	2	1				
C-RAM	GEI	19-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	19-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW1	Sample	GEI Imported Data																5				
C-RAM	GEI	19-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW1	Sample	GEI Imported Data													1							
C-RAM	GEI	28-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW2	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	28-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW2	Sample	GEI Imported Data																5				
C-RAM	GEI	28-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW2	Sample	GEI Imported Data													1							
C-RAM	GEI	27-Sep-00	Drum Area A	Drum Area A	1150-DA-1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	27-Sep-00	Drum Area A	Drum Area A	1150-DA-1	Sample	GEI Imported Data																5				

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	03-Nov-00	Drum Area B	Drum Area B	1150-DB-SW1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	03-Nov-00	Drum Area B	Drum Area B	1150-DB-SW1	Sample	GEI Imported Data												1								
C-RAM	GEI	03-Nov-00	Drum Area B	Drum Area B	1150-DB-SW1	Sample	GEI Imported Data																5				
	GEI	08-Dec-77	East Ditch	SS-1	SS-01	Sample														5							
	GEI	08-Dec-77	East Ditch	SS-2	SS-02	Sample														5							
	GEI	19-Jan-78	East Ditch	SS-1	SS-01	Sample														5							
	GEI	19-Jan-78	East Ditch	SS-2	SS-02	Sample														5							
	GEI	21-Feb-78	East Ditch	SS-1	SS-01	Sample														5							
	GEI	21-Feb-78	East Ditch	SS-2	SS-02	Sample														5							
	GEI	15-Mar-78	East Ditch	SS-1	SS-01	Sample														5							
	GEI	15-Mar-78	East Ditch	SS-16	SS-16	Sample														5							
	GEI	10-Apr-78	East Ditch	SS-1	SS-01	Sample														5							
	GEI	10-Apr-78	East Ditch	SS-16	SS-16	Sample														5							
		01-Oct-82	East Ditch	SS-1	SS-01	Sample					2									4	1						
		01-Oct-82	East Ditch	SS-16	SS-16	Sample					2									4	1						
		01-Jun-83	East Ditch	SS-1	SS-01	Sample					2									4	1						
		01-Jun-83	East Ditch	SS-16	SS-16	Sample					2									4	1						
		01-Oct-83	East Ditch	SS-1	SS-01	Sample					2									4	1						
		01-Oct-83	East Ditch	SS-16	SS-16	Sample					2									4	1						
		01-Jul-84	East Ditch	SS-1	SS-01	Sample					2									4	1						
		01-Jul-84	East Ditch	SS-16	SS-16	Sample					2									4	1						
		01-Dec-84	East Ditch	SS-1	SS-01	Sample					2									4							
		01-Dec-84	East Ditch	SS-16	SS-16	Sample					2									4							
		01-May-85	East Ditch	SS-1	SS-01	Sample												1			1						
		01-May-85	East Ditch	SS-16	SS-16	Sample												1			1						
		01-May-85	East Ditch	SS-2	SS-02	Sample												1			1						
		01-Dec-85	East Ditch	SS-16	SS-16	Sample												1		4	1						
		27-Jun-86	East Ditch	SS-16	SS-16	Sample												1		4	1						
		01-Oct-86	East Ditch	SS-B	SS-B	Sample												1		3	1						
		01-Dec-86	East Ditch	SS-1	SS-01	Sample														2	1						
		01-Dec-86	East Ditch	SS-16	SS-16	Sample														3	1						
		01-Dec-86	East Ditch	SS-B	SS-B	Sample														3	1						
		01-Jun-87	East Ditch	SS-1	SS-01	Sample												1		3	1						
		01-Jun-87	East Ditch	SS-16	SS-16	Sample												1		3	1						
		01-Dec-87	East Ditch	SS-1	SS-01	Sample												1		3							
		01-Dec-87	East Ditch	SS-16	SS-16	Sample												1		3							
		01-Dec-87	East Ditch	SS-B	SS-B	Sample												1		3	1						
		01-Dec-87	East Ditch	SS-E	SS-E	Sample												1		3	1						
		10-Dec-91	East Ditch	SW-1	SW-01	Sample		36		65				21	7			23		4							
		10-Dec-91	East Ditch	SW-2	SW-02	Sample		36		65				21	7			23		4							
		31-Aug-92	East Ditch	SW-1	SW-01	Sample		36		65				21				23		3	2	1					
		31-Aug-92	East Ditch	SW-2	SW-02	Sample		36		65				21				23		3	2	1					
		31-Aug-92	East Ditch	SW-3	SW-03	Sample		36		65				21				23		3	2	1					
		30-Nov-92	East Ditch	SW-1	SW-01	Sample		36		65				21				23		3	2	1					
		30-Nov-92	East Ditch	SW-2	SW-02	Sample		36		65				21				23		3	2	1					
		30-Nov-92	East Ditch	SW-3	SW-03	Sample		36		65				21				23		3	2	1					
		02-Dec-92	East Ditch	SW-23	SW-23	Sample		36		65				21				24		5	2	1					
		07-Jan-93	East Ditch	SW-24	SW-24	Sample		36		65				21				24		4							
		25-Mar-93	East Ditch	SW-25	SW-25	Sample		36		65				21				24		4	2	1					
		25-Mar-93	East Ditch	SW-26	SW-26	Sample		36		65				21				24		4							
		25-Mar-93	East Ditch	SW-27	SW-27	Sample		36		65				21				24		4							
		25-Mar-93	East Ditch	SW-28	SW-28	Sample		36		65				21				24		4							
		25-Mar-93	East Ditch	SW-29	SW-29	Sample		36		65				21				24		4							
		20-Apr-93	East Ditch	SW-30	SW-30	Sample		36		65				21				24		4							
PCMP	GEI	09-Feb-01	East Ditch	ISCO3	1170-ISCO3-1	Sample	GEI Imported Data											1		1							
PCMP	GEI	09-Feb-01	East Ditch	ISCO3	1170-ISCO3-1	Sample	GEI Imported Data												1								
PCMP	GEI	09-Mar-01	East Ditch	ISCO3	1170-ISCO3-5	Sample	GEI Imported Data											1		2							
PCMP	GEI	09-Mar-01	East Ditch	ISCO3	1170-ISCO3-5	Sample	GEI Imported Data												1								
PCMP	GEI	02-Apr-01	East Ditch	ISCO3	1170-ISCO3-9	Sample	GEI Imported Data											1		4							
PCMP	GEI	02-Apr-01	East Ditch	ISCO3	1170-ISCO3-9	Sample	GEI Imported Data												2								
PCMP	GEI	30-Apr-01	East Ditch	ISCO3	1170-ISCO3-13	Sample	GEI Imported Data											1		4							
PCMP	GEI	30-Apr-01	East Ditch	ISCO3	1170-ISCO3-13	Sample	GEI Imported Data												2								
PCMP	GEI	04-Jun-01	East Ditch	ISCO3	1170-ISCO3-25	Sample	GEI Imported Data											1		4							
PCMP	GEI	04-Jun-01	East Ditch	ISCO3	1170-ISCO3-25	Sample	GEI Imported Data												2								
PCMP	GEI	02-Jul-01	East Ditch	ISCO3	1170-ISCO3-33	Sample	GEI Imported Data											1		4							

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	02-Jul-01	East Ditch	ISCO3	1170-ISCO3-33 DISSOLVED	Sample	GEI Imported Data												2								
PCMP	GEI	06-Aug-01	East Ditch	ISCO3	1170-ISCO3-38	Sample												1		4							
PCMP	GEI	06-Aug-01	East Ditch	ISCO3	1170-ISCO3-38 DISSOLVED	Sample													2								
PCMP	GEI	04-Sep-01	East Ditch	ISCO3	1170-ISCO3-42	Sample												1		4							
PCMP	GEI	04-Sep-01	East Ditch	ISCO3	1170-ISCO3-42	Sample													2								
PCMP	GEI	08-Oct-01	East Ditch	ISCO3	1170-ISCO3-43	Sample												1		4							
PCMP	GEI	08-Oct-01	East Ditch	ISCO3	1170-ISCO3-43 DISSOLVED	Sample													2								
PCMP	GEI	12-Nov-01	East Ditch	ISCO3	1170-ISCO3-44	Sample												1		4							
PCMP	GEI	12-Nov-01	East Ditch	ISCO3	1170-ISCO3-44 DISSOLVED	Sample													2								
PCMP	GEI	10-Dec-01	East Ditch	ISCO3	1170-ISCO3-46	Sample												1		4							
PCMP	GEI	10-Dec-01	East Ditch	ISCO3	1170-ISCO3-46 DISSOLVED	Sample													2								
PCMP	GEI	07-Jan-02	East Ditch	ISCO3	1170-ISCO3-50	Sample												1		8							
PCMP	GEI	07-Jan-02	East Ditch	ISCO3	1170-ISCO3-50 DISSOLVED	Sample													2								
PCMP	GEI	04-Feb-02	East Ditch	ISCO3	1170-ISCO3-51	Sample												1		8							
PCMP	GEI	04-Feb-02	East Ditch	ISCO3	1170-ISCO3-51 DISSOLVED	Sample													2								
PCMP	GEI	25-Feb-02	East Ditch	ISCO3	1170-ISCO3-52	Sample												1		8							
PCMP	GEI	25-Feb-02	East Ditch	ISCO3	1170-ISCO3-52 DISSOLVED	Sample													2								
PCMP	GEI	25-Mar-02	East Ditch	ISCO3	1170-ISCO3-53	Sample												1		8	1						
PCMP	GEI	25-Mar-02	East Ditch	ISCO3	1170-ISCO3-53 DISSOLVED	Sample													2								
PCMP	GEI	22-Apr-02	East Ditch	ISCO3	1170-ISCO3-54	Sample												1		8							
PCMP	GEI	22-Apr-02	East Ditch	ISCO3	1170-ISCO3-54 DISSOLVED	Sample													2								
PCMP	GEI	20-May-02	East Ditch	ISCO3	1170-ISCO3-55	Sample												1	2	6							
PCMP	GEI	24-Jun-02	East Ditch	ISCO3	1170-ISCO3-56	Sample												1	2	6							
PCMP	GEI	22-Jul-02	East Ditch	ISCO3	1170-ISCO3-57	Sample												1	2	6							
PCMP		04-Nov-02	East Ditch	ISCO3	1170-ISC03-61	Sample												1	2	6							
PCMP		09-Dec-02	East Ditch	ISCO3	1170-ISCO3-62	Sample												1	2	6							
PCMP	MACTEC	03-Feb-03	East Ditch	ISCO3	1170-ISCO3-63	Sample												1	2	4							
PCMP	MACTEC	06-Feb-03	East Ditch	ISCO3	1170-ISCO3-63	Sample														2							
PCMP	MACTEC	05-May-03	East Ditch	ISCO3	1170-ISCO3-64	Sample												1	2	4		1					
PCMP	MACTEC	19-May-03	East Ditch	ISCO3	1170-ISCO3-64	Sample														2							
East Ditch	MACTEC	18-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample		68		65				20	9			24	23	16							
East Ditch	MACTEC	18-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample							16														
East Ditch	MACTEC	18-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample					1																
Floc	MACTEC	19-Jun-03	East Ditch	BACKFLOC	BACKFLOC-2003	Sample												6		2							
Floc	MACTEC	19-Jun-03	East Ditch	BACKFLOC	BACKFLOCSW-2003	Sample													6	1							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample		68		65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample							16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample					1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample										2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample											18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample		68		65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample							16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample					1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample										2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample											18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample		68		65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample							16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample					1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample										2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample											18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample		68		65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate		68		65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample							16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate							16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample					1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-01	Duplicate					1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample										2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate										2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample											18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate											18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample		68		65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample							16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample					1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample										2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample											18										

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample										2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample											17										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample											1										
Floc	MACTEC	25-Jun-03	East Ditch	SOEAST	SOEASTSW-2003	Sample													6	1							
PCMP	MACTEC	10-Jul-03	East Ditch	ISCO3	1170-ISCO3-64	Sample					1																
PCMP	MACTEC	11-Aug-03	East Ditch	ISCO3	1170-ISCO3-65	Sample												1	2	6							
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-02	Sample						1															
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-02	Sample						1															
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-02	Sample						1															
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-02	Duplicate		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-02	Sample						1															
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-02	Duplicate						1															
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-02	Sample						1															
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW6	EDSW6-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW6	EDSW6-02	Sample						1															
PCMP	MACTEC	17-Nov-03	East Ditch	ISCO3	1170-ISCO3-66	Sample												1	2	6							
PCMP	MACTEC	02-Feb-04	East Ditch	ISCO3	1170-ISCO3-67	Sample												1	2	6		1					
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-03	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-03	Sample						1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-03	Sample										2											
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW6	EDSW6-03	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW6	EDSW6-03	Sample						1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW6	EDSW6-03	Sample										2											
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW7	EDSW7-01	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW7	EDSW7-01	Sample						1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW7	EDSW7-01	Sample										2											
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW8	EDSW8-01	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW8	EDSW8-01	Sample						1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW8	EDSW8-01	Sample										2											
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW0	EDSW0-01	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW0	EDSW0-01	Sample						1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW0	EDSW0-03	Sample										2											
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-03	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-03	Sample						1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-03	Sample										2											
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-03	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-03	Sample						1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-03	Sample										2											
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-03	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-03	Sample						1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-03	Sample										2											
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-03	Sample		75			68				19	7			25	23	16		1				
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-03	Duplicate		75			68				19	7			25	23	16						
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-03	Sample						1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-03	Duplicate						1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-03	Sample										2											
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-03	Duplicate										2											
PCMP	MACTEC	10-May-04	East Ditch	ISCO3	1170-ISCO3-68	Sample												1	2	6		1					
PCMP	MACTEC	09-Aug-04	East Ditch	ISCO3	1170-ISCO3-69	Sample												1	2	6		1					
East Ditch	MACTEC	05-Oct-04	East Ditch	EDLBSW1	EDLBSW1-01	Sample		75	2	3	68			18	19	7		11	25	23	15		1				
East Ditch	MACTEC	05-Oct-04	East Ditch	EDLBSW1	EDLBSW1-01	Sample						1															
East Ditch	MACTEC	05-Oct-04	East Ditch	EDLBSW1	EDLBSW1-01	Sample										2											
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW7	EDSW7-02	Sample		75	2	3	68			18	19	7		11	25	23	15		1				
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW7	EDSW7-02	Sample						1															
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW7	EDSW7-02	Sample										2											
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02	Sample		75	2	3	68			18	19	7		11	25	23	15		1				
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8DUP-02	Duplicate		75	2	3	68			18	19	7		11	25	23	15						
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02	Sample						1															
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8DUP-02	Duplicate						1															
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02	Sample										2											

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Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02 DUP	Duplicate										2												
PCMP	MACTEC	01-Nov-04	East Ditch	ISCO3	1170-ISCO3-70	Sample												1		6		1						
PCMP	MACTEC	01-Nov-04	East Ditch	ISCO3	1170-ISCO3-70	Sample													2									
PCMP	MACTEC	31-Jan-05	East Ditch	ISCO3	1170-ISCO3-71	Sample												1		1		1						
PCMP	MACTEC	31-Jan-05	East Ditch	ISCO3	1170-ISCO3-71	Sample													2									
PCMP	MACTEC	01-Feb-05	East Ditch	ISCO3	1170-ISCO3-71	Sample														5								
East Ditch	MACTEC	15-Feb-05	East Ditch	EDLBSW1	EDLBSW1-02	Sample		75	2	3	68			18	19	7	2	10	25		15							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDLBSW1	EDLBSW1-02	Sample													23									
East Ditch	MACTEC	15-Feb-05	East Ditch	EDLBSW1	EDLBSW1-02	Sample						1																
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW7	EDSW7-03	Sample		75	2	3	68			18	19	7	2	10	25		15							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW7	EDSW7-03	Sample													23									
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW7	EDSW7-03	Sample						1																
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8-03	Sample		75	2	3	68			18	19	7	2	10	25		15							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8DUP-03	Duplicate		75	2	3	68			18	19	7	2	10	25		15							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8-03	Sample													23									
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8DUP-03	Duplicate													23									
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8-03	Sample						1																
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8 DUP-03	Duplicate						1																
PCMP	MACTEC	09-May-05	East Ditch	ISCO3	1170-ISCO3-72	Sample												1		6		1						
PCMP	MACTEC	09-May-05	East Ditch	ISCO3	1170-ISCO3-72	Sample													2									
PCMP	MACTEC	21-Nov-05	East Ditch	ISCO3	1170-ISCO3-74	Sample												1		6		1						
PCMP	MACTEC	21-Nov-05	East Ditch	ISCO3	1170-ISCO3-74	Sample													2									
PCMP	MACTEC	20-Feb-06	East Ditch	ISCO3	1170-ISCO3-75	Sample														4								
PCMP	MACTEC	21-Nov-05	Ephemeral Ditch	SDSW-J	SD-SW-J-03	Sample													3	6		1						
PCMP	MACTEC	21-Nov-05	Ephemeral Ditch	SDSW-J	SD-SW-J-03	Sample												3										
PCMP	MACTEC	20-Feb-06	Ephemeral Ditch	SDSW-J	SDSW-J-03	Sample														2								
Maple Meadow Brook	HARDING ESE	11-Dec-00	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 MS/MSD	Sample													7	9								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 D	Sample												5		3								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 MS/MSD	Sample												5		3								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1D DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 MS/MSD DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample												5		3								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2 DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample												5		3								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3 DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample												5		3								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6 DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-7	MMB-SW7	Sample												5		3								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-7	MMB-SW7 DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4	Sample												5		3								
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4 DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5	Sample												5		3								
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5 DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample												5		3								
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A DISSOLVED	Sample													5									
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-1	MMBSW1-02	Sample												5	5	3								
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-2	MMBSW2-02	Sample												5	5	3								
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-3	MMBSW3-02	Sample												5	5	3								
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-6	MMBSW6-02	Sample												5	5	3								
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-7	MMBSW7-02	Sample												5	5	3								
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW04-02	Sample												5	5	3								
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW04-02D	Duplicate												5	5	3								
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW05-02	Sample												5	5	3								
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A-02	Sample												5	5	3								
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3-03	Sample						1										1						
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4-03	Sample						1										1						
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6-03	Sample						1										1						
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW8-03	Sample						1										1						
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW9-03	Sample						1										1						
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample			2									1	19	10								
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1																
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample			2									1	19	10								
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1																
Maple Meadow Brook	MACTEC	11-Nov-03	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample			2									1	19	10								
Maple Meadow Brook	MACTEC	11-Nov-03	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1																

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Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1																
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample					1																
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample					1																
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1																
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1																
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1																
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample					1																
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample			2										1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1																
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample														19	9						
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1																
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample														19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample					1																
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample														19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample					1																
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample														19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1																
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample														19	9						
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1																
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample														19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample					1																
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample														19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1																
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample														19	9	1					
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1																
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample														19	9	1					
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample					1																
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample														19	9	1					
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample					1																
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample														19	9	1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1																
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample														19	9	1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample					1																
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample														19	9	1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1																
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample														19	9	1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1																
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample														19	9	1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample					1																
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample														19	9	1					
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample					1																
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample														19	9	1					
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample					1																
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample														19	9	1					
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1																
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample														19	9	1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate														19	9	1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1																
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate					1																
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample														19	9	1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample					1																
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample														19	9	1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample					1																
Maple Meadow Brook	MACTEC	11-Aug-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample														19	9	1					
Maple Meadow Brook	MACTEC	11-Aug-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1																
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample														19	9	1					
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate														19	9						
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1																

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acenaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1-DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample													19	9		1					
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1															
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1															
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample													19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11	Sample						1															
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample													19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5	Sample						1															
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample													19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample						1															
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample													19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample						1															
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample													19	9		1					
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample						1															
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample													19	9		1					
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample						1															
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW10	Sample						1															
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4	Sample						1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample													19	9		1					
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 Duplicate	Duplicate													19	9							
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1	Sample						1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample													19	9		1					
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW8	Sample						1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample													19	9		1					
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW9	Sample						1															
Maple Meadow Brook	MACTEC	10-May-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample													19	9		1					
Maple Meadow Brook	MACTEC	10-May-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample													19	9		1					
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample													19	9		1					
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample													19	9		1					
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample													19	9		1					
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample													19	9		1					
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample														9		1					
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate														9							
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample													19	9		1					
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample													19	9		1					
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample													19	9		1					
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUPLICATE	Duplicate													19	9							

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acenaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19									
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19									
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9		1						
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1															
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9		1						
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1															
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9		1						
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUPLICATE	Duplicate												19	9		1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1															
Maple Meadow Brook	MACTEC	29-Jul-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9		1						
Maple Meadow Brook	MACTEC	29-Jul-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1						
Maple Meadow Brook	MACTEC	29-Jul-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1															
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample												19	9		1						
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1															
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9		1						
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1															
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9		1						
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1															
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9		1						
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1															
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9		1						
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1															
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9		1						
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1															
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9		1						
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19	9								
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1															
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1-DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1						
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1															
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9		1						
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1															
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1						
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUPLICATE	Duplicate												19	9								
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1															
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9-DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	17-Nov-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9		1						
Maple Meadow Brook	MACTEC	17-Nov-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9		1						
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												3									
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 Duplicate	Duplicate												19	9								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 Duplicate	Duplicate												3									
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9		1						
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												3									
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1															

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample													19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 Duplicate	Duplicate													19	9							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 Duplicate	Duplicate													3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1																
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUP	Duplicate					1																
		01-Oct-86	Off-Property West Ditch	SS-D	SS-D	Sample													1		3	1					
		01-Dec-86	Off-Property West Ditch	SS-D	SS-D	Sample															2	1					
		01-Jun-87	Off-Property West Ditch	SS-D	SS-D	Sample													1		3	1					
		01-Dec-87	Off-Property West Ditch	SS-D	SS-D	Sample													1		3	1					
		02-Sep-92	Off-Property West Ditch	SW-15	SW-15	Sample		36		65				21					23		3	2	1				
		02-Dec-92	Off-Property West Ditch	SW-15	SW-15	Sample		36		65				21					23		3	2	1				
		02-Feb-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460309													14	13	2					
		02-Feb-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	4	1				
		03-May-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460409													14	14	2					
		03-May-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	5	1				
		19-Jul-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460478													14	13	2					
		19-Jul-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	4	1				
		18-Oct-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460656													14	14	2					
		18-Oct-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	4	1				
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample													17	15	8						
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample													17	15	8						
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample													17	15	8						
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample													17	15	8						
OPWD		09-Dec-02	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample				1				1													
OPWD		09-Dec-02	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample				1				1													
OPWD		09-Dec-02	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample				1				1													
OPWD		09-Dec-02	Off-property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample				1				1													
OPWD	MACTEC	04-Feb-03	Off-Property West Ditch	OPWD-SWRUN1	OPWD-SWRUN1	Sample													7	7	3						
OPWD	MACTEC	04-Feb-03	Off-Property West Ditch	OPWD-SWRUN2	OPWD-SWRUN2	Sample													7	7	3						
OPWD	MACTEC	04-Feb-03	Off-Property West Ditch	OPWD-SWRUN3	OPWD-SWRUN3	Sample													7	7	3						
OPWD	MACTEC	12-Feb-03	Off-Property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample				1				1					17	15	6						
OPWD	MACTEC	12-Feb-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample				1				1					17	15	6						
OPWD	MACTEC	12-Feb-03	Off-property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample				1				1					17	15	6						
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample				1				1					17	15	7		1				
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample					1																
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample				1				1					17	15	7		1				
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample					1																
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample				1				1					17	15	7		1				
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample					1																
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample				1				1					17	15	7		1				

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OPWD	MACTEC	21-May-03	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample					1																
Floc	MACTEC	25-Jun-03	Off-Property West Ditch	REDFLOC	REDFLOCSW-2003	Sample													6	1							
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN1	OPWD-SWRUN1	Sample	Stormwater Runoff							19				4	4	4							
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN1	OPWD-SWRUN1	Sample											18										
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN2	OPWD-SWRUN2	Sample	Stormwater Runoff							19				4	4	4							
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN2	OPWD-SWRUN2	Sample											18										
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN3	OPWD-SWRUN3	Sample	Stormwater Runoff							19				4	4	4							
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN3	OPWD-SWRUN3	Sample											18										
OPWD	MACTEC	20-Aug-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample					1			1				17	15	7							
OPWD	MACTEC	20-Aug-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample					1			1				17	15	7							
OPWD	MACTEC	20-Aug-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample					1			1				17	15	7							
OPWD	MACTEC	20-Aug-03	Off-property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample					1			1				17	15	7							
Floc	MACTEC	08-Sep-03	Off-Property West Ditch	WHITE FLOC	Whitefloc-2003	Sample												6		2							
Floc	MACTEC	08-Sep-03	Off-Property West Ditch	WHITE FLOC	WhiteflocSW-2003	Sample													6	1							
	GEI	08-Dec-77	On-Property West Ditch	SS-11	SS-11	Sample														5							
	GEI	19-Jan-78	On-Property West Ditch	SS-11	SS-11	Sample														5							
	GEI	21-Feb-78	On-Property West Ditch	SS-11	SS-11	Sample														5							
	GEI	15-Mar-78	On-Property West Ditch	SS-11	SS-11	Sample														5							
	GEI	10-Apr-78	On-Property West Ditch	SS-11	SS-11	Sample														5							
		01-May-85	On-Property West Ditch	SS-11	SS-11	Sample												1			1						
		01-Oct-86	On-Property West Ditch	SS-C	SS-C	Sample												1		3	1						
		01-Dec-86	On-Property West Ditch	SS-C	SS-C	Sample														2	1						
		01-Jun-87	On-Property West Ditch	SS-C	SS-C	Sample												1		3	1						
		01-Dec-87	On-Property West Ditch	SS-C	SS-C	Sample												1		3	1						
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data							30	7		7	26		23	1				12		22
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data							30	7		7	26		23	1				12		22
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data	65			65																
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data	65			65																
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data																	1			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data																	1			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data																	5			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data																	5			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data												25								
C-RAM	GEI	27-Sep-00	On-Property West Ditch	On-Property West Ditch	1150-WD-1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	27-Sep-00	On-Property West Ditch	On-Property West Ditch	1150-WD-1	Sample	GEI Imported Data																	5			
Floc	MACTEC	25-Jun-03	On-Property West Ditch	RAM-9	REDFLOC-2003	Sample												6		2							
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data	6					17					6									
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data																	5			
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data												1								
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data				65																
C-RAM	GEI	06-Dec-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWC33	Sample	GEI Imported Data				65							1		1							
C-RAM	GEI	06-Dec-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWC33	Sample	GEI Imported Data												1								
	GEI	08-Dec-77	South Ditch	SS-12	SS-12	Sample														5							
	GEI	08-Dec-77	South Ditch	SS-5	SS-05	Sample														5							
	GEI	19-Jan-78	South Ditch	SS-12	SS-12	Sample														5							
	GEI	19-Jan-78	South Ditch	SS-5	SS-05	Sample														5							
	GEI	21-Feb-78	South Ditch	SS-12	SS-12	Sample														5							
	GEI	15-Mar-78	South Ditch	SS-12	SS-12	Sample														5							
	GEI	15-Mar-78	South Ditch	SS-5	SS-05	Sample														5							
	GEI	10-Apr-78	South Ditch	SS-12	SS-12	Sample														5							
	GEI	10-Apr-78	South Ditch	SS-5	SS-05	Sample														5							
	Malcolm Pirnie	01-Mar-81	South Ditch	SS-12	SS-12	Sample												1		3	1						
	Malcolm Pirnie	01-Mar-81	South Ditch	SS-5	SS-05	Sample												1		3	1						
	Malcolm Pirnie	01-Apr-81	South Ditch	SS-12	SS-12	Sample												1		3	1						
	Malcolm Pirnie	01-Apr-81	South Ditch	SS-5	SS-05	Sample												1		3	1						
	Malcolm Pirnie	01-May-81	South Ditch	SS-12	SS-12	Sample												1		3	1						
	Malcolm Pirnie	01-May-81	South Ditch	SS-5	SS-05	Sample												1		3	1						
	Malcolm Pirnie	01-Jun-81	South Ditch	SS-12	SS-12	Sample												1		3	1						
	Malcolm Pirnie	01-Jun-81	South Ditch	SS-5	SS-05	Sample												1		3	1						

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	Malcolm Pirnie	01-Aug-81	South Ditch	SS-12	SS-12	Sample													1		3	1					
	Malcolm Pirnie	01-Aug-81	South Ditch	SS-5	SS-05	Sample													1		3	1					
	Malcolm Pirnie	01-Dec-81	South Ditch	SS-12	SS-12	Sample													1		3	1					
	Malcolm Pirnie	01-Dec-81	South Ditch	SS-5	SS-05	Sample															3	1					
		01-Oct-82	South Ditch	SS-12	SS-12	Sample															4	1					
		01-Oct-82	South Ditch	SS-5	SS-05	Sample					2								1		4	1					
		01-Jun-83	South Ditch	SS-12	SS-12	Sample															4	1					
		01-Jun-83	South Ditch	SS-5	SS-05	Sample					2								1		4	1					
		01-Oct-83	South Ditch	SS-12	SS-12	Sample															4	1					
		01-Oct-83	South Ditch	SS-5	SS-05	Sample					2								1		4	1					
		01-Jul-84	South Ditch	SS-12	SS-12	Sample															4	1					
		01-Jul-84	South Ditch	SS-5	SS-05	Sample					2										4	1					
		01-Dec-84	South Ditch	SS-12	SS-12	Sample															4	1					
		01-Dec-84	South Ditch	SS-5	SS-05	Sample					2								1		4	1					
		01-May-85	South Ditch	SS-12	SS-12	Sample													1			1					
		01-May-85	South Ditch	SS-5	SS-05	Sample													1			1					
		01-Dec-85	South Ditch	SS-12	SS-12	Sample													1		4	1					
		01-Dec-85	South Ditch	SS-5	SS-05	Sample													1		4	1					
		01-Jul-86	South Ditch	SS-12	SS-12	Sample													1		3	1					
		01-Jul-86	South Ditch	SS-5	SS-05	Sample													1		3	1					
		01-Dec-86	South Ditch	SS-12	SS-12	Sample													1		3	1					
		01-Dec-86	South Ditch	SS-5	SS-05	Sample													1		3	1					
		01-Jun-87	South Ditch	SS-12	SS-12	Sample													1		3	1					
		01-Jun-87	South Ditch	SS-5	SS-05	Sample													1		3	1					
		01-Dec-87	South Ditch	SS-12	SS-12	Sample													1		3	1					
		01-Dec-87	South Ditch	SS-5	SS-05	Sample													1		3						
CRA WORK PLAN		14-May-90	South Ditch	SDITCH	SDITCH	Sample																			1		
		01-Sep-92	South Ditch	SW-10	SW-10	Sample		36			65				21				23		3	2	1				
		01-Sep-92	South Ditch	SW-11	SW-11	Sample		36			65				21				23		3	2	1				
		01-Sep-92	South Ditch	SW-9	SW-09	Sample		36			65				21				23		3	2	1				
		01-Dec-92	South Ditch	SW-10	SW-10	Sample		36			65				21				23		3	2	1				
		01-Dec-92	South Ditch	SW-11	SW-11	Sample		36			65				21				23		3	2	1				
		01-Dec-92	South Ditch	SW-20	SW-20	Sample		36			65				21				23		3	2	1				
		01-Dec-92	South Ditch	SW-21	SW-21	Sample		36			65				21				23		3	2	1				
		01-Dec-92	South Ditch	SW-22	SW-22	Sample		36			65				21				23		3	2	1				
		01-Dec-92	South Ditch	SW-9	SW-09	Sample		36			65				21				23		3	2	1				
		03-Dec-92	South Ditch	SW-19	SW-19	Sample		36			65				21				23		3	1	1				
		02-Feb-95	South Ditch	GSW-15	SW-15	Sample	FILTERED 1460312													14	13	2					
		02-Feb-95	South Ditch	GSW-15	SW-15	Sample													14		13	4	1				
		03-May-95	South Ditch	GSW-15	SW-15	Sample	FILTERED 1460405													14	14	2					
		03-May-95	South Ditch	GSW-15	SW-15	Sample													14		13	5	1				
		04-May-95	South Ditch	GSW-18	SW-18	Sample	FILTERED 1460415													14	13	1					
		04-May-95	South Ditch	GSW-18	SW-18	Sample													14		12	5	1				
	GEOMEGA	18-Apr-96	South Ditch	GSW-1	SOUTH DITCH #1	Sample	FILTERED													1							
	GEOMEGA	18-Apr-96	South Ditch	GSW-1	SOUTH DITCH #1	Sample	FILTERED													23	3						
	GEOMEGA	18-Apr-96	South Ditch	GSW-2	SOUTH DITCH #2	Sample	FILTERED													1							
	GEOMEGA	18-Apr-96	South Ditch	GSW-3	SOUTH DITCH #3	Sample	FILTERED													1							
	GEOMEGA	18-Apr-96	South Ditch	GSW-P	SOUTH DITCH POND #1	Sample	FILTERED													1							
	GEOMEGA	19-Apr-96	South Ditch	GSW-2	SOUTH DITCH #2	Sample	FILTERED													23	3						
	GEOMEGA	19-Apr-96	South Ditch	GSW-3	SOUTH DITCH #3	Sample	FILTERED													23	3						
	GEOMEGA	19-Apr-96	South Ditch	GSW-P	SO. DITCH POND-F	Sample	FILTERED 1460824													23							
	GEOMEGA	19-Apr-96	South Ditch	GSW-P	SO. DITCH POND-U	Sample													23		3						
		23-Jan-97	South Ditch	SDREF-012	BS012REF	Background Sample					65				19				23								
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data								30	7		7	26		23	1			12		22
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data	65			65																
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data																1				
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data																5				
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data								30	7		7	26		23	1			12		22
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data								30	7		7	26		23	1			12		22
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data	65			65																
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data	65			65																
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data																1				
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data																1				
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data																5				
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data																5				

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data												25								
C-RAM	GEI	20-Sep-00	South Ditch	NP-1	1140-SD-SW1	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	20-Sep-00	South Ditch	NP-1	1140-SD-SW1	Sample	GEI Imported Data				65																
C-RAM	GEI	21-Sep-00	South Ditch	NP-1	1140-SD-SW2	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	21-Sep-00	South Ditch	NP-1	1140-SD-SW2	Sample	GEI Imported Data				65																
C-RAM	GEI	22-Sep-00	South Ditch	NP-1	1140-SD-SW3	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	22-Sep-00	South Ditch	NP-1	1140-SD-SW3	Sample	GEI Imported Data				65																
C-RAM	GEI	23-Sep-00	South Ditch	NP-1	1140-SD-SW4	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	23-Sep-00	South Ditch	NP-1	1140-SD-SW4	Sample	GEI Imported Data				65																
C-RAM	GEI	25-Sep-00	South Ditch	NP-1	1140-SD-SW5	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	25-Sep-00	South Ditch	NP-1	1140-SD-SW5	Sample	GEI Imported Data				65																
C-RAM	GEI	26-Sep-00	South Ditch	NP-1	1140-SD-SW6	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	26-Sep-00	South Ditch	NP-1	1140-SD-SW6	Sample	GEI Imported Data				65																
C-RAM	GEI	27-Sep-00	South Ditch	NP-1	1140-SD-SW7	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	28-Sep-00	South Ditch	NP-1	1140-SD-SW8	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	28-Sep-00	South Ditch	NP-1	1140-SD-SW8	Sample	GEI Imported Data				65																
C-RAM	GEI	29-Sep-00	South Ditch	NP-1	1140-SD-SW9	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	29-Sep-00	South Ditch	NP-1	1140-SD-SW9	Sample	GEI Imported Data				65																
C-RAM	GEI	02-Oct-00	South Ditch	NP-1	1140-SD-SW10	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	02-Oct-00	South Ditch	NP-1	1140-SD-SW10	Sample	GEI Imported Data				65																
C-RAM	GEI	04-Oct-00	South Ditch	NP-1	1140-SD-SW11	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	04-Oct-00	South Ditch	NP-1	1140-SD-SW11	Sample	GEI Imported Data				65																
C-RAM	GEI	05-Oct-00	South Ditch	NP-1	1150-SD-SW11D	Sample	GEI Imported Data				65																
C-RAM	GEI	05-Oct-00	South Ditch	SW11A	1150-SD-SW11A	Sample	GEI Imported Data				65																
C-RAM	GEI	05-Oct-00	South Ditch	SW11B	1150-SD-SW11B	Sample	GEI Imported Data				65																
C-RAM	GEI	05-Oct-00	South Ditch	SW11C	1150-SD-SW11C	Sample	GEI Imported Data				65																
C-RAM	GEI	05-Oct-00	South Ditch	SW11E	1150-SD-SW11E	Sample	GEI Imported Data				65																
C-RAM	GEI	06-Oct-00	South Ditch	NP-1	97598-SWLOC-14	Sample	GEI Imported Data												1								
C-RAM	GEI	06-Oct-00	South Ditch	NP-1	97598-SWLOC-14	Sample	GEI Imported Data													1							
C-RAM	GEI	06-Oct-00	South Ditch	NP-1	97598-SWLOC-14	Sample	GEI Imported Data														1						
C-RAM	GEI	06-Oct-00	South Ditch	SW11B	97598-SWLOC-10	Sample	GEI Imported Data												1								
C-RAM	GEI	06-Oct-00	South Ditch	SW11B	97598-SWLOC-10	Sample	GEI Imported Data													1							
C-RAM	GEI	06-Oct-00	South Ditch	SW11B	97598-SWLOC-10	Sample	GEI Imported Data														1						
C-RAM	GEI	06-Oct-00	South Ditch	SW11C	97598-SWLOC-11	Sample	GEI Imported Data												1								
C-RAM	GEI	06-Oct-00	South Ditch	SW11C	97598-SWLOC-11	Sample	GEI Imported Data													1							
C-RAM	GEI	06-Oct-00	South Ditch	SW11C	97598-SWLOC-11	Sample	GEI Imported Data														1						
C-RAM	GEI	06-Oct-00	South Ditch	SW11E	97598-SWLOC-16	Sample	GEI Imported Data												1								
C-RAM	GEI	06-Oct-00	South Ditch	SW11E	97598-SWLOC-16	Sample	GEI Imported Data													1							
C-RAM	GEI	06-Oct-00	South Ditch	SW11E	97598-SWLOC-16	Sample	GEI Imported Data														1						
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-12	97598-SWLOC-12	Sample	GEI Imported Data												1								
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-12	97598-SWLOC-12	Sample	GEI Imported Data													1							
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-12	97598-SWLOC-12	Sample	GEI Imported Data														1						
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-9	97598-SWLOC-9	Sample	GEI Imported Data												1								
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-9	97598-SWLOC-9	Sample	GEI Imported Data													1							
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-9	97598-SWLOC-9	Sample	GEI Imported Data														1						
C-RAM	GEI	07-Oct-00	South Ditch	NP-1	1150-SD-SWA1	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	07-Oct-00	South Ditch	NP-1	1150-SD-SWA1	Sample	GEI Imported Data													1							
C-RAM	GEI	07-Oct-00	South Ditch	NP-1	1150-SD-SWA1	Sample	GEI Imported Data				65																
C-RAM	GEI	09-Oct-00	South Ditch	NP-1	1150-SD-SWA2	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	09-Oct-00	South Ditch	NP-1	1150-SD-SWA2	Sample	GEI Imported Data													1							
C-RAM	GEI	09-Oct-00	South Ditch	NP-1	1150-SD-SWA2	Sample	GEI Imported Data				65																
C-RAM	GEI	10-Oct-00	South Ditch	NP-1	1150-SD-SWA3	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	10-Oct-00	South Ditch	NP-1	1150-SD-SWA3	Sample	GEI Imported Data													1							
C-RAM	GEI	10-Oct-00	South Ditch	NP-1	1150-SD-SWA3	Sample	GEI Imported Data				65																
C-RAM	GEI	11-Oct-00	South Ditch	NP-1	1150-SD-SWA4	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	11-Oct-00	South Ditch	NP-1	1150-SD-SWA4	Sample	GEI Imported Data													1							
C-RAM	GEI	11-Oct-00	South Ditch	NP-1	1150-SD-SWA4	Sample	GEI Imported Data				65																
C-RAM	GEI	12-Oct-00	South Ditch	NP-1	1150-SD-SWA5	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	12-Oct-00	South Ditch	NP-1	1150-SD-SWA5	Sample	GEI Imported Data													1							
C-RAM	GEI	12-Oct-00	South Ditch	NP-1	1150-SD-SWA5	Sample	GEI Imported Data				65																
C-RAM	GEI	18-Oct-00	South Ditch	NP-1	1150-SD-SWA6	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	18-Oct-00	South Ditch	NP-1	1150-SD-SWA6	Sample	GEI Imported Data													1							
C-RAM	GEI	18-Oct-00	South Ditch	NP-1	1150-SD-SWA6	Sample	GEI Imported Data				65																
C-RAM	GEI	19-Oct-00	South Ditch	NP-1	1150-SD-SWA7	Sample	GEI Imported Data						17					1		1							
C-RAM	GEI	19-Oct-00	South Ditch	NP-1	1150-SD-SWA7	Sample	GEI Imported Data													1							

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Summary of Surface Water Samples Collected to Date - By Area

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	19-Oct-00	South Ditch	NP-1	1150-SD-SWA7	Sample	GEI Imported Data				65																
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA8	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA9	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA8	Sample	GEI Imported Data													1								
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA9	Sample	GEI Imported Data													1								
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA8	Sample	GEI Imported Data				65																	
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA9	Sample	GEI Imported Data				65																	
C-RAM	GEI	23-Oct-00	South Ditch	NP-1	1150-SD-SWA10	Sample	GEI Imported Data						16						1		1							
C-RAM	GEI	23-Oct-00	South Ditch	NP-1	1150-SD-SWA10	Sample	GEI Imported Data													1								
C-RAM	GEI	23-Oct-00	South Ditch	NP-1	1150-SD-SWA10	Sample	GEI Imported Data				65																	
C-RAM	GEI	24-Oct-00	South Ditch	NP-1	1150-SD-SWB1	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	24-Oct-00	South Ditch	NP-1	1150-SD-SWB1	Sample	GEI Imported Data													1								
C-RAM	GEI	24-Oct-00	South Ditch	NP-1	1150-SD-SWB1	Sample	GEI Imported Data				65																	
C-RAM	GEI	25-Oct-00	South Ditch	NP-1	1150-SD-SWB2	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	25-Oct-00	South Ditch	NP-1	1150-SD-SWB2	Sample	GEI Imported Data													1								
C-RAM	GEI	25-Oct-00	South Ditch	NP-1	1150-SD-SWB2	Sample	GEI Imported Data				65																	
C-RAM	GEI	26-Oct-00	South Ditch	NP-1	1150-SD-SWC1	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	26-Oct-00	South Ditch	NP-1	1150-SD-SWC1	Sample	GEI Imported Data													1								
C-RAM	GEI	26-Oct-00	South Ditch	NP-1	1150-SD-SWC1	Sample	GEI Imported Data				65																	
C-RAM	GEI	27-Oct-00	South Ditch	NP-1	1150-SD-SWC2	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	27-Oct-00	South Ditch	NP-1	1150-SD-SWC2	Sample	GEI Imported Data													1								
C-RAM	GEI	27-Oct-00	South Ditch	NP-1	1150-SD-SWC2	Sample	GEI Imported Data				65																	
C-RAM	GEI	30-Oct-00	South Ditch	NP-1	1150-SD-SWC3	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	30-Oct-00	South Ditch	NP-1	1150-SD-SWC3	Sample	GEI Imported Data													1								
C-RAM	GEI	30-Oct-00	South Ditch	NP-1	1150-SD-SWC3	Sample	GEI Imported Data				65																	
C-RAM	GEI	31-Oct-00	South Ditch	NP-1	1150-SD-SWC4	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	31-Oct-00	South Ditch	NP-1	1150-SD-SWC4	Sample	GEI Imported Data													1								
C-RAM	GEI	31-Oct-00	South Ditch	NP-1	1150-SD-SWC4	Sample	GEI Imported Data				65																	
C-RAM	GEI	01-Nov-00	South Ditch	NP-1	1150-SD-SWC5	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	01-Nov-00	South Ditch	NP-1	1150-SD-SWC5	Sample	GEI Imported Data													1								
C-RAM	GEI	01-Nov-00	South Ditch	NP-1	1150-SD-SWC5	Sample	GEI Imported Data				65																	
C-RAM	GEI	02-Nov-00	South Ditch	NP-1	1150-SD-SWC6	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	02-Nov-00	South Ditch	NP-1	1150-SD-SWC6	Sample	GEI Imported Data													1								
C-RAM	GEI	02-Nov-00	South Ditch	NP-1	1150-SD-SWC6	Sample	GEI Imported Data				65																	
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data													1								
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data				65																	
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data				67																	
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data													1								
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data				65																	
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data				67																	
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data													1								
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data				65																	
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data				67																	
C-RAM	GEI	07-Nov-00	South Ditch	NP-1	1150-SD-SWC10	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	07-Nov-00	South Ditch	NP-1	1150-SD-SWC10	Sample	GEI Imported Data													1								
C-RAM	GEI	07-Nov-00	South Ditch	NP-1	1150-SD-SWC10	Sample	GEI Imported Data				65																	
C-RAM	GEI	08-Nov-00	South Ditch	NP-1	1150-SD-SWC11	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	08-Nov-00	South Ditch	NP-1	1150-SD-SWC11	Sample	GEI Imported Data													1								
C-RAM	GEI	08-Nov-00	South Ditch	NP-1	1150-SD-SWC11	Sample	GEI Imported Data				65																	
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data													1								
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data				65																	
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data				67																	
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data													1								
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data				65																	
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data				67																	
C-RAM	GEI	12-Nov-00	South Ditch	NP-1	1150-SD-SWC14	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	12-Nov-00	South Ditch	NP-1	1150-SD-SWC14	Sample	GEI Imported Data													1								
C-RAM	GEI	13-Nov-00	South Ditch	NP-1	1150-SD-SWC15	Sample	GEI Imported Data						17						1		1							
C-RAM	GEI	13-Nov-00	South Ditch	NP-1	1150-SD-SWC15	Sample	GEI Imported Data													1								
C-RAM	GEI	14-Nov-00	South Ditch	NP-1	1150-SD-SWC16	Sample	GEI Imported Data						17						1		1							

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	14-Nov-00	South Ditch	NP-1	1150-SD-SWC16	Sample	GEI Imported Data												1									
C-RAM	GEI	15-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC17	Sample	GEI Imported Data													1								
C-RAM	GEI	15-Nov-00	South Ditch	NP-1	1150-SD-SWC17	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	15-Nov-00	South Ditch	NP-1	1150-SD-SWC17	Sample	GEI Imported Data												1									
C-RAM	GEI	16-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC18	Sample	GEI Imported Data													1								
C-RAM	GEI	16-Nov-00	South Ditch	NP-1	1150-SD-SWC18	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	16-Nov-00	South Ditch	NP-1	1150-SD-SWC18	Sample	GEI Imported Data												1									
C-RAM	GEI	17-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC19	Sample	GEI Imported Data													1								
C-RAM	GEI	17-Nov-00	South Ditch	NP-1	1150-SD-SWC19	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	17-Nov-00	South Ditch	NP-1	1150-SD-SWC19	Sample	GEI Imported Data												1									
C-RAM	GEI	18-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC20	Sample	GEI Imported Data													1								
C-RAM	GEI	18-Nov-00	South Ditch	NP-1	1150-SD-SWC20	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	18-Nov-00	South Ditch	NP-1	1150-SD-SWC20	Sample	GEI Imported Data												1									
C-RAM	GEI	19-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC21	Sample	GEI Imported Data													1								
C-RAM	GEI	19-Nov-00	South Ditch	NP-1	1150-SD-SWC21	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	19-Nov-00	South Ditch	NP-1	1150-SD-SWC21	Sample	GEI Imported Data												1									
C-RAM	GEI	20-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC22	Sample	GEI Imported Data													1								
C-RAM	GEI	20-Nov-00	South Ditch	NP-1	1150-SD-SWC22	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	20-Nov-00	South Ditch	NP-1	1150-SD-SWC22	Sample	GEI Imported Data												1									
C-RAM	GEI	21-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC23	Sample	GEI Imported Data													1								
C-RAM	GEI	21-Nov-00	South Ditch	NP-1	1150-SD-SWC23	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	21-Nov-00	South Ditch	NP-1	1150-SD-SWC23	Sample	GEI Imported Data												1									
C-RAM	GEI	22-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC24	Sample	GEI Imported Data													1								
C-RAM	GEI	22-Nov-00	South Ditch	NP-1	1150-SD-SWC24	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	22-Nov-00	South Ditch	NP-1	1150-SD-SWC24	Sample	GEI Imported Data												1									
C-RAM	GEI	27-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC25	Sample	GEI Imported Data													1								
C-RAM	GEI	27-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC26	Sample	GEI Imported Data													1								
C-RAM	GEI	27-Nov-00	South Ditch	NP-1	1150-SD-SWC25	Sample	GEI Imported Data				67		17					1		1								
C-RAM	GEI	27-Nov-00	South Ditch	NP-1	1150-SD-SWC25	Sample	GEI Imported Data												1									
C-RAM	GEI	28-Nov-00	South Ditch	NP-1	1150-SD-SWC26	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	28-Nov-00	South Ditch	NP-1	1150-SD-SWC26	Sample	GEI Imported Data												1									
C-RAM	GEI	29-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC27	Sample	GEI Imported Data													1								
C-RAM	GEI	29-Nov-00	South Ditch	NP-1	1150-SD-SWC27	Sample	GEI Imported Data						17					1		1								
C-RAM	GEI	29-Nov-00	South Ditch	NP-1	1150-SD-SWC27	Sample	GEI Imported Data												1									
C-RAM	GEI	30-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC28	Sample	GEI Imported Data											3		1								
C-RAM	GEI	30-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC28	Sample	GEI Imported Data												3									
C-RAM	GEI	30-Nov-00	South Ditch	NP-1	1150-SD-SWC28	Sample	GEI Imported Data						17					3		1								
C-RAM	GEI	30-Nov-00	South Ditch	NP-1	1150-SD-SWC28	Sample	GEI Imported Data												3									
C-RAM	GEI	01-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC29	Sample	GEI Imported Data													1								
C-RAM	GEI	01-Dec-00	South Ditch	NP-1	1150-SD-SWC29	Sample	GEI Imported Data				65		17					1		1								
C-RAM	GEI	01-Dec-00	South Ditch	NP-1	1150-SD-SWC29	Sample	GEI Imported Data												1									
C-RAM	GEI	03-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC30	Sample	GEI Imported Data													1								
C-RAM	GEI	03-Dec-00	South Ditch	NP-1	1150-SD-SWC30	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	03-Dec-00	South Ditch	NP-1	1150-SD-SWC30	Sample	GEI Imported Data												1									
C-RAM	GEI	04-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC31	Sample	GEI Imported Data													1								
C-RAM	GEI	04-Dec-00	South Ditch	NP-1	1150-SD-SWC31	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	04-Dec-00	South Ditch	NP-1	1150-SD-SWC31	Sample	GEI Imported Data												1									
C-RAM	GEI	05-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC32	Sample	GEI Imported Data													1								
C-RAM	GEI	05-Dec-00	South Ditch	NP-1	1150-SD-SWC32	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	05-Dec-00	South Ditch	NP-1	1150-SD-SWC32	Sample	GEI Imported Data												1									
C-RAM	GEI	06-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC33	Sample	GEI Imported Data													1								
C-RAM	GEI	06-Dec-00	South Ditch	NP-1	1150-SD-SWC33	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	06-Dec-00	South Ditch	NP-1	1150-SD-SWC33	Sample	GEI Imported Data												1									
C-RAM	GEI	07-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC34	Sample	GEI Imported Data													1								
C-RAM	GEI	07-Dec-00	South Ditch	NP-1	1150-SD-SWC34	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	07-Dec-00	South Ditch	NP-1	1150-SD-SWC34	Sample	GEI Imported Data												1									
C-RAM	GEI	08-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC35	Sample	GEI Imported Data													1								
C-RAM	GEI	08-Dec-00	South Ditch	NP-1	1150-SD-SWC35	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	08-Dec-00	South Ditch	NP-1	1150-SD-SWC35	Sample	GEI Imported Data												1									
C-RAM	GEI	09-Dec-00	South Ditch	NP-1	1150-SD-SWC36	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	09-Dec-00	South Ditch	NP-1	1150-SD-SWC36	Sample	GEI Imported Data												1									
C-RAM	GEI	11-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC37	Sample	GEI Imported Data													1								
C-RAM	GEI	11-Dec-00	South Ditch	NP-1	1150-SD-SWC37	Sample	GEI Imported Data				65							1		1								
C-RAM	GEI	11-Dec-00	South Ditch	NP-1	1150-SD-SWC37	Sample	GEI Imported Data												1									
C-RAM	GEI	12-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC38	Sample	GEI Imported Data													1								

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acenaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	12-Dec-00	South Ditch	NP-1	1150-SD-SWC38	Sample	GEI Imported Data				65								1		1							
C-RAM	GEI	12-Dec-00	South Ditch	NP-1	1150-SD-SWC38	Sample	GEI Imported Data													1								
C-RAM	GEI	13-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC39	Sample	GEI Imported Data														1							
C-RAM	GEI	13-Dec-00	South Ditch	NP-1	1150-SD-SWC39	Sample	GEI Imported Data				65								1		1							
C-RAM	GEI	13-Dec-00	South Ditch	NP-1	1150-SD-SWC39	Sample	GEI Imported Data													1								
C-RAM	GEI	21-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD1	Sample	GEI Imported Data												1		1							
C-RAM	GEI	21-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD1	Sample	GEI Imported Data													1								
C-RAM	GEI	21-Dec-00	South Ditch	NP-1	1150-SD-SWD1	Sample	GEI Imported Data												1		1							
C-RAM	GEI	21-Dec-00	South Ditch	NP-1	1150-SD-SWD1	Sample	GEI Imported Data													1								
C-RAM	GEI	29-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD2	Sample	GEI Imported Data												1		1							
C-RAM	GEI	29-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD2	Sample	GEI Imported Data													1								
C-RAM	GEI	29-Dec-00	South Ditch	NP-1	1150-SD-SWD2	Sample	GEI Imported Data												1		1							
C-RAM	GEI	29-Dec-00	South Ditch	NP-1	1150-SD-SWD2	Sample	GEI Imported Data													1								
C-RAM	GEI	04-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD3	Sample	GEI Imported Data												1		1							
C-RAM	GEI	04-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD3	Sample	GEI Imported Data													1								
C-RAM	GEI	04-Jan-01	South Ditch	NP-1	1150-SD-SWD3	Sample	GEI Imported Data												1		1							
C-RAM	GEI	04-Jan-01	South Ditch	NP-1	1150-SD-SWD3	Sample	GEI Imported Data													1								
C-RAM	GEI	11-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD4	Sample	GEI Imported Data												1									
C-RAM	GEI	11-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD4	Sample	GEI Imported Data														1							
C-RAM	GEI	11-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD4	Sample	GEI Imported Data													1								
C-RAM	GEI	11-Jan-01	South Ditch	NP-1	1150-SD-SWD4	Sample	GEI Imported Data												1		1							
C-RAM	GEI	11-Jan-01	South Ditch	NP-1	1150-SD-SWD4	Sample	GEI Imported Data													1								
C-RAM	GEI	18-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD5	Sample	GEI Imported Data												1		1							
C-RAM	GEI	18-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD5	Sample	GEI Imported Data													1								
C-RAM	GEI	18-Jan-01	South Ditch	NP-1	1150-SD-SWD5	Sample	GEI Imported Data												1		1							
C-RAM	GEI	18-Jan-01	South Ditch	NP-1	1150-SD-SWD5	Sample	GEI Imported Data													1								
C-RAM	GEI	25-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD6	Sample	GEI Imported Data												1		1							
C-RAM	GEI	25-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD6	Sample	GEI Imported Data													1								
C-RAM	GEI	25-Jan-01	South Ditch	NP-1	1150-SD-SWD6	Sample	GEI Imported Data												1		1							
C-RAM	GEI	25-Jan-01	South Ditch	NP-1	1150-SD-SWD6	Sample	GEI Imported Data													1								
C-RAM	GEI	02-Feb-01	South Ditch	ISCO1	1150-OPWD-SWD7	Sample	GEI Imported Data												1		1							
C-RAM	GEI	02-Feb-01	South Ditch	ISCO1	1150-OPWD-SWD7	Sample	GEI Imported Data													1								
C-RAM	GEI	02-Feb-01	South Ditch	NP-1	1150-SD-SWD7	Sample	GEI Imported Data												1		1							
C-RAM	GEI	02-Feb-01	South Ditch	NP-1	1150-SD-SWD7	Sample	GEI Imported Data													1								
PCMP	GEI	09-Feb-01	South Ditch	ISCO1	1170-ISCO1-1	Sample	GEI Imported Data												1		1							
PCMP	GEI	09-Feb-01	South Ditch	ISCO1	1170-ISCO1-1	Sample	GEI Imported Data													1								
PCMP	GEI	09-Feb-01	South Ditch	ISCO2	1170-ISCO2-1	Sample	GEI Imported Data												1		1							
PCMP	GEI	09-Feb-01	South Ditch	ISCO2	1170-ISCO2-1	Sample	GEI Imported Data													1								
PCMP	GEI	09-Feb-01	South Ditch	NP-1	1170-NP1-1	Sample	GEI Imported Data												1		1							
PCMP	GEI	09-Feb-01	South Ditch	NP-1	1170-NP1-1	Sample	GEI Imported Data													1								
PCMP	GEI	15-Feb-01	South Ditch	ISCO1	1170-ISCO1-2	Sample	GEI Imported Data												1		1							
PCMP	GEI	15-Feb-01	South Ditch	ISCO1	1170-ISCO1-2	Sample	GEI Imported Data													1								
PCMP	GEI	15-Feb-01	South Ditch	ISCO2	1170-ISCO2-2	Sample	GEI Imported Data												1		1							
PCMP	GEI	15-Feb-01	South Ditch	ISCO2	1170-ISCO2-2	Sample	GEI Imported Data													1								
PCMP	GEI	15-Feb-01	South Ditch	NP-1	1170-NP1-2	Sample	GEI Imported Data												1		1							
PCMP	GEI	15-Feb-01	South Ditch	NP-1	1170-NP1-2	Sample	GEI Imported Data													1								
PCMP	GEI	23-Feb-01	South Ditch	ISCO1	1170-ISCO1-3	Sample	GEI Imported Data												1		2							
PCMP	GEI	23-Feb-01	South Ditch	ISCO1	1170-ISCO1-3	Sample	GEI Imported Data													1								
PCMP	GEI	23-Feb-01	South Ditch	ISCO2	1170-ISCO2-3	Sample	GEI Imported Data												1		2							
PCMP	GEI	23-Feb-01	South Ditch	ISCO2	1170-ISCO2-3	Sample	GEI Imported Data													1								
PCMP	GEI	23-Feb-01	South Ditch	NP-1	1170-NP1-3	Sample	GEI Imported Data												1		2							
PCMP	GEI	23-Feb-01	South Ditch	NP-1	1170-NP1-3	Sample	GEI Imported Data													1								
PCMP	GEI	01-Mar-01	South Ditch	ISCO1	1170-ISCO1-4	Sample	GEI Imported Data												1		2							
PCMP	GEI	01-Mar-01	South Ditch	ISCO1	1170-ISCO1-4	Sample	GEI Imported Data													1								
PCMP	GEI	01-Mar-01	South Ditch	ISCO2	1170-ISCO2-4	Sample	GEI Imported Data												1		2							
PCMP	GEI	01-Mar-01	South Ditch	ISCO2	1170-ISCO2-4	Sample	GEI Imported Data													1								
PCMP	GEI	09-Mar-01	South Ditch	ISCO1	1170-ISCO1-5	Sample	GEI Imported Data												1		2							
PCMP	GEI	09-Mar-01	South Ditch	ISCO1	1170-ISCO1-5	Sample	GEI Imported Data													1								
PCMP	GEI	09-Mar-01	South Ditch	ISCO2	1170-ISCO2-5	Sample	GEI Imported Data												1		2							
PCMP	GEI	09-Mar-01	South Ditch	ISCO2	1170-ISCO2-5	Sample	GEI Imported Data													1								
PCMP	GEI	16-Mar-01	South Ditch	ISCO1	1170-ISCO1-6	Sample	GEI Imported Data												1		4							
PCMP	GEI	16-Mar-01	South Ditch	ISCO1	1170-ISCO1-6	Sample	GEI Imported Data													2								
PCMP	GEI	16-Mar-01	South Ditch	ISCO2	1170-ISCO2-6	Sample	GEI Imported Data												1		4							
PCMP	GEI	16-Mar-01	South Ditch	ISCO2	1170-ISCO2-6	Sample	GEI Imported Data													2								
PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-7	Sample	GEI Imported Data												1		4							

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PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-8	Sample	GEI Imported Data												1		4							
PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-7	Sample	GEI Imported Data													2								
PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-8	Sample	GEI Imported Data													2								
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-7	Sample	GEI Imported Data												1		4							
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-8	Sample	GEI Imported Data												1		4							
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-7	Sample	GEI Imported Data													2								
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-8	Sample	GEI Imported Data													2								
PCMP	GEI	02-Apr-01	South Ditch	ISCO1	1170-ISCO1-9	Sample	GEI Imported Data												1		4							
PCMP	GEI	02-Apr-01	South Ditch	ISCO1	1170-ISCO1-9	Sample	GEI Imported Data													2								
PCMP	GEI	02-Apr-01	South Ditch	ISCO2	1170-ISCO2-9	Sample	GEI Imported Data												1		4							
PCMP	GEI	02-Apr-01	South Ditch	ISCO2	1170-ISCO2-9	Sample	GEI Imported Data													2								
PCMP	GEI	09-Apr-01	South Ditch	ISCO1	1170-ISCO1-10	Sample	GEI Imported Data												1		4							
PCMP	GEI	09-Apr-01	South Ditch	ISCO1	1170-ISCO1-10	Sample	GEI Imported Data													2								
PCMP	GEI	09-Apr-01	South Ditch	ISCO2	1170-ISCO2-10	Sample	GEI Imported Data												1		4							
PCMP	GEI	09-Apr-01	South Ditch	ISCO2	1170-ISCO2-10	Sample	GEI Imported Data													2								
PCMP	GEI	16-Apr-01	South Ditch	ISCO1	1170-ISCO1-11	Sample	GEI Imported Data												1		4							
PCMP	GEI	16-Apr-01	South Ditch	ISCO1	1170-ISCO1-11	Sample	GEI Imported Data													2								
PCMP	GEI	16-Apr-01	South Ditch	ISCO2	1170-ISCO2-11	Sample	GEI Imported Data												1		4							
PCMP	GEI	16-Apr-01	South Ditch	ISCO2	1170-ISCO2-11	Sample	GEI Imported Data													2								
PCMP	GEI	23-Apr-01	South Ditch	ISCO1	1170-ISCO1-12	Sample	GEI Imported Data												1		4							
PCMP	GEI	23-Apr-01	South Ditch	ISCO1	1170-ISCO1-12	Sample	GEI Imported Data													2								
PCMP	GEI	23-Apr-01	South Ditch	ISCO2	1170-ISCO2-12	Sample	GEI Imported Data												1		4							
PCMP	GEI	23-Apr-01	South Ditch	ISCO2	1170-ISCO2-12	Sample	GEI Imported Data													2								
PCMP	GEI	30-Apr-01	South Ditch	ISCO1	1170-ISCO1-13	Sample	GEI Imported Data												1		4							
PCMP	GEI	30-Apr-01	South Ditch	ISCO1	1170-ISCO1-13	Sample	GEI Imported Data													2								
PCMP	GEI	30-Apr-01	South Ditch	ISCO2	1170-ISCO2-13	Sample	GEI Imported Data												1		4							
PCMP	GEI	30-Apr-01	South Ditch	ISCO2	1170-ISCO2-13	Sample	GEI Imported Data													2								
PCMP	GEI	07-May-01	South Ditch	ISCO1	1170-ISCO1-14	Sample	GEI Imported Data												1		4							
PCMP	GEI	07-May-01	South Ditch	ISCO1	1170-ISCO1-14	Sample	GEI Imported Data													2								
PCMP	GEI	07-May-01	South Ditch	ISCO2	1170-ISCO2-14	Sample	GEI Imported Data												1		4							
PCMP	GEI	07-May-01	South Ditch	ISCO2	1170-ISCO2-14	Sample	GEI Imported Data													2								
PCMP	GEI	14-May-01	South Ditch	ISCO1	1170-ISCO1-15	Sample	GEI Imported Data												1		4							
PCMP	GEI	14-May-01	South Ditch	ISCO1	1170-ISCO1-15	Sample	GEI Imported Data													2								
PCMP	GEI	14-May-01	South Ditch	ISCO2	1170-ISCO2-15	Sample	GEI Imported Data			67									1		4							
PCMP	GEI	14-May-01	South Ditch	ISCO2	1170-ISCO2-15	Sample	GEI Imported Data													2								
PCMP	GEI	15-May-01	South Ditch	ISCO2	1170-ISCO2-16	Sample	GEI Imported Data			67									1									
PCMP	GEI	15-May-01	South Ditch	ISCO2	1170-ISCO2-16	Sample	GEI Imported Data													1								
PCMP	GEI	16-May-01	South Ditch	ISCO2	1170-ISCO2-17	Sample	GEI Imported Data			67									1									
PCMP	GEI	16-May-01	South Ditch	ISCO2	1170-ISCO2-17	Sample	GEI Imported Data													1								
PCMP	GEI	17-May-01	South Ditch	ISCO2	1170-ISCO2-18	Sample	GEI Imported Data			67									1									
PCMP	GEI	17-May-01	South Ditch	ISCO2	1170-ISCO2-18	Sample	GEI Imported Data													1								
PCMP	GEI	18-May-01	South Ditch	ISCO2	1170-ISCO2-19	Sample	GEI Imported Data			67									1									
PCMP	GEI	18-May-01	South Ditch	ISCO2	1170-ISCO2-19	Sample	GEI Imported Data													1								
PCMP	GEI	21-May-01	South Ditch	ISCO1	1170-ISCO1-20	Sample	GEI Imported Data												1		4							
PCMP	GEI	21-May-01	South Ditch	ISCO1	1170-ISCO1-20	Sample	GEI Imported Data													1								
PCMP	GEI	21-May-01	South Ditch	ISCO2	1170-ISCO2-20	Sample	GEI Imported Data												1		4							
PCMP	GEI	21-May-01	South Ditch	ISCO2	1170-ISCO2-20	Sample	GEI Imported Data													1								
PCMP	GEI	23-May-01	South Ditch	ISCO2	1170-ISCO2-21	Sample	GEI Imported Data			65									1									
PCMP	GEI	23-May-01	South Ditch	ISCO2	1170-ISCO2-21	Sample	GEI Imported Data													1								
PCMP	GEI	24-May-01	South Ditch	ISCO2	1170-ISCO2-22	Sample	GEI Imported Data													1								
PCMP	GEI	24-May-01	South Ditch	ISCO2	1170-ISCO2-22	Sample	GEI Imported Data			65									1									
PCMP	GEI	29-May-01	South Ditch	ISCO2	1170-ISCO2-23	Sample	GEI Imported Data												1									
PCMP	GEI	29-May-01	South Ditch	ISCO2	1170-ISCO2-23	Sample	GEI Imported Data													1								
PCMP	GEI	30-May-01	South Ditch	ISCO2	1170-ISCO2-24	Sample	GEI Imported Data												1									
PCMP	GEI	30-May-01	South Ditch	ISCO2	1170-ISCO2-24	Sample	GEI Imported Data													1								
PCMP	GEI	04-Jun-01	South Ditch	ISCO1	1170-ISCO1-25	Sample	GEI Imported Data												1		4							
PCMP	GEI	04-Jun-01	South Ditch	ISCO1	1170-ISCO1-25	Sample	GEI Imported Data													2								
PCMP	GEI	04-Jun-01	South Ditch	ISCO2	1170-ISCO2-25	Sample	GEI Imported Data												1		4							
PCMP	GEI	04-Jun-01	South Ditch	ISCO2	1170-ISCO2-25	Sample	GEI Imported Data													2								
PCMP	GEI	05-Jun-01	South Ditch	ISCO1	1170-SD26-1	Sample	GEI Imported Data												1									
PCMP	GEI	05-Jun-01	South Ditch	ISCO1	1170-SD26-1	Sample	GEI Imported Data													1								
PCMP	GEI	05-Jun-01	South Ditch	ISCO1	1170-SD26-1	Sample	GEI Imported Data														1							
PCMP	GEI	05-Jun-01	South Ditch	ISCO2	1170-SD26-4	Sample	GEI Imported Data												1									
PCMP	GEI	05-Jun-01	South Ditch	ISCO2	1170-SD26-4	Sample	GEI Imported Data													1								
PCMP	GEI	05-Jun-01	South Ditch	ISCO2	1170-SD26-4	Sample	GEI Imported Data														1							

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acenaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	05-Jun-01	South Ditch	SD26-2	1170-SD26-2	Sample	GEI Imported Data												1									
PCMP	GEI	05-Jun-01	South Ditch	SD26-2	1170-SD26-2	Sample	GEI Imported Data													1								
PCMP	GEI	05-Jun-01	South Ditch	SD26-2	1170-SD26-2	Sample	GEI Imported Data														1							
PCMP	GEI	05-Jun-01	South Ditch	SW11C	1170-SD26-3	Sample	GEI Imported Data												1									
PCMP	GEI	05-Jun-01	South Ditch	SW11C	1170-SD26-3	Sample	GEI Imported Data													1								
PCMP	GEI	05-Jun-01	South Ditch	SW11C	1170-SD26-3	Sample	GEI Imported Data														1							
PCMP	GEI	06-Jun-01	South Ditch	ISCO2	1170-ISCO2-27	Sample	GEI Imported Data												1									
PCMP	GEI	06-Jun-01	South Ditch	ISCO2	1170-ISCO2-27	Sample	GEI Imported Data													1								
PCMP	GEI	07-Jun-01	South Ditch	ISCO2	1170-ISCO2-28	Sample	GEI Imported Data												1									
PCMP	GEI	07-Jun-01	South Ditch	ISCO2	1170-ISCO2-28	Sample	GEI Imported Data													1								
PCMP	GEI	09-Jun-01	South Ditch	NP-1	1170-SD-29	Sample	GEI Imported Data												1									
PCMP	GEI	09-Jun-01	South Ditch	NP-1	1170-SD-29	Sample	GEI Imported Data													1								
PCMP	GEI	11-Jun-01	South Ditch	ISCO2	1170-ISCO2-30	Sample	GEI Imported Data												1			4						
PCMP	GEI	11-Jun-01	South Ditch	ISCO2	1170-ISCO2-30	Sample	GEI Imported Data													2								
PCMP	GEI	18-Jun-01	South Ditch	ISCO1	1170-ISCO1-31	Sample	GEI Imported Data												1			4						
PCMP	GEI	18-Jun-01	South Ditch	ISCO1	1170-ISCO1-31	Sample	GEI Imported Data													2								
PCMP	GEI	18-Jun-01	South Ditch	ISCO2	1170-ISCO2-31	Sample	GEI Imported Data												1			4						
PCMP	GEI	18-Jun-01	South Ditch	ISCO2	1170-ISCO2-31	Sample	GEI Imported Data													2								
PCMP	GEI	25-Jun-01	South Ditch	ISCO1	1170-ISCO1-32	Sample	GEI Imported Data												1			4						
PCMP	GEI	25-Jun-01	South Ditch	ISCO1	1170-ISCO1-32	Sample	GEI Imported Data													2								
PCMP	GEI	25-Jun-01	South Ditch	ISCO2	1170-ISCO2-32	Sample	GEI Imported Data												1			4						
PCMP	GEI	25-Jun-01	South Ditch	ISCO2	1170-ISCO2-32	Sample	GEI Imported Data													2								
PCMP	GEI	02-Jul-01	South Ditch	ISCO1	1170-ISCO1-33 MS/MSD	Sample	GEI Imported Data												1			4						
PCMP	GEI	02-Jul-01	South Ditch	ISCO1	1170-ISCO1-33 DISSOLVED MS/MSD	Sample	GEI Imported Data													2								
PCMP	GEI	02-Jul-01	South Ditch	ISCO2	1170-ISCO2-33	Sample	GEI Imported Data												1			4						
PCMP	GEI	02-Jul-01	South Ditch	ISCO2	1170-ISCO2-33 DISSOLVED	Sample	GEI Imported Data													2								
PCMP	GEI	09-Jul-01	South Ditch	ISCO1	1170-ISCO1-34	Sample	GEI Imported Data												1			4						
PCMP	GEI	09-Jul-01	South Ditch	ISCO1	1170-ISCO1-34	Sample	GEI Imported Data													2								
PCMP	GEI	09-Jul-01	South Ditch	ISCO2	1170-ISCO2-34	Sample	GEI Imported Data												1			4						
PCMP	GEI	09-Jul-01	South Ditch	ISCO2	1170-ISCO2-34	Sample	GEI Imported Data													2								
PCMP	GEI	16-Jul-01	South Ditch	ISCO2	1170-ISCO2-35	Sample	GEI Imported Data												1			4						
PCMP	GEI	16-Jul-01	South Ditch	ISCO2	1170-ISCO2-35	Sample	GEI Imported Data													1								
PCMP	GEI	23-Jul-01	South Ditch	ISCO1	1170-ISCO1-36 MS/MSD	Sample	GEI Imported Data												1			4						
PCMP	GEI	23-Jul-01	South Ditch	ISCO1	1170-ISCO1-36 DISOLVED MS/MSD	Sample	GEI Imported Data													2								
PCMP	GEI	30-Jul-01	South Ditch	ISCO1	1170-ISCO1-37 MS/MSD	Sample	GEI Imported Data												1			4						
PCMP	GEI	30-Jul-01	South Ditch	ISCO1	1170-ISCO1-37 MS/MSD DISSOLVED	Sample	GEI Imported Data													2								
PCMP	GEI	30-Jul-01	South Ditch	TD1	1170-TD1-37	Sample	GEI Imported Data												1									
PCMP	GEI	30-Jul-01	South Ditch	TD1	1170-TD1-37 DISSOLVED	Sample	GEI Imported Data													2								
PCMP	GEI	30-Jul-01	South Ditch	TD2	1170-TD2-37	Sample	GEI Imported Data												1									
PCMP	GEI	30-Jul-01	South Ditch	TD2	1170-TD2-37 DISSOLVED	Sample	GEI Imported Data													2								
PCMP	GEI	30-Jul-01	South Ditch	TD3	1170-TD3-37	Sample	GEI Imported Data												1									
PCMP	GEI	30-Jul-01	South Ditch	TD3	1170-TD3-37 DISSOLVED	Sample	GEI Imported Data													2								
PCMP	GEI	06-Aug-01	South Ditch	ISCO1	1170-ISCO1-38	Sample													1			4						
PCMP	GEI	06-Aug-01	South Ditch	ISCO1	1170-ISCO1-38 DISSOLVED	Sample														2								
PCMP	GEI	06-Aug-01	South Ditch	ISCO2	1170-ISCO2-38 MS/MSD	Sample													1			4						
PCMP	GEI	06-Aug-01	South Ditch	ISCO2	1170-ISCO2-38 DISSOLVED MS/MSD	Sample														2								
PCMP	GEI	13-Aug-01	South Ditch	ISCO1	1170-ISCO1-39	Sample													1			4						
PCMP	GEI	13-Aug-01	South Ditch	ISCO1	1170-ISCO1-39	Sample														2								
PCMP	GEI	13-Aug-01	South Ditch	ISCO2	1170-ISCO2-39	Sample													1			4						
PCMP	GEI	13-Aug-01	South Ditch	ISCO2	1170-ISCO2-39	Sample														2								
PCMP	GEI	20-Aug-01	South Ditch	ISCO1	1170-ISCO1-40	Sample													1			4						
PCMP	GEI	20-Aug-01	South Ditch	ISCO1	1170-ISCO1-40	Sample														2								
PCMP	GEI	20-Aug-01	South Ditch	ISCO2	1170-ISCO2-40	Sample													1			4						
PCMP	GEI	20-Aug-01	South Ditch	ISCO2	1170-ISCO2-40	Sample														2								
PCMP	GEI	27-Aug-01	South Ditch	ISCO1	1170-ISCO1-41	Sample													1			4						
PCMP	GEI	27-Aug-01	South Ditch	ISCO1	1170-ISCO1-41	Sample														2								
PCMP	GEI	27-Aug-01	South Ditch	ISCO2	1170-ISCO2-41	Sample													1			4						
PCMP	GEI	27-Aug-01	South Ditch	ISCO2	1170-ISCO2-41	Sample														2								
PCMP	GEI	04-Sep-01	South Ditch	ISCO1	1170-ISCO1-42	Sample													1			4						
PCMP	GEI	04-Sep-01	South Ditch	ISCO1	1170-ISCO1-42	Sample														2								
PCMP	GEI	12-Nov-01	South Ditch	ISCO1	1170-ISCO1-44	Sample													1			4						
PCMP	GEI	12-Nov-01	South Ditch	ISCO1	1170-ISCO1-44 DISSOLVED	Sample														2								
PCMP	GEI	12-Nov-01	South Ditch	ISCO2	1170-ISCO2-44	Sample													1			4						
PCMP	GEI	12-Nov-01	South Ditch	ISCO2	1170-ISCO2-44 DISSOLVED	Sample														2								
PCMP	GEI	12-Nov-01	South Ditch	PZ-16RSW	1170-PZ16-44	Sample													1			4						

Table 2.1-6
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Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	12-Nov-01	South Ditch	PZ-16RSW	1170-PZ16-44 DISSOLVED	Sample													2									
PCMP	GEI	12-Nov-01	South Ditch	SD-17	1170-PZ17-44 MS/MSD	Sample												1		4								
PCMP	GEI	12-Nov-01	South Ditch	SD-17	1170-PZ17-44 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	03-Dec-01	South Ditch	ISCO1	1170-ISCO1-45 MS/MSD	Sample												1		4								
PCMP	GEI	03-Dec-01	South Ditch	ISCO1	1170-ISCO1-45 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	03-Dec-01	South Ditch	ISCO2	1170-ISCO2-45	Sample												1		4								
PCMP	GEI	03-Dec-01	South Ditch	ISCO2	1170-ISCO2-45 DISSOLVED	Sample													2									
PCMP	GEI	10-Dec-01	South Ditch	ISCO1	1170-ISCO1-46 MS/MSD	Sample												1		4								
PCMP	GEI	10-Dec-01	South Ditch	ISCO1	1170-ISCO1-46 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	10-Dec-01	South Ditch	ISCO2	1170-ISCO2-46	Sample												1		4								
PCMP	GEI	10-Dec-01	South Ditch	ISCO2	1170-ISCO2-46 DISSOLVED	Sample													2									
PCMP	GEI	10-Dec-01	South Ditch	PZ-16RSW	1170-PZ16-46	Sample												1		4								
PCMP	GEI	10-Dec-01	South Ditch	PZ-16RSW	1170-PZ16-46 DISSOLVED	Sample													2									
PCMP	GEI	10-Dec-01	South Ditch	SD-17	1170-PZ17-46	Sample												1		4								
PCMP	GEI	10-Dec-01	South Ditch	SD-17	1170-PZ17-46 DISSOLVED	Sample													2									
PCMP	GEI	17-Dec-01	South Ditch	ISCO1	1170-ISCO1-47 MS/MSD	Sample												1		4								
PCMP	GEI	17-Dec-01	South Ditch	ISCO1	1170-ISCO1-47 MS/MSD DISSOLVED	Sample													2									
PCMP	GEI	17-Dec-01	South Ditch	ISCO2	1170-ISCO2-47	Sample												1		4								
PCMP	GEI	17-Dec-01	South Ditch	ISCO2	1170-ISCO2-47 DISSOLVED	Sample													2									
PCMP	GEI	26-Dec-01	South Ditch	ISCO1	1170-ISCO1-48 MS/MSD	Sample												1		4								
PCMP	GEI	26-Dec-01	South Ditch	ISCO1	1170-ISCO1-48 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	26-Dec-01	South Ditch	ISCO2	1170-ISCO2-48	Sample												1		4								
PCMP	GEI	26-Dec-01	South Ditch	ISCO2	1170-ISCO2-48 DISSOLVED	Sample													2									
PCMP	GEI	31-Dec-01	South Ditch	ISCO1	1170-ISCO1-49	Sample												1		4								
PCMP	GEI	31-Dec-01	South Ditch	ISCO1	1170-ISCO1-49 DISSOLVED	Sample													2									
PCMP	GEI	31-Dec-01	South Ditch	ISCO2	1170-ISCO2-49 MS/MSD	Sample												1		4								
PCMP	GEI	31-Dec-01	South Ditch	ISCO2	1170-ISCO2-49 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	07-Jan-02	South Ditch	ISCO1	1170-ISCO1-50 MS/MSD	Sample												1		8								
PCMP	GEI	07-Jan-02	South Ditch	ISCO1	1170-ISCO1-50 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	07-Jan-02	South Ditch	ISCO2	1170-ISCO2-50	Sample												1		8								
PCMP	GEI	07-Jan-02	South Ditch	ISCO2	1170-ISCO2-50 DISSOLVED	Sample													2									
PCMP	GEI	07-Jan-02	South Ditch	PZ-16RSW	1170-PZ16-50	Sample												1		8								
PCMP	GEI	07-Jan-02	South Ditch	PZ-16RSW	1170-PZ16-50 DISSOLVED	Sample													2									
PCMP	GEI	07-Jan-02	South Ditch	SD-17	1170-PZ17-50	Sample												1		8								
PCMP	GEI	07-Jan-02	South Ditch	SD-17	1170-PZ17-50 DISSOLVED	Sample													2									
PCMP	GEI	04-Feb-02	South Ditch	ISCO1	1170-ISCO1-51 MS/MSD	Sample												1		8								
PCMP	GEI	04-Feb-02	South Ditch	ISCO1	1170-ISCO1-51 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	04-Feb-02	South Ditch	ISCO2	1170-ISCO2-51	Sample												1		8								
PCMP	GEI	04-Feb-02	South Ditch	ISCO2	1170-ISCO2-51 DISSOLVED	Sample													2									
PCMP	GEI	04-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-51	Sample												1		8								
PCMP	GEI	04-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-51 DISSOLVED	Sample													2									
PCMP	GEI	04-Feb-02	South Ditch	SD-17	1170-PZ17-51	Sample												1		8								
PCMP	GEI	04-Feb-02	South Ditch	SD-17	1170-PZ17-51 DISSOLVED	Sample													2									
PCMP	GEI	25-Feb-02	South Ditch	ISCO1	1170-ISCO1-52 MS/MSD	Sample												1		9								
PCMP	GEI	25-Feb-02	South Ditch	ISCO1	1170-ISCO1-52 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	25-Feb-02	South Ditch	ISCO2	1170-ISCO2-52	Sample												1		8								
PCMP	GEI	25-Feb-02	South Ditch	ISCO2	1170-ISCO2-52 DISSOLVED	Sample													2									
PCMP	GEI	25-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-52	Sample												1		8								
PCMP	GEI	25-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-52 DISSOLVED	Sample													2									
PCMP	GEI	25-Feb-02	South Ditch	SD-17	1170-PZ17-52	Sample												1		8								
PCMP	GEI	25-Feb-02	South Ditch	SD-17	1170-PZ17-52 DISSOLVED	Sample													2									
PCMP	GEI	25-Mar-02	South Ditch	ISCO1	1170-ISCO1-53 MS/MSD	Sample												1		8	1							
PCMP	GEI	25-Mar-02	South Ditch	ISCO1	1170-ISCO1-53 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	25-Mar-02	South Ditch	ISCO2	1170-ISCO2-53	Sample												1		8	1							
PCMP	GEI	25-Mar-02	South Ditch	ISCO2	1170-ISCO2-53 DISSOLVED	Sample													2									
PCMP	GEI	25-Mar-02	South Ditch	PZ-16RSW	1170-PZ16-53	Sample												1		8	1							
PCMP	GEI	25-Mar-02	South Ditch	PZ-16RSW	1170-PZ16-53 DISSOLVED	Sample													2									
PCMP	GEI	25-Mar-02	South Ditch	SD-17	1170-PZ17-53	Sample												1		8	1							
PCMP	GEI	25-Mar-02	South Ditch	SD-17	1170-PZ17-53 DISSOLVED	Sample													2									
PCMP	GEI	22-Apr-02	South Ditch	ISCO1	1170-ISCO1-54 MS/MSD	Sample												1		9								
PCMP	GEI	22-Apr-02	South Ditch	ISCO1	1170-ISCO1-54 DISSOLVED MS/MSD	Sample													2									
PCMP	GEI	22-Apr-02	South Ditch	ISCO2	1170-ISCO2-54	Sample												1		8								
PCMP	GEI	22-Apr-02	South Ditch	ISCO2	1170-ISCO2-54 DISSOLVED	Sample													2									
PCMP	GEI	22-Apr-02	South Ditch	PZ-16RSW	1170-PZ16-54	Sample												1		8								
PCMP	GEI	22-Apr-02	South Ditch	PZ-16RSW	1170-PZ16-54 DISSOLVED	Sample													2									

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Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acenaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	22-Apr-02	South Ditch	SD-17	1170-PZ17-54	Sample													1		8						
PCMP	GEI	22-Apr-02	South Ditch	SD-17	1170-PZ17-54 DISSOLVED	Sample														2							
PCMP	GEI	20-May-02	South Ditch	ISCO1	1170-ISCO1-55	Sample													1	2	6						
PCMP	GEI	20-May-02	South Ditch	ISCO2	1170-ISCO2-55	Sample													1	2	6						
PCMP	GEI	20-May-02	South Ditch	SD-17	1170-PZ17-55	Sample													1	2	6						
PCMP	GEI	24-Jun-02	South Ditch	ISCO1	1170-ISCO1-56	Sample													1	2	6						
PCMP	GEI	24-Jun-02	South Ditch	ISCO2	1170-ISCO2-56	Sample													1	2	6						
PCMP	GEI	24-Jun-02	South Ditch	SD-17	1170-PZ17-56	Sample													1	2	6						
PCMP	GEI	22-Jul-02	South Ditch	ISCO1	1170-ISCO1-57	Sample													1	2	6						
PCMP	GEI	22-Jul-02	South Ditch	SD-17	1170-PZ17-57	Sample													1	2	6						
PCMP	GEI	12-Aug-02	South Ditch	ISCO1	1170-ISCO1-58	Sample													1	2	6						
PCMP	GEI	12-Aug-02	South Ditch	SD-17	1170-PZ17-58	Sample													1	2	6						
PCMP	GEI	09-Sep-02	South Ditch	ISCO1	1170-ISCOL-59	Sample													1	2	6						
PCMP	GEI	09-Sep-02	South Ditch	SD-17	1170-PZ17-59	Sample													1	2	6						
PCMP		07-Oct-02	South Ditch	ISCO1	1170-ISC01-60	Sample													1	2	6						
PCMP		07-Oct-02	South Ditch	SD-17	1170-PZ17-60	Sample													1	2	6						
PCMP		04-Nov-02	South Ditch	ISCO1	1170-ISC01-61	Sample													1	2	6						
PCMP		04-Nov-02	South Ditch	ISCO2	1170-ISC02-61	Sample													1	2	6						
PCMP		04-Nov-02	South Ditch	SD-17	1170-PZ17-61	Sample													1	2	6						
PCMP		09-Dec-02	South Ditch	ISCO1	1170-ISCO1-62	Sample													1	2	6						
PCMP		09-Dec-02	South Ditch	ISCO2	1170-ISCO2-62	Sample													1	2	6						
PCMP		09-Dec-02	South Ditch	SD-17	1170-PZ17-62	Sample													1	2	6						
PCMP	MACTEC	03-Feb-03	South Ditch	ISCO1	1170-ISCO1-63	Sample													1	2	4						
PCMP	MACTEC	03-Feb-03	South Ditch	ISCO2	1170-ISCO2-63	Sample													1	2	4						
PCMP	MACTEC	03-Feb-03	South Ditch	SD-17	1170-PZ-17-63	Sample													1	2	4						
PCMP	MACTEC	06-Feb-03	South Ditch	ISCO1	1170-ISCO1-63	Sample															2						
PCMP	MACTEC	06-Feb-03	South Ditch	ISCO2	1170-ISCO2-63	Sample															2						
PCMP	MACTEC	06-Feb-03	South Ditch	SD-17	1170-PZ-17-63	Sample															2						
PCMP	MACTEC	05-May-03	South Ditch	ISCO1	1170-ISCO1-64	Sample													1	2	4		1				
PCMP	MACTEC	05-May-03	South Ditch	ISCO2	1170-ISCO2-64	Sample													1	2	4		1				
PCMP	MACTEC	05-May-03	South Ditch	SD-17	1170-PZ-17-64	Sample													1	2	4		1				
PCMP	MACTEC	19-May-03	South Ditch	ISCO1	1170-ISCO1-64	Sample															2						
PH2 OPWD FS	GEI	19-May-03	South Ditch	ISCO1	1170-ISC01-AC	Sample													1		1	1	1				
PCMP	MACTEC	19-May-03	South Ditch	ISCO2	1170-ISCO2-64	Sample															2						
PCMP	MACTEC	19-May-03	South Ditch	SD-17	1170-PZ-17-64	Sample															2						
PH2 OPWD FS	GEI	23-May-03	South Ditch	ISCO1	1170-ISC01-AG	Sample													1		1	1	1				
PH2 OPWD FS	GEI	26-May-03	South Ditch	ISCO1	1170-ISC01-AJ	Sample													1		1	1	1				
PH2 OPWD FS	GEI	26-May-03	South Ditch	ISCO1	1170-ISC01-AK	Sample													1		1	1	1				
PH2 OPWD FS	GEI	26-May-03	South Ditch	ISCO1	1170-ISC01-AL	Sample													1		1	1	1				
PH2 OPWD FS	GEI	27-May-03	South Ditch	ISCO1	1170-ISC01-AM	Sample													1		1	1	1				
PH2 OPWD FS	GEI	27-May-03	South Ditch	ISCO1	1170-ISC01-AN	Sample													1		1	1	1				
PH2 OPWD FS	GEI	27-May-03	South Ditch	ISCO1	1170-ISC01-AO	Sample													1		1	1	1				
PH2 OPWD FS	GEI	28-May-03	South Ditch	ISCO1	1170-ISC01-AP	Sample													1		1	1	1				
PH2 OPWD FS	GEI	30-May-03	South Ditch	ISCO1	1170-ISC01-AR	Sample													3		3						
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AT	Sample													3		3						
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AU	Sample													3		3						
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AV	Sample													3		3						
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AX	Sample													3		3						
PH2 OPWD FS	GEI	07-Jun-03	South Ditch	ISCO1	1170-ISC01-BD	Sample													3		3	1	1				
PH2 OPWD FS	GEI	07-Jun-03	South Ditch	ISCO2	1170-ISC02-AA	Sample													3		3	1	1				
PH2 OPWD FS	GEI	08-Jun-03	South Ditch	ISCO2	1170-ISC02-AB	Sample													3		3	1	1				
PH2 OPWD FS	GEI	12-Jun-03	South Ditch	ISCO1	1170-ISCO1-BG	Sample													3		3	1	1				
PH2 OPWD FS	GEI	12-Jun-03	South Ditch	ISCO2	1170-ISCO2-AF	Sample													3		3	1	1				
PH2 OPWD FS	GEI	14-Jun-03	South Ditch	ISCO1	1170-ISCO1-BI	Sample													3		3	1	1				
PH2 OPWD FS	GEI	14-Jun-03	South Ditch	ISCO2	1170-ISCO2-AH	Sample													3		3	1	1				
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BR	Sample													3		3	1	1				
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BU	Sample													3		3	1	1				
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BV	Sample													3		3	1	1				
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BW	Sample													3		3						
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO2	1170-ISC02-AP	Sample													3		3	1	1				
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO2	1170-ISC02-AQ	Sample													3		3	1	1				
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO2	1170-ISC02-AR	Sample													3		3	1	1				
PH2 OPWD FS	GEI	23-Jun-03	South Ditch	ISCO1	1170-ISC01-BX	Sample													3		3	1	1				
PH2 OPWD FS	GEI	23-Jun-03	South Ditch	ISCO2	1170-ISC02-AS	Sample													3		3	1	1				
PH2 OPWD FS	GEI	23-Jun-03	South Ditch	ISCO2	1170-ISC02-AT	Sample													3		3	1	1				

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acenaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PH2 OPWD FS	GEI	25-Jun-03	South Ditch	ISCO1	1170-ISC01-BZ	Sample													3		3	1	1				
PH2 OPWD FS	GEI	25-Jun-03	South Ditch	ISCO2	1170-ISC02-AV	Sample													3		3	1	1				
PCMP	MACTEC	10-Jul-03	South Ditch	ISCO1	1170-ISCO1-64	Sample						1															
PCMP	MACTEC	10-Jul-03	South Ditch	ISCO2	1170-ISCO2-64	Sample						1															
PCMP	MACTEC	10-Jul-03	South Ditch	SD-17	1170-P217R-64	Sample						1															
PCMP	MACTEC	11-Aug-03	South Ditch	ISCO1	1170-ISCO1-65	Sample												1	2	6							
PCMP	MACTEC	11-Aug-03	South Ditch	ISCO2	1170-ISCO2-65	Sample												1	2	6							
PCMP	MACTEC	11-Aug-03	South Ditch	SD-17	1170-PZ-17-65	Sample												1	2	6							
PCMP	MACTEC	17-Nov-03	South Ditch	ISCO1	1170-ISCO1-66	Sample												1	2	6							
PCMP	MACTEC	17-Nov-03	South Ditch	ISCO2	1170-ISCO2-66	Sample												1	2	6							
PCMP	MACTEC	17-Nov-03	South Ditch	SD-17	1170-PZ17-66	Sample												1	2	6							
PCMP	MACTEC	02-Feb-04	South Ditch	ISCO1	1170-ISCO1-67	Sample												1	2	6		1					
PCMP	MACTEC	02-Feb-04	South Ditch	SD-17	1170-PZ-17-67	Sample												1	2	6		1					
PCMP	MACTEC	10-May-04	South Ditch	ISCO1	1170-ISCO1-68	Sample												1	2	6		1					
PCMP	MACTEC	10-May-04	South Ditch	ISCO1	1170-ISCO1-68 DUPLICATE	Duplicate												1	2	6							
PCMP	MACTEC	10-May-04	South Ditch	ISCO2	1170-ISCO2-68	Sample												1	2	6		1					
PCMP	MACTEC	10-May-04	South Ditch	SD-17	1170-PZ-17-68	Sample												1	2	6		1					
PCMP	MACTEC	09-Aug-04	South Ditch	ISCO1	1170-ISCO1-69	Sample												1	2	6		1					
PCMP	MACTEC	09-Aug-04	South Ditch	ISCO2	1170-ISCO2-69	Sample												1	2	6		1					
PCMP	MACTEC	09-Aug-04	South Ditch	SD-17	1170-PZ-17-69	Sample												1	2	6		1					
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO1	1170-ISCO1-70	Sample												1		6		1					
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO1	1170-ISCO1-70	Sample													2								
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO2	1170-ISCO2-70	Sample												1		6		1					
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO2	1170-ISCO2-70	Sample													2								
PCMP	MACTEC	01-Nov-04	South Ditch	SD-17	1170-PZ-17-70	Sample												1		6		1					
PCMP	MACTEC	01-Nov-04	South Ditch	SD-17	1170-PZ-17-70	Sample													2								
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO1	1170-ISCO1-71	Sample												1		6		1					
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO1	1170-ISCO1-71	Sample													2								
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO2	1170-ISCO2-71	Sample												1		6		1					
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO2	1170-ISCO2-71	Sample													2								
PCMP	MACTEC	31-Jan-05	South Ditch	SD-17	1170-PZ-17-71	Sample												1		6		1					
PCMP	MACTEC	31-Jan-05	South Ditch	SD-17	1170-PZ-17-71	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72 DUPLICATE	Duplicate												1		6							
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72 DUPLICATE	Duplicate													2								
PCMP	MACTEC	09-May-05	South Ditch	ISCO2	1170-ISCO2-72	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	ISCO2	1170-ISCO2-72	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SD-17	1170-PZ-17-72	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SD-17	1170-PZ-17-72	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-A	SDSW-A-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-A	SDSW-A-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-B	SDSW-B-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-B	SDSW-B-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-C	SDSW-C-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-C	SDSW-C-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-D	SDSW-D-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-D	SDSW-D-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-E	SDSW-E-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-E	SDSW-E-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-F	SDSW-F-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-F	SDSW-F-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-G	SDSW-G-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-G	SDSW-G-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-H	SDSW-H-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-H	SDSW-H-01	Sample													2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-I	SDSW-I-01	Sample												1		6		1					
PCMP	MACTEC	09-May-05	South Ditch	SDSW-I	SDSW-I-01	Sample													2								
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73	Sample												1		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73 DUPLICATE	Duplicate												1		6							
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73 DISSOLVED	Sample													2								
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73 DISSOLVED DUPLICATE	Duplicate													2								
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73	Sample												1		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73 DUPLICATE	Duplicate												1		6							
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73 DISSOLVED	Sample													2								

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73 DISSOLVED DUPLICATE	Duplicate													2								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-A	SD-SW-A-02	Sample												3		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-A	SD-SW-A-02	Sample													3								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-C	SD-SW-C-02	Sample												3		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-C	SD-SW-C-02	Sample													3								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02	Sample												3		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02 DUPLICATE	Duplicate												3		6							
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02	Sample													3								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02 DUPLICATE	Duplicate													3								
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-01	Sample															4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-01	Sample															4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-18R	PZ-18R-SURFACE-F-01	Sample															4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-20	PZ-20-SURFACE-F-01	Sample															4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-21	PZ-21-SURFACE-F-01	Sample															4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-22	PZ-22-SURFACE-F-01	Sample															4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-02	Sample															4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-02	Sample															4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-18R	PZ-18R-SURFACE-F-02	Sample															4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-20	PZ-20-SURFACE-F-02	Sample															4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-21	PZ-21-SURFACE-F-02	Sample															4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-22	PZ-22-SURFACE-F-02	Sample															4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-23	PZ-23-SURFACE-F-02	Sample															4	1					
South Ditch Field Data	OLIN	08-Nov-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-03A	Sample															4	1					
South Ditch Field Data	OLIN	08-Nov-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-03A	Sample															4	1					
South Ditch Field Data	OLIN	08-Nov-05	South Ditch	PZ-20	PZ-20-SURFACE-F-03A	Sample															4	1					
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74	Sample												1		6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74 DUPLICATE	Duplicate												1		6							
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74	Sample													2								
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74 DUPLICATE	Duplicate													2								
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO2	1170-ISCO2-74	Sample												1		6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO2	1170-ISCO2-74	Sample													2								
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-18R	PZ-18R-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-20	PZ-20-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-21	PZ-21-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-22	PZ-22-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-23	PZ-23-SURFACE-F-03B	Sample															4	1					
PCMP	MACTEC	21-Nov-05	South Ditch	SD-17	1170-PZ-17-74	Sample												1		6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SD-17	1170-PZ-17-74	Sample													2								
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-A	SD-SW-A-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-A	SD-SW-A-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-B	SD-SW-B-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-B	SD-SW-B-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-C	SD-SW-C-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-C	SD-SW-C-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03 DUPLICATE	Duplicate													3	6							
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03 DUPLICATE	Duplicate												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-E	SD-SW-E-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-E	SD-SW-E-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-F	SD-SW-F-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-F	SD-SW-F-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-G	SD-SW-G-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-G	SD-SW-G-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-H	SD-SW-H-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-H	SD-SW-H-03	Sample												3									
South Ditch Field Data	OLIN	05-Dec-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-04A	Sample															4	1					
South Ditch Field Data	OLIN	05-Dec-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-04A	Sample															4	1					
South Ditch Field Data	OLIN	05-Dec-05	South Ditch	PZ-20	PZ-20-SURFACE-F-04A	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-20	PZ-20-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-21	PZ-21-SURFACE-F-04B	Sample															4	1					

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-22	PZ-22-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-23	PZ-23-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	09-Jan-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-05A	Sample															4	1					
South Ditch Field Data	OLIN	09-Jan-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-05A	Sample															4	1					
South Ditch Field Data	OLIN	09-Jan-06	South Ditch	PZ-20	PZ-20-SURFACE-F-05A	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-20	PZ-20-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-21	PZ-21-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-22	PZ-22-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-23	PZ-23-SURFACE-F-05B	Sample															4	1					
PCMP	MACTEC	20-Feb-06	South Ditch	ISCO1	1170-ISCO1-75	Sample														3							
PCMP	MACTEC	20-Feb-06	South Ditch	ISCO1	1170-ISCO1-75-Duplicate	Duplicate														4							
PCMP	MACTEC	20-Feb-06	South Ditch	ISCO2	1170-ISCO2-75	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SD-17	1170-PZ-17-75	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-A	SDSW-A-03	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-B	SDSW-B-03	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-C	SDSW-C-03	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-D	SDSW-D-03 Duplicate	Duplicate														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-D	SDSW-D-03	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-E	SDSW-E-03	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-F	SDSW-F-03	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-G	SDSW-G-03	Sample														4							
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-H	SDSW-H-03	Sample														4							
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-06	Sample															4	1					
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-06	Sample															4	1					
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-20	PZ-20-SURFACE-F-06	Sample															4	1					
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-21	PZ-21-SURFACE-F-06	Sample															4	1					
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-22	PZ-22-SURFACE-F-06	Sample															4	1					
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-23	PZ-23-SURFACE-F-06	Sample															4	1					
South Ditch Field Data	OLIN	07-Mar-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-07A	Sample															4	1					
South Ditch Field Data	OLIN	07-Mar-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-07A	Sample															4	1					
South Ditch Field Data	OLIN	07-Mar-06	South Ditch	PZ-20	PZ-20-SURFACE-F-07A	Sample															4	1					
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-07B	Sample															4	1					
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-07B	Sample															4	1					
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-07B	Sample															4	1					
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-20	PZ-20-SURFACE-F-07B	Sample															4	1					
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-21	PZ-21-SURFACE-F-07B	Sample															4	1					
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-22	PZ-22-SURFACE-F-07B	Sample															4	1					
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-23	PZ-23-SURFACE-F-07B	Sample															4	1					
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-08	Sample															4	1					
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-08	Sample															4	1					
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-18R	PZ-18RR-SURFACE-F-08	Sample															4	1					
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-20	PZ-20-SURFACE-F-08	Sample															4	1					
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-21	PZ-21-SURFACE-F-08	Sample															4	1					
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-22	PZ-22-SURFACE-F-08	Sample															4	1					
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-23	PZ-23-SURFACE-F-08	Sample															4	1					
South Ditch Field Data	OLIN	08-May-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-09A	Sample															4	1					
South Ditch Field Data	OLIN	08-May-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-09A	Sample															4	1					
South Ditch Field Data	OLIN	08-May-06	South Ditch	PZ-20	PZ-20-SURFACE-F-09A	Sample															4	1					
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-09B	Sample															4	1					
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-09B	Sample															4	1					
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-09B	Sample															4	1					
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-20	PZ-20-SURFACE-F-09B	Sample															4	1					
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-21	PZ-21-SURFACE-F-09B	Sample															4	1					
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-22	PZ-22-SURFACE-F-09B	Sample															4	1					
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-23	PZ-23-SURFACE-F-09B	Sample															4	1					
South Ditch Field Data	OLIN	05-Jun-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-10A	Sample															4	1					
South Ditch Field Data	OLIN	05-Jun-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-10A	Sample															4	1					
South Ditch Field Data	OLIN	05-Jun-06	South Ditch	PZ-20	PZ-20-SURFACE-F-10A	Sample															4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-10B	Sample															4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-10B	Sample															4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-10B	Sample															4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-20	PZ-20-SURFACE-F-10B	Sample															4	1					

Table 2.1-6
Summary of Surface Water Samples Collected to Date - By Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acenaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kempore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-21	PZ-21-SURFACE-F-10B	Sample																4	1				
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-22	PZ-22-SURFACE-F-10B	Sample																4	1				
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-23	PZ-23-SURFACE-F-10B	Sample																4	1				
South Ditch Field Data	OLIN	05-Jul-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-11A	Sample																4	1				
South Ditch Field Data	OLIN	05-Jul-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-11A	Sample																4	1				
South Ditch Field Data	OLIN	05-Jul-06	South Ditch	PZ-20	PZ-20-SURFACE-F-11A	Sample																4	1				
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-11B	Sample																4	1				
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-11B	Sample																4	1				
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-11B	Sample																4	1				
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-20	PZ-20-SURFACE-F-11B	Sample																4	1				
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-21	PZ-21-SURFACE-F-11B	Sample																4	1				
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-22	PZ-22-SURFACE-F-11B	Sample																4	1				
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-23	PZ-23-SURFACE-F-11B	Sample																4	1				
South Ditch Field Data	OLIN	10-Aug-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-12A	Sample																4	1				
South Ditch Field Data	OLIN	10-Aug-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-12A	Sample																4	1				
South Ditch Field Data	OLIN	10-Aug-06	South Ditch	PZ-20	PZ-20-SURFACE-F-12A	Sample																4	1				
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-12B	Sample																4	1				
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-12B	Sample																4	1				
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-12B	Sample																4	1				
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-20	PZ-20-SURFACE-F-12B	Sample																4	1				
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-21	PZ-21-SURFACE-F-12B	Sample																4	1				
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-22	PZ-22-SURFACE-F-12B	Sample																4	1				
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-23	PZ-23-SURFACE-F-12B	Sample																4	1				
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-13A	Sample																4	1				
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-13A	Sample																4	1				
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-13A	Sample																4	1				
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-20	PZ-20-SURFACE-F-13A	Sample																4	1				
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-21	PZ-21-SURFACE-F-13A	Sample																4	1				
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-22	PZ-22-SURFACE-F-13A	Sample																4	1				
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-23	PZ-23-SURFACE-F-13A	Sample																4	1				
		31-Aug-92	East Ditch	SW-4	SW-04	Sample		36		65			21			23		3			2	1				
		31-Aug-92	East Ditch	SW-5	SW-05	Sample		36		65			21			23		3			2	1				
		31-Aug-92	South Ditch	SW-6	SW-06	Sample		36		65			21			23		3			2	1				
		30-Nov-92	East Ditch	SW-4	SW-04	Sample		36		65			21			23		3			2	1				
		30-Nov-92	East Ditch	SW-5	SW-05	Sample		36		65			21			23		3			2	1				
		01-Dec-92	South Ditch	SW-6	SW-06	Sample		36		65			21			24		5			2	1				
		01-Dec-92	South Ditch	SW-6	SW-06	Duplicate	DUP OF 1000306	36		65			21			24		5								
	GEOMEGA	18-Apr-96	South Ditch	SW-6	SOUTH DITCH #4	Sample	FILTERED												1								
	GEOMEGA	19-Apr-96	South Ditch	SW-6	SOUTH DITCH #4	Sample	FILTERED												23	3							
		01-Sep-92	South Ditch	SW-14	SW-14	Sample		36		65			21			23		3			2	1				
		01-Sep-92	Off-Property West Ditch	SW-17	SW-17	Sample		36		65			21			24		3			2	1				
		01-Sep-92	Off-Property West Ditch	SW-17	SW-17	Duplicate	DUP OF 1000184	36		65			21			24		3								
		02-Sep-92	On-Property West Ditch	SW-13	SW-13	Sample		36		65			21			23		3			2	1				
		02-Sep-92	Off-Property West Ditch	SW-16	SW-16	Sample		36		65			21			23		3			2	1				
		02-Sep-92	Off-Property West Ditch	SW-18	SW-18	Sample		36		65			21			23		3			2	1				
		01-Dec-92	On-Property West Ditch	SW-13	SW-13	Sample		36		65			21			24		5			2	1				
		01-Dec-92	South Ditch	SW-14	SW-14	Sample		36		65			21			23		3			2	1				
		02-Dec-92	Off-Property West Ditch	SW-16	SW-16	Sample		36		65			21			24		5			2	1				
		02-Dec-92	Off-Property West Ditch	SW-17	SW-17	Sample		36		65			21			24		5			2	1				
		02-Dec-92	Off-Property West Ditch	SW-17	SW-17	Duplicate	DUP OF 1000320	36		65			21			24		6								
		02-Dec-92	Off-Property West Ditch	SW-18	SW-18	Sample		36		65			21			23		3			2	1				

Prepared/Date KJC 07/27/07:
Checked/Date: MJM 07/27/07

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
	GEI	08-Dec-77	East Ditch	SS-1	SS-01	Sample														5						
	GEI	08-Dec-77		SS-10	SS-10	Sample														5						
	GEI	08-Dec-77	On-Property West Ditch	SS-11	SS-11	Sample														5						
	GEI	08-Dec-77	South Ditch	SS-12	SS-12	Sample														5						
	GEI	08-Dec-77	East Ditch	SS-2	SS-02	Sample														5						
	GEI	08-Dec-77		SS-3	SS-03	Sample														5						
	GEI	08-Dec-77		SS-4	SS-04	Sample														5						
	GEI	08-Dec-77	South Ditch	SS-5	SS-05	Sample														5						
	GEI	08-Dec-77		SS-6	SS-06	Sample														5						
	GEI	08-Dec-77		SS-7	SS-07	Sample														5						
	GEI	08-Dec-77		SS-8	SS-08	Sample														5						
	GEI	19-Jan-78	East Ditch	SS-1	SS-01	Sample														5						
	GEI	19-Jan-78		SS-10	SS-10	Sample														5						
	GEI	19-Jan-78	On-Property West Ditch	SS-11	SS-11	Sample														5						
	GEI	19-Jan-78	South Ditch	SS-12	SS-12	Sample														5						
	GEI	19-Jan-78	East Ditch	SS-2	SS-02	Sample														5						
	GEI	19-Jan-78		SS-3	SS-03	Sample														5						
	GEI	19-Jan-78		SS-4	SS-04	Sample														5						
	GEI	19-Jan-78	South Ditch	SS-5	SS-05	Sample														5						
	GEI	19-Jan-78		SS-6	SS-06	Sample														5						
	GEI	19-Jan-78		SS-7	SS-07	Sample														5						
	GEI	21-Feb-78	East Ditch	SS-1	SS-01	Sample														5						
	GEI	21-Feb-78		SS-10	SS-10	Sample														5						
	GEI	21-Feb-78	On-Property West Ditch	SS-11	SS-11	Sample														5						
	GEI	21-Feb-78	South Ditch	SS-12	SS-12	Sample														5						
	GEI	21-Feb-78	East Ditch	SS-2	SS-02	Sample														5						
	GEI	21-Feb-78		SS-3	SS-03	Sample														5						
	GEI	21-Feb-78		SS-6	SS-06	Sample														5						
	GEI	21-Feb-78		SS-7	SS-07	Sample														5						
	GEI	15-Mar-78	East Ditch	SS-1	SS-01	Sample														5						
	GEI	15-Mar-78		SS-10	SS-10	Sample														5						
	GEI	15-Mar-78	On-Property West Ditch	SS-11	SS-11	Sample														5						
	GEI	15-Mar-78	South Ditch	SS-12	SS-12	Sample														5						
	GEI	15-Mar-78		SS-15	SS-15	Sample														5						
	GEI	15-Mar-78	East Ditch	SS-16	SS-16	Sample														5						
	GEI	15-Mar-78		SS-17	SS-17	Sample														5						
	GEI	15-Mar-78		SS-3	SS-03	Sample														5						
	GEI	15-Mar-78		SS-4	SS-04	Sample														5						
	GEI	15-Mar-78	South Ditch	SS-5	SS-05	Sample														5						
	GEI	15-Mar-78		SS-6	SS-06	Sample														5						
	GEI	15-Mar-78		SS-7	SS-07	Sample														5						
	GEI	15-Mar-78		SS-8	SS-08	Sample														5						
	GEI	10-Apr-78	East Ditch	SS-1	SS-01	Sample														5						
	GEI	10-Apr-78		SS-10	SS-10	Sample														5						
	GEI	10-Apr-78	On-Property West Ditch	SS-11	SS-11	Sample														5						
	GEI	10-Apr-78	South Ditch	SS-12	SS-12	Sample														5						
	GEI	10-Apr-78		SS-13	SS-13	Sample														5						
	GEI	10-Apr-78		SS-14	SS-14	Sample														5						
	GEI	10-Apr-78		SS-15	SS-15	Sample														5						
	GEI	10-Apr-78	East Ditch	SS-16	SS-16	Sample														5						
	GEI	10-Apr-78		SS-3	SS-03	Sample														5						
	GEI	10-Apr-78		SS-4	SS-04	Sample														5						
	GEI	10-Apr-78	South Ditch	SS-5	SS-05	Sample														5						
	GEI	10-Apr-78		SS-6	SS-06	Sample														5						
	GEI	10-Apr-78		SS-7	SS-07	Sample														5						
	GEI	10-Apr-78		SS-8	SS-08	Sample														5						
	GEI	10-Apr-78		SS-9	SS-09	Sample														5						
	Malcolm Pirnie	01-Mar-81	South Ditch	SS-12	SS-12	Sample													1	3	1					
	Malcolm Pirnie	01-Mar-81	South Ditch	SS-5	SS-05	Sample													1	3	1					
	Malcolm Pirnie	01-Apr-81	South Ditch	SS-12	SS-12	Sample													1	3	1					
	Malcolm Pirnie	01-Apr-81	South Ditch	SS-5	SS-05	Sample													1	3	1					
	Malcolm Pirnie	01-May-81	South Ditch	SS-12	SS-12	Sample													1	3	1					
	Malcolm Pirnie	01-May-81	South Ditch	SS-5	SS-05	Sample													1	3	1					

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
	Malcolm Pirnie	01-Jun-81	South Ditch	SS-12	SS-12	Sample												1		3	1					
	Malcolm Pirnie	01-Jun-81	South Ditch	SS-5	SS-05	Sample												1		3	1					
	Malcolm Pirnie	01-Aug-81	South Ditch	SS-12	SS-12	Sample												1		3	1					
	Malcolm Pirnie	01-Aug-81	South Ditch	SS-5	SS-05	Sample												1		3	1					
	Malcolm Pirnie	01-Dec-81	South Ditch	SS-12	SS-12	Sample												1		3	1					
	Malcolm Pirnie	01-Dec-81	South Ditch	SS-5	SS-05	Sample														3	1					
		01-Oct-82	East Ditch	SS-1	SS-01	Sample					2									4	1					
		01-Oct-82	South Ditch	SS-12	SS-12	Sample														4	1					
		01-Oct-82	East Ditch	SS-16	SS-16	Sample					2									4	1					
		01-Oct-82	South Ditch	SS-5	SS-05	Sample					2							1		4	1					
		01-Jun-83	East Ditch	SS-1	SS-01	Sample					2									4	1					
		01-Jun-83	South Ditch	SS-12	SS-12	Sample														4	1					
		01-Jun-83	East Ditch	SS-16	SS-16	Sample					2									4	1					
		01-Jun-83	South Ditch	SS-5	SS-05	Sample					2							1		4	1					
		01-Oct-83	East Ditch	SS-1	SS-01	Sample					2									4	1					
		01-Oct-83	South Ditch	SS-12	SS-12	Sample														4	1					
		01-Oct-83	East Ditch	SS-16	SS-16	Sample					2									4	1					
		01-Oct-83	South Ditch	SS-5	SS-05	Sample					2							1		4	1					
		01-Jul-84	East Ditch	SS-1	SS-01	Sample					2									4	1					
		01-Jul-84	South Ditch	SS-12	SS-12	Sample														4	1					
		01-Jul-84	East Ditch	SS-16	SS-16	Sample					2									4	1					
		01-Jul-84	South Ditch	SS-5	SS-05	Sample					2									4	1					
		01-Dec-84	East Ditch	SS-1	SS-01	Sample					2									4						
		01-Dec-84	South Ditch	SS-12	SS-12	Sample														4	1					
		01-Dec-84	East Ditch	SS-16	SS-16	Sample					2									4						
		01-Dec-84	South Ditch	SS-5	SS-05	Sample					2							1		4	1					
		01-May-85	East Ditch	SS-1	SS-01	Sample												1			1					
		01-May-85	On-Property West Ditch	SS-11	SS-11	Sample												1			1					
		01-May-85	South Ditch	SS-12	SS-12	Sample												1			1					
		01-May-85	East Ditch	SS-16	SS-16	Sample												1			1					
		01-May-85	East Ditch	SS-2	SS-02	Sample												1			1					
		01-May-85	South Ditch	SS-5	SS-05	Sample												1			1					
		01-Dec-85	South Ditch	SS-12	SS-12	Sample												1		4	1					
		01-Dec-85	East Ditch	SS-16	SS-16	Sample												1		4	1					
		01-Dec-85	South Ditch	SS-5	SS-05	Sample												1		4	1					
		27-Jun-86		SS-14	SS-14	Sample												1		4	1					
		27-Jun-86	East Ditch	SS-16	SS-16	Sample												1		4	1					
		27-Jun-86		SS-17	SS-17	Sample												1		4	1					
		01-Jul-86	South Ditch	SS-12	SS-12	Sample												1		3	1					
		01-Jul-86		SS-13	SS-13	Sample												1		4	1					
		01-Jul-86	South Ditch	SS-5	SS-05	Sample												1		3	1					
		01-Oct-86		SS-14	SS-14	Sample												1		3	1					
		01-Oct-86	East Ditch	SS-B	SS-B	Sample												1		3	1					
		01-Oct-86	On-Property West Ditch	SS-C	SS-C	Sample												1		3	1					
		01-Oct-86	Off-Property West Ditch	SS-D	SS-D	Sample												1		3	1					
		01-Dec-86	East Ditch	SS-1	SS-01	Sample														2	1					
		01-Dec-86	South Ditch	SS-12	SS-12	Sample												1		3	1					
		01-Dec-86		SS-13	SS-13	Sample														3	1					
		01-Dec-86		SS-14	SS-14	Sample												1		3	1					
		01-Dec-86	East Ditch	SS-16	SS-16	Sample														3	1					
		01-Dec-86		SS-17	SS-17	Sample												1		3	1					
		01-Dec-86	South Ditch	SS-5	SS-05	Sample												1		3	1					
		01-Dec-86	East Ditch	SS-B	SS-B	Sample														3	1					
		01-Dec-86	On-Property West Ditch	SS-C	SS-C	Sample														2	1					
		01-Dec-86	Off-Property West Ditch	SS-D	SS-D	Sample														2	1					
		01-Jun-87	East Ditch	SS-1	SS-01	Sample												1		3	1					
		01-Jun-87	South Ditch	SS-12	SS-12	Sample												1		3	1					
		01-Jun-87	East Ditch	SS-16	SS-16	Sample												1		3	1					
		01-Jun-87		SS-17	SS-17	Sample												1		3	1					
		01-Jun-87	South Ditch	SS-5	SS-05	Sample												1		3	1					
		01-Jun-87	On-Property West Ditch	SS-C	SS-C	Sample												1		3	1					
		01-Jun-87	Off-Property West Ditch	SS-D	SS-D	Sample												1		3	1					
		01-Dec-87	East Ditch	SS-1	SS-01	Sample												1		3						

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Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
		01-Dec-87	South Ditch	SS-12	SS-12	Sample												1		3	1					
		01-Dec-87		SS-13	SS-13	Sample												1		3	1					
		01-Dec-87		SS-14	SS-14	Sample												1		3	1					
		01-Dec-87	East Ditch	SS-16	SS-16	Sample												1		3						
		01-Dec-87		SS-17	SS-17	Sample												1		3						
		01-Dec-87	South Ditch	SS-5	SS-05	Sample												1		3						
		01-Dec-87	East Ditch	SS-B	SS-B	Sample												1		3	1					
		01-Dec-87	On-Property West Ditch	SS-C	SS-C	Sample												1		3	1					
		01-Dec-87	Off-Property West Ditch	SS-D	SS-D	Sample												1		3	1					
		01-Dec-87	East Ditch	SS-E	SS-E	Sample												1		3	1					
CRA WORK PLAN		14-May-90	South Ditch	SDITCH	SDITCH	Sample																	1			
		10-Dec-91	East Ditch	SW-1	SW-01	Sample		36			65				21	7		23		4						
		10-Dec-91	East Ditch	SW-2	SW-02	Sample		36			65				21	7		23		4						
		31-Aug-92	East Ditch	SW-1	SW-01	Sample		36			65				21			23		3	2	1				
		31-Aug-92	East Ditch	SW-2	SW-02	Sample		36			65				21			23		3	2	1				
		31-Aug-92	East Ditch	SW-3	SW-03	Sample		36			65				21			23		3	2	1				
		31-Aug-92	South/East Ditch	SW-4	SW-04	Sample		36			65				21			23		3	2	1				
		31-Aug-92	South/East Ditch	SW-5	SW-05	Sample		36			65				21			23		3	2	1				
		31-Aug-92	South/East Ditch	SW-6	SW-06	Sample		36			65				21			23		3	2	1				
		01-Sep-92	South Ditch	SW-10	SW-10	Sample		36			65				21			23		3	2	1				
		01-Sep-92	South Ditch	SW-11	SW-11	Sample		36			65				21			23		3	2	1				
		01-Sep-92	South Ditch	SW-14	SW-14	Sample		36			65				21			23		3	2	1				
		01-Sep-92	Off-Property West Ditch	SW-17	SW-17	Sample		36			65				21			24		3	2	1				
		01-Sep-92	Off-Property West Ditch	SW-17	SW-17	Duplicate	DUP OF 1000184	36			65				21			24		3						
		01-Sep-92	Delta	SW-7	SW-07	Sample		36			65				21			23		3	2	1				
		01-Sep-92	Central Pond	SW-8	SW-08	Sample		36			65				21			23		3	2	1				
		01-Sep-92	South Ditch	SW-9	SW-09	Sample		36			65				21			23		3	2	1				
		02-Sep-92	Buried Debris Area	SW-12	SW-12	Sample		36			65				21			23		3	2	1				
		02-Sep-92	On-Property West Ditch	SW-13	SW-13	Sample		36			65				21			23		3	2	1				
		02-Sep-92	Off-Property West Ditch	SW-15	SW-15	Sample		36			65				21			23		3	2	1				
		02-Sep-92	Off-Property West Ditch	SW-16	SW-16	Sample		36			65				21			23		3	2	1				
		02-Sep-92	Off-Property West Ditch	SW-18	SW-18	Sample		36			65				21			23		3	2	1				
		30-Nov-92	East Ditch	SW-1	SW-01	Sample		36			65				21			23		3	2	1				
		30-Nov-92	East Ditch	SW-2	SW-02	Sample		36			65				21			23		3	2	1				
		30-Nov-92	East Ditch	SW-3	SW-03	Sample		36			65				21			23		3	2	1				
		30-Nov-92	South/East Ditch	SW-4	SW-04	Sample		36			65				21			23		3	2	1				
		30-Nov-92	South/East Ditch	SW-5	SW-05	Sample		36			65				21			23		3	2	1				
		01-Dec-92	South Ditch	SW-10	SW-10	Sample		36			65				21			23		3	2	1				
		01-Dec-92	South Ditch	SW-11	SW-11	Sample		36			65				21			23		3	2	1				
		01-Dec-92	Buried Debris Area	SW-12	SW-12	Sample		36			65				21			23		3	2	1				
		01-Dec-92	On-Property West Ditch	SW-13	SW-13	Sample		36			65				21			24		5	2	1				
		01-Dec-92	South Ditch	SW-14	SW-14	Sample		36			65				21			23		3	2	1				
		01-Dec-92	South Ditch	SW-20	SW-20	Sample		36			65				21			23		3	2	1				
		01-Dec-92	South Ditch	SW-21	SW-21	Sample		36			65				21			23		3	2	1				
		01-Dec-92	South Ditch	SW-22	SW-22	Sample		36			65				21			23		3	2	1				
		01-Dec-92	South/East Ditch	SW-6	SW-06	Sample		36			65				21			24		5	2	1				
		01-Dec-92	South/East Ditch	SW-6	SW-06	Duplicate	DUP OF 1000306	36			65				21			24		5						
		01-Dec-92	Delta	SW-7	SW-07	Sample		36			65				21			23		3	2	1				
		01-Dec-92	Central Pond	SW-8	SW-08	Sample		36			65				21			24		5	2	1				
		01-Dec-92	South Ditch	SW-9	SW-09	Sample		36			65				21			23		3	2	1				
		02-Dec-92	Off-Property West Ditch	SW-15	SW-15	Sample		36			65				21			23		3	2	1				
		02-Dec-92	Off-Property West Ditch	SW-16	SW-16	Sample		36			65				21			24		5	2	1				
		02-Dec-92	Off-Property West Ditch	SW-17	SW-17	Sample		36			65				21			24		5	2	1				
		02-Dec-92	Off-Property West Ditch	SW-17	SW-17	Duplicate	DUP OF 1000320	36			65				21			24		6						
		02-Dec-92	Off-Property West Ditch	SW-18	SW-18	Sample		36			65				21			23		3	2	1				
		02-Dec-92	East Ditch	SW-23	SW-23	Sample		36			65				21			24		5	2	1				
		03-Dec-92	South Ditch	SW-19	SW-19	Sample		36			65				21			23		3	1	1				
		07-Jan-93	East Ditch	SW-24	SW-24	Sample		36			65				21			24		4						
		25-Mar-93	East Ditch	SW-25	SW-25	Sample		36			65				21			24		4	2	1				
		25-Mar-93	East Ditch	SW-26	SW-26	Sample		36			65				21			24		4						
		25-Mar-93	East Ditch	SW-27	SW-27	Sample		36			65				21			24		4						
		25-Mar-93	East Ditch	SW-28	SW-28	Sample		36			65				21			24		4						
		25-Mar-93	East Ditch	SW-29	SW-29	Sample		36			65				21			24		4						

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Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
		20-Apr-93	East Ditch	SW-30	SW-30	Sample		36			65				21				24		4						
		02-Feb-95		GSW-11	SW-11	Sample	FILTERED 1460308													14	13	2						
		02-Feb-95		GSW-11	SW-11	Sample													14		13	4	1					
		02-Feb-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460309													14	13	2						
		02-Feb-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	4	1					
		02-Feb-95		GSW-14	SW-14	Sample	FILTERED 1460304													14	13	2						
		02-Feb-95		GSW-14	SW-14	Duplicate	FILTDUP 1460295													12	13	1						
		02-Feb-95		GSW-14	SW-14	Sample													14		13	4	1					
		02-Feb-95		GSW-14	SW-14	Duplicate	DUP OF 1460304												12		13	1						
		02-Feb-95	South Ditch	GSW-15	SW-15	Sample	FILTERED 1460312													14	13	2						
		02-Feb-95	South Ditch	GSW-15	SW-15	Sample													14		13	4	1					
		02-Feb-95		GSW-16	SW-16	Sample	FILTERED 1460311													14	13	2						
		02-Feb-95		GSW-16	SW-16	Sample													14		13	4	1					
		02-Feb-95		GSW-17	SW-17	Sample	FILTERED 1460310													14	13	2						
		02-Feb-95		GSW-17	SW-17	Sample													14		13	4	1					
		03-May-95		GSW-11	SW-11	Sample	FILTERED 1460406													14	14	2						
		03-May-95		GSW-11	SW-11	Sample													14		13	5	1					
		03-May-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460409													14	14	2						
		03-May-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	5	1					
		03-May-95		GSW-14	SW-14	Sample	FILTERED 1460407													14	14	2						
		03-May-95		GSW-14	SW-14	Duplicate	FILTDUP 1460408													14	13	1						
		03-May-95		GSW-14	SW-14	Sample													14		13	5	1					
		03-May-95		GSW-14	SW-14	Duplicate	DUP OF 1460407												14		13	1						
		03-May-95	South Ditch	GSW-15	SW-15	Sample	FILTERED 1460405													14	14	2						
		03-May-95	South Ditch	GSW-15	SW-15	Sample													14		13	5	1					
		03-May-95		GSW-16	SW-16	Sample	FILTERED 1460401													14	14	2						
		03-May-95		GSW-16	SW-16	Sample													14		13	5	1					
		03-May-95		GSW-17	SW-17	Sample	FILTERED 1460402													14	14	2						
		03-May-95		GSW-17	SW-17	Sample													14		13	5	1					
		04-May-95	South Ditch	GSW-18	SW-18	Sample	FILTERED 1460415													14	13	1						
		04-May-95	South Ditch	GSW-18	SW-18	Sample													14		12	5	1					
		19-Jul-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460478													14	13	2						
		19-Jul-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	4	1					
		19-Jul-95		GSW-14	SW-14	Sample	FILTERED 1460481													14	13	2						
		19-Jul-95		GSW-14	SW-14	Sample	FILTERED 1460482													14	13	1						
		19-Jul-95		GSW-14	SW-14	Sample													14		13	5	1					
		19-Jul-95		GSW-14	SW-14	Sample													14		13	1						
		19-Jul-95		GSW-16	SW-16	Sample	FILTERED 1460480													14	13	2						
		19-Jul-95		GSW-16	SW-16	Sample													14		13	5	1					
		19-Jul-95		GSW-17	SW-17	Sample	FILTERED 1460479													14	13	2						
		19-Jul-95		GSW-17	SW-17	Sample													14		13	5	1					
		18-Oct-95		GSW-11	SW-17	Sample	FILTERED 1460659													14	13	2						
		18-Oct-95		GSW-11	SW-17	Duplicate	FILTDUP 1460642													14	13	1						
		18-Oct-95		GSW-11	SW-17	Sample													14		13	4	1					
		18-Oct-95		GSW-11	SW-17	Duplicate	DUP OF 1460659												14		13	1						
		18-Oct-95	Off-Property West Ditch	GSW-12	SW-12	Sample	FILTERED 1460656													14	14	2						
		18-Oct-95	Off-Property West Ditch	GSW-12	SW-12	Sample													14		13	4	1					
		18-Oct-95		GSW-14	SW-14	Sample	FILTERED 1460655													14	13	2						
		18-Oct-95		GSW-14	SW-14	Sample													14		13	5	1					
		18-Oct-95		GSW-16	SW-16	Sample	FILTERED 1460661													14	13	2						
		18-Oct-95		GSW-16	SW-16	Sample													14		13	5	1					
		01-Apr-96	Background	SDBK-001	SW001XXBKX	Background Sample		36			64				21				24		5						
		01-Apr-96	Background	SDBK-002	SW002XXBKX	Background Sample		36			64				21				24		5						
		02-Apr-96	Background	SDBK-005	SW005XXBKX	Background Sample									21													
		02-Apr-96	Background	SDBK-006	SW006XXBKX	Background Sample									21													
		02-Apr-96	Background	SDBK-007	SW007XXBKX	Background Sample									21													
		02-Apr-96	Background	SDBK-013	SW013XXBKX	Background Sample									21													
		03-Apr-96	Background	SDBK-003	SW003XXBKX	Background Sample		36			64				21				24		5						
		03-Apr-96	Background	SDBK-004	SW004XXBKX	Background Sample		36			64				21				24		5						
		03-Apr-96	Background	SDBK-008	SW008XXBKX	Background Sample									21													
		03-Apr-96	Background	SDBK-009	SW009XXBKX	Background Sample									21													
		04-Apr-96	Background	SDBK-010	SW010XXBKX	Background Sample									21													
		04-Apr-96	Background	SDBK-011	SW011XXBKX	Background Sample									21													

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		04-Apr-96	Background	SDBK-012	SW012XXBKX	Background Sample								21												
		04-Apr-96	Background	SDBK-014	SW014XXBKX	Background Sample		36			64			21				24		1						
		04-Apr-96	Background	SDBK-014	SW014XXBKD	Background Duplicate		36			64			21				24		1						
	GEOMEGA	18-Apr-96	South Ditch	GSW-1	SOUTH DITCH #1	Sample	FILTERED												1							
	GEOMEGA	18-Apr-96	South Ditch	GSW-1	SOUTH DITCH #1	Sample	FILTERED												23	3						
	GEOMEGA	18-Apr-96	South Ditch	GSW-2	SOUTH DITCH #2	Sample	FILTERED												1							
	GEOMEGA	18-Apr-96	South Ditch	GSW-3	SOUTH DITCH #3	Sample	FILTERED												1							
	GEOMEGA	18-Apr-96	South Ditch	GSW-P	SOUTH DITCH POND #1	Sample	FILTERED												1							
	GEOMEGA	18-Apr-96	South/East Ditch	SW-6	SOUTH DITCH #4	Sample	FILTERED												1							
	GEOMEGA	19-Apr-96	South Ditch	GSW-2	SOUTH DITCH #2	Sample	FILTERED												23	3						
	GEOMEGA	19-Apr-96	South Ditch	GSW-3	SOUTH DITCH #3	Sample	FILTERED												23	3						
	GEOMEGA	19-Apr-96	South Ditch	GSW-P	SO. DITCH POND-F	Sample	FILTERED 1460824												23							
	GEOMEGA	19-Apr-96	South Ditch	GSW-P	SO. DITCH POND-U	Sample												23		3						
	GEOMEGA	19-Apr-96	South/East Ditch	SW-6	SOUTH DITCH #4	Sample	FILTERED												23	3						
		23-Jan-97	South Ditch	SDREF-012	BS012REF	Background Sample					65			19				23								
		24-Jan-97		FETAX WATER	FETAX WATER	Sample												23								
1998 Floc	Geomega	13-Jan-98		EDB	EDB1 WATER	Sample												28		4						
1998 Floc	Geomega	13-Jan-98		EDC	EDC2 WATER	Sample												28		4						
1998 Floc	Geomega	13-Jan-98		EDS	EDS3 WATER	Sample												28		4						
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data							30	7		7	26		23	1				12	22
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data	65			65															
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data																1			
C-RAM	GEI	20-Jul-00	South Ditch	NP-1	NP-1C	Sample	GEI Imported Data																5			
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data							30	7		7	26		23	1				12	22
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data							30	7		7	26		23	1				12	22
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data	65			65															
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data	65			65															
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data																1			
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data																1			
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2C	Sample	GEI Imported Data																5			
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data																5			
C-RAM	GEI	20-Jul-00	South Ditch	NP-2	NP-2T	Sample	GEI Imported Data												25							
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data							30	7		7	26		23	1				12	22
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data							30	7		7	26		23	1				12	22
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data	65			65															
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data	65			65															
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data																1			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data																1			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3C	Sample	GEI Imported Data																5			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data																5			
C-RAM	GEI	20-Jul-00	On-Property West Ditch	NP-3	NP-3T	Sample	GEI Imported Data												25							
C-RAM	GEI	18-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-0	Sample	GEI Imported Data	6						18				6								
C-RAM	GEI	18-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-0	Sample	GEI Imported Data																5			
C-RAM	GEI	20-Sep-00	South Ditch	NP-1	1140-SD-SW1	Sample	GEI Imported Data							17				1		1						
C-RAM	GEI	20-Sep-00	South Ditch	NP-1	1140-SD-SW1	Sample	GEI Imported Data				65															
C-RAM	GEI	21-Sep-00	South Ditch	NP-1	1140-SD-SW2	Sample	GEI Imported Data							17				1		1						
C-RAM	GEI	21-Sep-00	South Ditch	NP-1	1140-SD-SW2	Sample	GEI Imported Data				65															
C-RAM	GEI	22-Sep-00	South Ditch	NP-1	1140-SD-SW3	Sample	GEI Imported Data							17				1		1						
C-RAM	GEI	22-Sep-00	South Ditch	NP-1	1140-SD-SW3	Sample	GEI Imported Data				65															
C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-1	Sample	GEI Imported Data	9						18				6								
C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-2	Sample	GEI Imported Data	9						18				6								
C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-1	Sample	GEI Imported Data																5			
C-RAM	GEI	22-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-2	Sample	GEI Imported Data																5			
C-RAM	GEI	23-Sep-00	South Ditch	NP-1	1140-SD-SW4	Sample	GEI Imported Data							17				1		1						
C-RAM	GEI	23-Sep-00	South Ditch	NP-1	1140-SD-SW4	Sample	GEI Imported Data				65															
C-RAM	GEI	25-Sep-00	South Ditch	NP-1	1140-SD-SW5	Sample	GEI Imported Data							17				1		1						
C-RAM	GEI	25-Sep-00	South Ditch	NP-1	1140-SD-SW5	Sample	GEI Imported Data				65															
C-RAM	GEI	26-Sep-00	South Ditch	NP-1	1140-SD-SW6	Sample	GEI Imported Data							17				1		1						
C-RAM	GEI	26-Sep-00	South Ditch	NP-1	1140-SD-SW6	Sample	GEI Imported Data				65															
C-RAM	GEI	27-Sep-00	Drum Area A	Drum Area A	1150-DA-1	Sample	GEI Imported Data	6						17				6								
C-RAM	GEI	27-Sep-00	Drum Area A	Drum Area A	1150-DA-1	Sample	GEI Imported Data																5			
C-RAM	GEI	27-Sep-00	South Ditch	NP-1	1140-SD-SW7	Sample	GEI Imported Data							17				1		1						
C-RAM	GEI	27-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-3	Sample	GEI Imported Data	10						17				6								

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	27-Sep-00	C-RAM NPDES	NPDES-OUT	1150-OUT-3	Sample	GEI Imported Data																5			
C-RAM	GEI	27-Sep-00	On-Property West Ditch	On-Property West Ditch	1150-WD-1	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	27-Sep-00	On-Property West Ditch	On-Property West Ditch	1150-WD-1	Sample	GEI Imported Data																5			
C-RAM	GEI	28-Sep-00	South Ditch	NP-1	1140-SD-SW8	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	28-Sep-00	South Ditch	NP-1	1140-SD-SW8	Sample	GEI Imported Data				65															
C-RAM	GEI	29-Sep-00	South Ditch	NP-1	1140-SD-SW9	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	29-Sep-00	South Ditch	NP-1	1140-SD-SW9	Sample	GEI Imported Data				65															
C-RAM	GEI	02-Oct-00	South Ditch	NP-1	1140-SD-SW10	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	02-Oct-00	South Ditch	NP-1	1140-SD-SW10	Sample	GEI Imported Data				65															
C-RAM	GEI	04-Oct-00	South Ditch	NP-1	1140-SD-SW11	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	04-Oct-00	South Ditch	NP-1	1140-SD-SW11	Sample	GEI Imported Data				65															
C-RAM	GEI	04-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-4	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	04-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-4	Sample	GEI Imported Data																5			
C-RAM	GEI	05-Oct-00	South Ditch	NP-1	1150-SD-SW11D	Sample	GEI Imported Data				65															
C-RAM	GEI	05-Oct-00	South Ditch	SW11A	1150-SD-SW11A	Sample	GEI Imported Data				65															
C-RAM	GEI	05-Oct-00	South Ditch	SW11B	1150-SD-SW11B	Sample	GEI Imported Data				65															
C-RAM	GEI	05-Oct-00	South Ditch	SW11C	1150-SD-SW11C	Sample	GEI Imported Data				65															
C-RAM	GEI	05-Oct-00	South Ditch	SW11E	1150-SD-SW11E	Sample	GEI Imported Data				65															
C-RAM	GEI	06-Oct-00	South Ditch	NP-1	97598-SWLOC-14	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Oct-00	South Ditch	NP-1	97598-SWLOC-14	Sample	GEI Imported Data												1							
C-RAM	GEI	06-Oct-00	South Ditch	NP-1	97598-SWLOC-14	Sample	GEI Imported Data													1						
C-RAM	GEI	06-Oct-00	South Ditch	SW11B	97598-SWLOC-10	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Oct-00	South Ditch	SW11B	97598-SWLOC-10	Sample	GEI Imported Data												1							
C-RAM	GEI	06-Oct-00	South Ditch	SW11B	97598-SWLOC-10	Sample	GEI Imported Data													1						
C-RAM	GEI	06-Oct-00	South Ditch	SW11C	97598-SWLOC-11	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Oct-00	South Ditch	SW11C	97598-SWLOC-11	Sample	GEI Imported Data												1							
C-RAM	GEI	06-Oct-00	South Ditch	SW11C	97598-SWLOC-11	Sample	GEI Imported Data													1						
C-RAM	GEI	06-Oct-00	South Ditch	SW11E	97598-SWLOC-16	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Oct-00	South Ditch	SW11E	97598-SWLOC-16	Sample	GEI Imported Data												1							
C-RAM	GEI	06-Oct-00	South Ditch	SW11E	97598-SWLOC-16	Sample	GEI Imported Data													1						
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-12	97598-SWLOC-12	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-12	97598-SWLOC-12	Sample	GEI Imported Data												1							
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-12	97598-SWLOC-12	Sample	GEI Imported Data													1						
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-9	97598-SWLOC-9	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-9	97598-SWLOC-9	Sample	GEI Imported Data												1							
C-RAM	GEI	06-Oct-00	South Ditch	SWLOC-9	97598-SWLOC-9	Sample	GEI Imported Data													1						
C-RAM	GEI	07-Oct-00	South Ditch	NP-1	1150-SD-SWA1	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	07-Oct-00	South Ditch	NP-1	1150-SD-SWA1	Sample	GEI Imported Data												1							
C-RAM	GEI	07-Oct-00	South Ditch	NP-1	1150-SD-SWA1	Sample	GEI Imported Data				65															
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-TEST A	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT - A1	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-TEST A	Sample	GEI Imported Data												1							
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT- A1	Sample	GEI Imported Data												1							
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-TEST A	Sample	GEI Imported Data																5			
C-RAM	GEI	07-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A1	Sample	GEI Imported Data																5			
C-RAM	GEI	09-Oct-00	Central Pond	Central Pond	1150-CP-SW1	Sample	GEI Imported Data												1							
C-RAM	GEI	09-Oct-00	Central Pond	Central Pond	1150-CP-SW1	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	09-Oct-00	Central Pond	Central Pond	1150-CP-SW1	Sample	GEI Imported Data																5			
C-RAM	GEI	09-Oct-00	South Ditch	NP-1	1150-SD-SWA2	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	09-Oct-00	South Ditch	NP-1	1150-SD-SWA2	Sample	GEI Imported Data												1							
C-RAM	GEI	09-Oct-00	South Ditch	NP-1	1150-SD-SWA2	Sample	GEI Imported Data				65															
C-RAM	GEI	09-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A2	Sample	GEI Imported Data												1							
C-RAM	GEI	09-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A2	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	09-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A2	Sample	GEI Imported Data																5			
C-RAM	GEI	10-Oct-00	South Ditch	NP-1	1150-SD-SWA3	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	10-Oct-00	South Ditch	NP-1	1150-SD-SWA3	Sample	GEI Imported Data												1							
C-RAM	GEI	10-Oct-00	South Ditch	NP-1	1150-SD-SWA3	Sample	GEI Imported Data				65															
C-RAM	GEI	11-Oct-00	South Ditch	NP-1	1150-SD-SWA4	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	11-Oct-00	South Ditch	NP-1	1150-SD-SWA4	Sample	GEI Imported Data												1							
C-RAM	GEI	11-Oct-00	South Ditch	NP-1	1150-SD-SWA4	Sample	GEI Imported Data				65															
C-RAM	GEI	12-Oct-00	South Ditch	NP-1	1150-SD-SWA5	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	12-Oct-00	South Ditch	NP-1	1150-SD-SWA5	Sample	GEI Imported Data												1							
C-RAM	GEI	12-Oct-00	South Ditch	NP-1	1150-SD-SWA5	Sample	GEI Imported Data				65															

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	12-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A3	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	12-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A3	Sample	GEI Imported Data												1							
C-RAM	GEI	12-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-A3	Sample	GEI Imported Data																5			
C-RAM	GEI	18-Oct-00	South Ditch	NP-1	1150-SD-SWA6	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	18-Oct-00	South Ditch	NP-1	1150-SD-SWA6	Sample	GEI Imported Data												1							
C-RAM	GEI	18-Oct-00	South Ditch	NP-1	1150-SD-SWA6	Sample	GEI Imported Data				65															
C-RAM	GEI	19-Oct-00	South Ditch	NP-1	1150-SD-SWA7	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	19-Oct-00	South Ditch	NP-1	1150-SD-SWA7	Sample	GEI Imported Data												1							
C-RAM	GEI	19-Oct-00	South Ditch	NP-1	1150-SD-SWA7	Sample	GEI Imported Data				65															
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA8	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA9	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA8	Sample	GEI Imported Data												1							
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA9	Sample	GEI Imported Data												1							
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA8	Sample	GEI Imported Data				65															
C-RAM	GEI	20-Oct-00	South Ditch	NP-1	1150-SD-SWA9	Sample	GEI Imported Data				65															
C-RAM	GEI	23-Oct-00	South Ditch	NP-1	1150-SD-SWA10	Sample	GEI Imported Data						16					1		1						
C-RAM	GEI	23-Oct-00	South Ditch	NP-1	1150-SD-SWA10	Sample	GEI Imported Data												1							
C-RAM	GEI	23-Oct-00	South Ditch	NP-1	1150-SD-SWA10	Sample	GEI Imported Data				65															
C-RAM	GEI	24-Oct-00	South Ditch	NP-1	1150-SD-SWB1	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	24-Oct-00	South Ditch	NP-1	1150-SD-SWB1	Sample	GEI Imported Data												1							
C-RAM	GEI	24-Oct-00	South Ditch	NP-1	1150-SD-SWB1	Sample	GEI Imported Data				65															
C-RAM	GEI	24-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT B1	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	24-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT B1	Sample	GEI Imported Data												1							
C-RAM	GEI	24-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT B1	Sample	GEI Imported Data																5			
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data																5			
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data												1							
C-RAM	GEI	24-Oct-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWA1	Sample	GEI Imported Data				65															
C-RAM	GEI	25-Oct-00	South Ditch	NP-1	1150-SD-SWB2	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	25-Oct-00	South Ditch	NP-1	1150-SD-SWB2	Sample	GEI Imported Data												1							
C-RAM	GEI	25-Oct-00	South Ditch	NP-1	1150-SD-SWB2	Sample	GEI Imported Data				65															
C-RAM	GEI	25-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C1	Sample	GEI Imported Data	6					17					6								
C-RAM	GEI	25-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C1	Sample	GEI Imported Data												1							
C-RAM	GEI	25-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C1	Sample	GEI Imported Data																5			
C-RAM	GEI	26-Oct-00	South Ditch	NP-1	1150-SD-SWC1	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	26-Oct-00	South Ditch	NP-1	1150-SD-SWC1	Sample	GEI Imported Data												1							
C-RAM	GEI	26-Oct-00	South Ditch	NP-1	1150-SD-SWC1	Sample	GEI Imported Data				65															
C-RAM	GEI	27-Oct-00	South Ditch	NP-1	1150-SD-SWC2	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	27-Oct-00	South Ditch	NP-1	1150-SD-SWC2	Sample	GEI Imported Data												1							
C-RAM	GEI	27-Oct-00	South Ditch	NP-1	1150-SD-SWC2	Sample	GEI Imported Data				65															
C-RAM	GEI	27-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C2	Sample	GEI Imported Data	6										6								
C-RAM	GEI	27-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C2	Sample	GEI Imported Data												1							
C-RAM	GEI	27-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C2	Sample	GEI Imported Data																5			
C-RAM	GEI	30-Oct-00	South Ditch	NP-1	1150-SD-SWC3	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	30-Oct-00	South Ditch	NP-1	1150-SD-SWC3	Sample	GEI Imported Data												1							
C-RAM	GEI	30-Oct-00	South Ditch	NP-1	1150-SD-SWC3	Sample	GEI Imported Data				65															
C-RAM	GEI	30-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C3	Sample	GEI Imported Data	6										6								
C-RAM	GEI	30-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C3	Sample	GEI Imported Data												1							
C-RAM	GEI	30-Oct-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C3	Sample	GEI Imported Data																5			
C-RAM	GEI	31-Oct-00	South Ditch	NP-1	1150-SD-SWC4	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	31-Oct-00	South Ditch	NP-1	1150-SD-SWC4	Sample	GEI Imported Data												1							
C-RAM	GEI	31-Oct-00	South Ditch	NP-1	1150-SD-SWC4	Sample	GEI Imported Data				65															
C-RAM	GEI	01-Nov-00	South Ditch	NP-1	1150-SD-SWC5	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	01-Nov-00	South Ditch	NP-1	1150-SD-SWC5	Sample	GEI Imported Data												1							
C-RAM	GEI	01-Nov-00	South Ditch	NP-1	1150-SD-SWC5	Sample	GEI Imported Data				65															
C-RAM	GEI	02-Nov-00	South Ditch	NP-1	1150-SD-SWC6	Sample	GEI Imported Data						17					1		1						
C-RAM	GEI	02-Nov-00	South Ditch	NP-1	1150-SD-SWC6	Sample	GEI Imported Data												1							
C-RAM	GEI	02-Nov-00	South Ditch	NP-1	1150-SD-SWC6	Sample	GEI Imported Data				65															
C-RAM	GEI	03-Nov-00	Drum Area B	Drum Area B	1150-DB-SW1	Sample	GEI Imported Data	6					17					6								

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	03-Nov-00	Drum Area B	Drum Area B	1150-DB-SW1	Sample	GEI Imported Data											1								
C-RAM	GEI	03-Nov-00	Drum Area B	Drum Area B	1150-DB-SW1	Sample	GEI Imported Data																5			
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data											1								
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data				65															
C-RAM	GEI	03-Nov-00	South Ditch	NP-1	1150-SD-SWC7	Sample	GEI Imported Data				67															
C-RAM	GEI	03-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C4	Sample	GEI Imported Data										1									
C-RAM	GEI	03-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C4	Sample	GEI Imported Data											1								
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data											1								
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data				65															
C-RAM	GEI	04-Nov-00	South Ditch	NP-1	1150-SD-SWC8	Sample	GEI Imported Data				67															
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data				65															
C-RAM	GEI	06-Nov-00	South Ditch	NP-1	1150-SD-SWC9	Sample	GEI Imported Data				67															
C-RAM	GEI	07-Nov-00	South Ditch	NP-1	1150-SD-SWC10	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	07-Nov-00	South Ditch	NP-1	1150-SD-SWC10	Sample	GEI Imported Data											1								
C-RAM	GEI	07-Nov-00	South Ditch	NP-1	1150-SD-SWC10	Sample	GEI Imported Data				65															
C-RAM	GEI	08-Nov-00	South Ditch	NP-1	1150-SD-SWC11	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	08-Nov-00	South Ditch	NP-1	1150-SD-SWC11	Sample	GEI Imported Data											1								
C-RAM	GEI	08-Nov-00	South Ditch	NP-1	1150-SD-SWC11	Sample	GEI Imported Data				65															
C-RAM	GEI	08-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C5	Sample	GEI Imported Data	6					17				6									
C-RAM	GEI	08-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C5	Sample	GEI Imported Data											1								
C-RAM	GEI	08-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C5	Sample	GEI Imported Data																5			
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data											1								
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data				65															
C-RAM	GEI	09-Nov-00	South Ditch	NP-1	1150-SD-SWC12	Sample	GEI Imported Data				67															
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data											1								
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data				65															
C-RAM	GEI	10-Nov-00	South Ditch	NP-1	1150-SD-SWC13	Sample	GEI Imported Data				67															
C-RAM	GEI	12-Nov-00	South Ditch	NP-1	1150-SD-SWC14	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	12-Nov-00	South Ditch	NP-1	1150-SD-SWC14	Sample	GEI Imported Data											1								
C-RAM	GEI	13-Nov-00	Containment Wall	Containment Wall	1150-CW-SW1	Sample	GEI Imported Data	6					17				6									
C-RAM	GEI	13-Nov-00	Containment Wall	Containment Wall	1150-CW-SW1	Sample	GEI Imported Data											1								
C-RAM	GEI	13-Nov-00	Containment Wall	Containment Wall	1150-CW-SW1	Sample	GEI Imported Data																5			
C-RAM	GEI	13-Nov-00	South Ditch	NP-1	1150-SD-SWC15	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	13-Nov-00	South Ditch	NP-1	1150-SD-SWC15	Sample	GEI Imported Data											1								
C-RAM	GEI	13-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C6	Sample	GEI Imported Data	6					17				6									
C-RAM	GEI	13-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C6	Sample	GEI Imported Data											1								
C-RAM	GEI	13-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C6	Sample	GEI Imported Data																5			
C-RAM	GEI	14-Nov-00	South Ditch	NP-1	1150-SD-SWC16	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	14-Nov-00	South Ditch	NP-1	1150-SD-SWC16	Sample	GEI Imported Data											1								
C-RAM	GEI	15-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC17	Sample	GEI Imported Data													1						
C-RAM	GEI	15-Nov-00	South Ditch	NP-1	1150-SD-SWC17	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	15-Nov-00	South Ditch	NP-1	1150-SD-SWC17	Sample	GEI Imported Data											1								
C-RAM	GEI	16-Nov-00	Buried Debris Area	Buried Debris Area	1150-BD-SWC18	Sample	GEI Imported Data						17				1									
C-RAM	GEI	16-Nov-00	Buried Debris Area	Buried Debris Area	1150-BD-SWC18	Sample	GEI Imported Data											1								
C-RAM	GEI	16-Nov-00	Central Pond	Central Pond	1150-CP-SWC18	Sample	GEI Imported Data										1									
C-RAM	GEI	16-Nov-00	Central Pond	Central Pond	1150-CP-SWC18	Sample	GEI Imported Data											1								
C-RAM	GEI	16-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC18	Sample	GEI Imported Data													1						
C-RAM	GEI	16-Nov-00	South Ditch	NP-1	1150-SD-SWC18	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	16-Nov-00	South Ditch	NP-1	1150-SD-SWC18	Sample	GEI Imported Data											1								
C-RAM	GEI	17-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC19	Sample	GEI Imported Data													1						
C-RAM	GEI	17-Nov-00	South Ditch	NP-1	1150-SD-SWC19	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	17-Nov-00	South Ditch	NP-1	1150-SD-SWC19	Sample	GEI Imported Data											1								
C-RAM	GEI	18-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC20	Sample	GEI Imported Data													1						
C-RAM	GEI	18-Nov-00	South Ditch	NP-1	1150-SD-SWC20	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	18-Nov-00	South Ditch	NP-1	1150-SD-SWC20	Sample	GEI Imported Data											1								
C-RAM	GEI	19-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW1	Sample	GEI Imported Data	6					17				6									
C-RAM	GEI	19-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW1	Sample	GEI Imported Data																5			

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Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	19-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW1	Sample	GEI Imported Data											1								
C-RAM	GEI	19-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC21	Sample	GEI Imported Data												1							
C-RAM	GEI	19-Nov-00	South Ditch	NP-1	1150-SD-SWC21	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	19-Nov-00	South Ditch	NP-1	1150-SD-SWC21	Sample	GEI Imported Data											1								
C-RAM	GEI	20-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC22	Sample	GEI Imported Data												1							
C-RAM	GEI	20-Nov-00	South Ditch	NP-1	1150-SD-SWC22	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	20-Nov-00	South Ditch	NP-1	1150-SD-SWC22	Sample	GEI Imported Data											1								
C-RAM	GEI	20-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C7	Sample	GEI Imported Data	6					17				6									
C-RAM	GEI	20-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C7	Sample	GEI Imported Data																5			
C-RAM	GEI	20-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C7	Sample	GEI Imported Data											1								
C-RAM	GEI	21-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC23	Sample	GEI Imported Data												1							
C-RAM	GEI	21-Nov-00	South Ditch	NP-1	1150-SD-SWC23	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	21-Nov-00	South Ditch	NP-1	1150-SD-SWC23	Sample	GEI Imported Data											1								
C-RAM	GEI	22-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC24	Sample	GEI Imported Data												1							
C-RAM	GEI	22-Nov-00	South Ditch	NP-1	1150-SD-SWC24	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	22-Nov-00	South Ditch	NP-1	1150-SD-SWC24	Sample	GEI Imported Data											1								
C-RAM	GEI	27-Nov-00	Containment Wall	Containment Wall	1150-CW-SW2	Sample	GEI Imported Data										1									
C-RAM	GEI	27-Nov-00	Containment Wall	Containment Wall	1150-CW-SW2	Sample	GEI Imported Data											1								
C-RAM	GEI	27-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC25	Sample	GEI Imported Data												1							
C-RAM	GEI	27-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC26	Sample	GEI Imported Data												1							
C-RAM	GEI	27-Nov-00	South Ditch	NP-1	1150-SD-SWC25	Sample	GEI Imported Data				67		17				1		1							
C-RAM	GEI	27-Nov-00	South Ditch	NP-1	1150-SD-SWC25	Sample	GEI Imported Data											1								
C-RAM	GEI	27-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C8	Sample	GEI Imported Data	6					17				6									
C-RAM	GEI	27-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C8	Sample	GEI Imported Data																5			
C-RAM	GEI	27-Nov-00	C-RAM NPDES	NPDES-OUT	1150-OUT-C8	Sample	GEI Imported Data											1								
C-RAM	GEI	28-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW2	Sample	GEI Imported Data	6					17				6									
C-RAM	GEI	28-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW2	Sample	GEI Imported Data																5			
C-RAM	GEI	28-Nov-00	Detention Pond Outlet	Detention Pond Outlet	1150-DPO-SW2	Sample	GEI Imported Data											1								
C-RAM	GEI	28-Nov-00	South Ditch	NP-1	1150-SD-SWC26	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	28-Nov-00	South Ditch	NP-1	1150-SD-SWC26	Sample	GEI Imported Data											1								
C-RAM	GEI	29-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC27	Sample	GEI Imported Data												1							
C-RAM	GEI	29-Nov-00	South Ditch	NP-1	1150-SD-SWC27	Sample	GEI Imported Data						17				1		1							
C-RAM	GEI	29-Nov-00	South Ditch	NP-1	1150-SD-SWC27	Sample	GEI Imported Data											1								
C-RAM	GEI	30-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC28	Sample	GEI Imported Data										3		1							
C-RAM	GEI	30-Nov-00	South Ditch	ISCO1	1150-OPWD-SWC28	Sample	GEI Imported Data											3								
C-RAM	GEI	30-Nov-00	South Ditch	NP-1	1150-SD-SWC28	Sample	GEI Imported Data						17				3		1							
C-RAM	GEI	30-Nov-00	South Ditch	NP-1	1150-SD-SWC28	Sample	GEI Imported Data											3								
C-RAM	GEI	01-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC29	Sample	GEI Imported Data												1							
C-RAM	GEI	01-Dec-00	South Ditch	NP-1	1150-SD-SWC29	Sample	GEI Imported Data				65		17				1		1							
C-RAM	GEI	01-Dec-00	South Ditch	NP-1	1150-SD-SWC29	Sample	GEI Imported Data											1								
C-RAM	GEI	03-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC30	Sample	GEI Imported Data												1							
C-RAM	GEI	03-Dec-00	South Ditch	NP-1	1150-SD-SWC30	Sample	GEI Imported Data				65						1		1							
C-RAM	GEI	03-Dec-00	South Ditch	NP-1	1150-SD-SWC30	Sample	GEI Imported Data											1								
C-RAM	GEI	04-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC31	Sample	GEI Imported Data												1							
C-RAM	GEI	04-Dec-00	South Ditch	NP-1	1150-SD-SWC31	Sample	GEI Imported Data				65						1		1							
C-RAM	GEI	04-Dec-00	South Ditch	NP-1	1150-SD-SWC31	Sample	GEI Imported Data											1								
C-RAM	GEI	05-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC32	Sample	GEI Imported Data												1							
C-RAM	GEI	05-Dec-00	South Ditch	NP-1	1150-SD-SWC32	Sample	GEI Imported Data				65						1		1							
C-RAM	GEI	05-Dec-00	South Ditch	NP-1	1150-SD-SWC32	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC33	Sample	GEI Imported Data												1							
C-RAM	GEI	06-Dec-00	South Ditch	NP-1	1150-SD-SWC33	Sample	GEI Imported Data				65						1		1							
C-RAM	GEI	06-Dec-00	South Ditch	NP-1	1150-SD-SWC33	Sample	GEI Imported Data											1								
C-RAM	GEI	06-Dec-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWC33	Sample	GEI Imported Data				65						1		1							
C-RAM	GEI	06-Dec-00	On-Property West Ditch Wetland	On-Property West Ditch Wetland	1150-WDW-SWC33	Sample	GEI Imported Data											1								
C-RAM	GEI	07-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC34	Sample	GEI Imported Data												1							
C-RAM	GEI	07-Dec-00	South Ditch	NP-1	1150-SD-SWC34	Sample	GEI Imported Data				65						1		1							
C-RAM	GEI	07-Dec-00	South Ditch	NP-1	1150-SD-SWC34	Sample	GEI Imported Data											1								
C-RAM	GEI	08-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC35	Sample	GEI Imported Data												1							
C-RAM	GEI	08-Dec-00	South Ditch	NP-1	1150-SD-SWC35	Sample	GEI Imported Data				65						1		1							
C-RAM	GEI	08-Dec-00	South Ditch	NP-1	1150-SD-SWC35	Sample	GEI Imported Data											1								
C-RAM	GEI	09-Dec-00	South Ditch	NP-1	1150-SD-SWC36	Sample	GEI Imported Data				65						1		1							

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C-RAM	GEI	09-Dec-00	South Ditch	NP-1	1150-SD-SWC36	Sample	GEI Imported Data											1								
C-RAM	GEI	11-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC37	Sample	GEI Imported Data												1							
Maple Meadow Brook	HARDING ESE	11-Dec-00	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 MS/MSD	Sample												7	9							
C-RAM	GEI	11-Dec-00	South Ditch	NP-1	1150-SD-SWC37	Sample	GEI Imported Data			65							1		1							
C-RAM	GEI	11-Dec-00	South Ditch	NP-1	1150-SD-SWC37	Sample	GEI Imported Data											1								
C-RAM	GEI	12-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC38	Sample	GEI Imported Data												1							
C-RAM	GEI	12-Dec-00	South Ditch	NP-1	1150-SD-SWC38	Sample	GEI Imported Data			65							1		1							
C-RAM	GEI	12-Dec-00	South Ditch	NP-1	1150-SD-SWC38	Sample	GEI Imported Data											1								
C-RAM	GEI	13-Dec-00	South Ditch	ISCO1	1150-OPWD-SWC39	Sample	GEI Imported Data												1							
C-RAM	GEI	13-Dec-00	South Ditch	NP-1	1150-SD-SWC39	Sample	GEI Imported Data			65							1		1							
C-RAM	GEI	13-Dec-00	South Ditch	NP-1	1150-SD-SWC39	Sample	GEI Imported Data											1								
C-RAM	GEI	16-Dec-00	C-RAM NPDES	NPDES-OUT	1150-OUT-D1	Sample	GEI Imported Data	6					18				6									
C-RAM	GEI	16-Dec-00	C-RAM NPDES	NPDES-OUT	1150-OUT-D1	Sample	GEI Imported Data											1								
C-RAM	GEI	16-Dec-00	C-RAM NPDES	NPDES-OUT	1150-OUT-D1	Sample	GEI Imported Data															5				
C-RAM	GEI	21-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD1	Sample	GEI Imported Data										1		1							
C-RAM	GEI	21-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD1	Sample	GEI Imported Data											1								
C-RAM	GEI	21-Dec-00	South Ditch	NP-1	1150-SD-SWD1	Sample	GEI Imported Data										1		1							
C-RAM	GEI	21-Dec-00	South Ditch	NP-1	1150-SD-SWD1	Sample	GEI Imported Data											1								
C-RAM	GEI	29-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD2	Sample	GEI Imported Data										1		1							
C-RAM	GEI	29-Dec-00	South Ditch	ISCO1	1150-OPWD-SWD2	Sample	GEI Imported Data											1								
C-RAM	GEI	29-Dec-00	South Ditch	NP-1	1150-SD-SWD2	Sample	GEI Imported Data										1		1							
C-RAM	GEI	29-Dec-00	South Ditch	NP-1	1150-SD-SWD2	Sample	GEI Imported Data											1								
C-RAM	GEI	04-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD3	Sample	GEI Imported Data										1		1							
C-RAM	GEI	04-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD3	Sample	GEI Imported Data											1								
C-RAM	GEI	04-Jan-01	South Ditch	NP-1	1150-SD-SWD3	Sample	GEI Imported Data										1		1							
C-RAM	GEI	04-Jan-01	South Ditch	NP-1	1150-SD-SWD3	Sample	GEI Imported Data											1								
C-RAM	GEI	11-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD4	Sample	GEI Imported Data										1									
C-RAM	GEI	11-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD4	Sample	GEI Imported Data												1							
C-RAM	GEI	11-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD4	Sample	GEI Imported Data											1								
C-RAM	GEI	11-Jan-01	South Ditch	NP-1	1150-SD-SWD4	Sample	GEI Imported Data										1		1							
C-RAM	GEI	11-Jan-01	South Ditch	NP-1	1150-SD-SWD4	Sample	GEI Imported Data											1								
C-RAM	GEI	18-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD5	Sample	GEI Imported Data										1		1							
C-RAM	GEI	18-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD5	Sample	GEI Imported Data											1								
C-RAM	GEI	18-Jan-01	South Ditch	NP-1	1150-SD-SWD5	Sample	GEI Imported Data										1		1							
C-RAM	GEI	18-Jan-01	South Ditch	NP-1	1150-SD-SWD5	Sample	GEI Imported Data											1								
C-RAM	GEI	25-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD6	Sample	GEI Imported Data										1		1							
C-RAM	GEI	25-Jan-01	South Ditch	ISCO1	1150-OPWD-SWD6	Sample	GEI Imported Data											1								
C-RAM	GEI	25-Jan-01	South Ditch	NP-1	1150-SD-SWD6	Sample	GEI Imported Data										1		1							
C-RAM	GEI	25-Jan-01	South Ditch	NP-1	1150-SD-SWD6	Sample	GEI Imported Data											1								
C-RAM	GEI	02-Feb-01	South Ditch	ISCO1	1150-OPWD-SWD7	Sample	GEI Imported Data										1		1							
C-RAM	GEI	02-Feb-01	South Ditch	ISCO1	1150-OPWD-SWD7	Sample	GEI Imported Data											1								
C-RAM	GEI	02-Feb-01	South Ditch	NP-1	1150-SD-SWD7	Sample	GEI Imported Data										1		1							
C-RAM	GEI	02-Feb-01	South Ditch	NP-1	1150-SD-SWD7	Sample	GEI Imported Data											1								
PCMP	GEI	09-Feb-01	South Ditch	ISCO1	1170-ISCO1-1	Sample	GEI Imported Data										1		1							
PCMP	GEI	09-Feb-01	South Ditch	ISCO1	1170-ISCO1-1	Sample	GEI Imported Data											1								
PCMP	GEI	09-Feb-01	South Ditch	ISCO2	1170-ISCO2-1	Sample	GEI Imported Data										1		1							
PCMP	GEI	09-Feb-01	South Ditch	ISCO2	1170-ISCO2-1	Sample	GEI Imported Data											1								
PCMP	GEI	09-Feb-01	East Ditch	ISCO3	1170-ISCO3-1	Sample	GEI Imported Data										1		1							
PCMP	GEI	09-Feb-01	East Ditch	ISCO3	1170-ISCO3-1	Sample	GEI Imported Data											1								
PCMP	GEI	09-Feb-01	South Ditch	NP-1	1170-NP1-1	Sample	GEI Imported Data										1		1							
PCMP	GEI	09-Feb-01	South Ditch	NP-1	1170-NP1-1	Sample	GEI Imported Data											1								
PCMP	GEI	15-Feb-01	South Ditch	ISCO1	1170-ISCO1-2	Sample	GEI Imported Data										1		1							
PCMP	GEI	15-Feb-01	South Ditch	ISCO1	1170-ISCO1-2	Sample	GEI Imported Data											1								
PCMP	GEI	15-Feb-01	South Ditch	ISCO2	1170-ISCO2-2	Sample	GEI Imported Data										1		1							
PCMP	GEI	15-Feb-01	South Ditch	ISCO2	1170-ISCO2-2	Sample	GEI Imported Data											1								
PCMP	GEI	15-Feb-01	South Ditch	NP-1	1170-NP1-2	Sample	GEI Imported Data										1		1							
PCMP	GEI	15-Feb-01	South Ditch	NP-1	1170-NP1-2	Sample	GEI Imported Data											1								
PCMP	GEI	23-Feb-01	South Ditch	ISCO1	1170-ISCO1-3	Sample	GEI Imported Data										1		2							
PCMP	GEI	23-Feb-01	South Ditch	ISCO1	1170-ISCO1-3	Sample	GEI Imported Data											1								
PCMP	GEI	23-Feb-01	South Ditch	ISCO2	1170-ISCO2-3	Sample	GEI Imported Data										1		2							
PCMP	GEI	23-Feb-01	South Ditch	ISCO2	1170-ISCO2-3	Sample	GEI Imported Data											1								
PCMP	GEI	23-Feb-01	South Ditch	NP-1	1170-NP1-3	Sample	GEI Imported Data										1		2							
PCMP	GEI	23-Feb-01	South Ditch	NP-1	1170-NP1-3	Sample	GEI Imported Data											1								

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	01-Mar-01	South Ditch	ISCO1	1170-ISCO1-4	Sample	GEI Imported Data											1		2						
PCMP	GEI	01-Mar-01	South Ditch	ISCO1	1170-ISCO1-4	Sample	GEI Imported Data												1							
PCMP	GEI	01-Mar-01	South Ditch	ISCO2	1170-ISCO2-4	Sample	GEI Imported Data											1		2						
PCMP	GEI	01-Mar-01	South Ditch	ISCO2	1170-ISCO2-4	Sample	GEI Imported Data												1							
PCMP	GEI	09-Mar-01	South Ditch	ISCO1	1170-ISCO1-5	Sample	GEI Imported Data											1		2						
PCMP	GEI	09-Mar-01	South Ditch	ISCO1	1170-ISCO1-5	Sample	GEI Imported Data												1							
PCMP	GEI	09-Mar-01	South Ditch	ISCO2	1170-ISCO2-5	Sample	GEI Imported Data											1		2						
PCMP	GEI	09-Mar-01	South Ditch	ISCO2	1170-ISCO2-5	Sample	GEI Imported Data												1							
PCMP	GEI	09-Mar-01	East Ditch	ISCO3	1170-ISCO3-5	Sample	GEI Imported Data											1		2						
PCMP	GEI	09-Mar-01	East Ditch	ISCO3	1170-ISCO3-5	Sample	GEI Imported Data												1							
PCMP	GEI	16-Mar-01	South Ditch	ISCO1	1170-ISCO1-6	Sample	GEI Imported Data											1		4						
PCMP	GEI	16-Mar-01	South Ditch	ISCO1	1170-ISCO1-6	Sample	GEI Imported Data												2							
PCMP	GEI	16-Mar-01	South Ditch	ISCO2	1170-ISCO2-6	Sample	GEI Imported Data											1		4						
PCMP	GEI	16-Mar-01	South Ditch	ISCO2	1170-ISCO2-6	Sample	GEI Imported Data												2							
PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-7	Sample	GEI Imported Data											1		4						
PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-8	Sample	GEI Imported Data											1		4						
PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-7	Sample	GEI Imported Data												2							
PCMP	GEI	23-Mar-01	South Ditch	ISCO1	1170 ISCO1-8	Sample	GEI Imported Data												2							
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-7	Sample	GEI Imported Data											1		4						
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-8	Sample	GEI Imported Data											1		4						
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-7	Sample	GEI Imported Data												2							
PCMP	GEI	23-Mar-01	South Ditch	ISCO2	1170 ISCO2-8	Sample	GEI Imported Data												2							
PCMP	GEI	02-Apr-01	South Ditch	ISCO1	1170-ISCO1-9	Sample	GEI Imported Data											1		4						
PCMP	GEI	02-Apr-01	South Ditch	ISCO1	1170-ISCO1-9	Sample	GEI Imported Data												2							
PCMP	GEI	02-Apr-01	South Ditch	ISCO2	1170-ISCO2-9	Sample	GEI Imported Data											1		4						
PCMP	GEI	02-Apr-01	South Ditch	ISCO2	1170-ISCO2-9	Sample	GEI Imported Data												2							
PCMP	GEI	02-Apr-01	East Ditch	ISCO3	1170-ISCO3-9	Sample	GEI Imported Data											1		4						
PCMP	GEI	02-Apr-01	East Ditch	ISCO3	1170-ISCO3-9	Sample	GEI Imported Data												2							
PCMP	GEI	09-Apr-01	South Ditch	ISCO1	1170-ISCO1-10	Sample	GEI Imported Data											1		4						
PCMP	GEI	09-Apr-01	South Ditch	ISCO1	1170-ISCO1-10	Sample	GEI Imported Data												2							
PCMP	GEI	09-Apr-01	South Ditch	ISCO2	1170-ISCO2-10	Sample	GEI Imported Data											1		4						
PCMP	GEI	09-Apr-01	South Ditch	ISCO2	1170-ISCO2-10	Sample	GEI Imported Data												2							
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data	6																		
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data				17															
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data																1			
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data											6								
C-RAM	GEI	10-Apr-01	Central Pond	Central Pond	1150-CP-E1	Sample	GEI Imported Data												1							
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data	6																		
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data																1			
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data						17													
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data											5	1							
C-RAM	GEI	10-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-E1	Sample	GEI Imported Data											1								
PCMP	GEI	16-Apr-01	South Ditch	ISCO1	1170-ISCO1-11	Sample	GEI Imported Data											1		4						
PCMP	GEI	16-Apr-01	South Ditch	ISCO1	1170-ISCO1-11	Sample	GEI Imported Data												2							
PCMP	GEI	16-Apr-01	South Ditch	ISCO2	1170-ISCO2-11	Sample	GEI Imported Data											1		4						
PCMP	GEI	16-Apr-01	South Ditch	ISCO2	1170-ISCO2-11	Sample	GEI Imported Data												2							
PCMP	GEI	23-Apr-01	South Ditch	ISCO1	1170-ISCO1-12	Sample	GEI Imported Data											1		4						
PCMP	GEI	23-Apr-01	South Ditch	ISCO1	1170-ISCO1-12	Sample	GEI Imported Data												2							
PCMP	GEI	23-Apr-01	South Ditch	ISCO2	1170-ISCO2-12	Sample	GEI Imported Data											1		4						
PCMP	GEI	23-Apr-01	South Ditch	ISCO2	1170-ISCO2-12	Sample	GEI Imported Data												2							
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data	6																		
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data						17													
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data																1			
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data											6								
C-RAM	GEI	25-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-F1	Sample	GEI Imported Data												1							
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data	6																		
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data						17													
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data																1			
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data											6								
C-RAM	GEI	26-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-H1	Sample	GEI Imported Data												1							
PCMP	GEI	30-Apr-01	South Ditch	ISCO1	1170-ISCO1-13	Sample	GEI Imported Data											1		4						
PCMP	GEI	30-Apr-01	South Ditch	ISCO1	1170-ISCO1-13	Sample	GEI Imported Data												2							
PCMP	GEI	30-Apr-01	South Ditch	ISCO2	1170-ISCO2-13	Sample	GEI Imported Data											1		4						

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	30-Apr-01	South Ditch	ISCO2	1170-ISCO2-13	Sample	GEI Imported Data											2								
PCMP	GEI	30-Apr-01	East Ditch	ISCO3	1170-ISCO3-13	Sample	GEI Imported Data											1		4						
PCMP	GEI	30-Apr-01	East Ditch	ISCO3	1170-ISCO3-13	Sample	GEI Imported Data											2								
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data	6																		
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data						17													
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data																1			
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data											6								
C-RAM	GEI	30-Apr-01	C-RAM NPDES	NPDES-OUT	1150-OUT-I1	Sample	GEI Imported Data												1							
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data	6																		
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data						17													
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data																1			
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data											6								
C-RAM	GEI	03-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-J1	Sample	GEI Imported Data												1							
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data	6																		
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data						17													
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data																1			
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data											6								
C-RAM	GEI	04-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-K1	Sample	GEI Imported Data												1							
PCMP	GEI	07-May-01	South Ditch	ISCO1	1170-ISCO1-14	Sample	GEI Imported Data											1		4						
PCMP	GEI	07-May-01	South Ditch	ISCO1	1170-ISCO1-14	Sample	GEI Imported Data												2							
PCMP	GEI	07-May-01	South Ditch	ISCO2	1170-ISCO2-14	Sample	GEI Imported Data											1		4						
PCMP	GEI	07-May-01	South Ditch	ISCO2	1170-ISCO2-14	Sample	GEI Imported Data												2							
C-RAM	GEI	08-May-01	Buried Debris Area	Buried Debris Area	1150-BD-PH1	Sample	GEI Imported Data												4							
C-RAM	GEI	08-May-01	Buried Debris Area	Buried Debris Area	1150-BD-PH2	Sample	GEI Imported Data												4							
PCMP	GEI	14-May-01	South Ditch	ISCO1	1170-ISCO1-15	Sample	GEI Imported Data											1		4						
PCMP	GEI	14-May-01	South Ditch	ISCO1	1170-ISCO1-15	Sample	GEI Imported Data												2							
PCMP	GEI	14-May-01	South Ditch	ISCO2	1170-ISCO2-15	Sample	GEI Imported Data				67							1		4						
PCMP	GEI	14-May-01	South Ditch	ISCO2	1170-ISCO2-15	Sample	GEI Imported Data												2							
PCMP	GEI	15-May-01	South Ditch	ISCO2	1170-ISCO2-16	Sample	GEI Imported Data				67							1								
PCMP	GEI	15-May-01	South Ditch	ISCO2	1170-ISCO2-16	Sample	GEI Imported Data												1							
PCMP	GEI	16-May-01	South Ditch	ISCO2	1170-ISCO2-17	Sample	GEI Imported Data				67							1								
PCMP	GEI	16-May-01	South Ditch	ISCO2	1170-ISCO2-17	Sample	GEI Imported Data												1							
PCMP	GEI	17-May-01	South Ditch	ISCO2	1170-ISCO2-18	Sample	GEI Imported Data				67							1								
PCMP	GEI	17-May-01	South Ditch	ISCO2	1170-ISCO2-18	Sample	GEI Imported Data												1							
PCMP	GEI	18-May-01	South Ditch	ISCO2	1170-ISCO2-19	Sample	GEI Imported Data				67							1								
PCMP	GEI	18-May-01	South Ditch	ISCO2	1170-ISCO2-19	Sample	GEI Imported Data												1							
PCMP	GEI	21-May-01	South Ditch	ISCO1	1170-ISCO1-20	Sample	GEI Imported Data											1		4						
PCMP	GEI	21-May-01	South Ditch	ISCO1	1170-ISCO1-20	Sample	GEI Imported Data												1							
PCMP	GEI	21-May-01	South Ditch	ISCO2	1170-ISCO2-20	Sample	GEI Imported Data											1		4						
PCMP	GEI	21-May-01	South Ditch	ISCO2	1170-ISCO2-20	Sample	GEI Imported Data												1							
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data	6																		
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data						17													
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data																1			
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data											6								
C-RAM	GEI	21-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L1	Sample	GEI Imported Data												1							
PCMP	GEI	23-May-01	South Ditch	ISCO2	1170-ISCO2-21	Sample	GEI Imported Data				65							1								
PCMP	GEI	23-May-01	South Ditch	ISCO2	1170-ISCO2-21	Sample	GEI Imported Data												1							
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data	6																		
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data						17													
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data																1			
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data											6								
C-RAM	GEI	23-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L2	Sample	GEI Imported Data												1							
PCMP	GEI	24-May-01	South Ditch	ISCO2	1170-ISCO2-22	Sample	GEI Imported Data												1							
PCMP	GEI	24-May-01	South Ditch	ISCO2	1170-ISCO2-22	Sample	GEI Imported Data				65							1								
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data						17													
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data																1			
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data											6								
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data												1							
C-RAM	GEI	25-May-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L3	Sample	GEI Imported Data	6																		
PCMP	GEI	29-May-01	South Ditch	ISCO2	1170-ISCO2-23	Sample	GEI Imported Data											1								
PCMP	GEI	29-May-01	South Ditch	ISCO2	1170-ISCO2-23	Sample	GEI Imported Data												1							
PCMP	GEI	30-May-01	South Ditch	ISCO2	1170-ISCO2-24	Sample	GEI Imported Data											1								
PCMP	GEI	30-May-01	South Ditch	ISCO2	1170-ISCO2-24	Sample	GEI Imported Data												1							

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Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data	6																		
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data						17													
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data															1				
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data										6									
C-RAM	GEI	01-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L4	Sample	GEI Imported Data											1								
PCMP	GEI	04-Jun-01	South Ditch	ISCO1	1170-ISCO1-25	Sample	GEI Imported Data										1		4							
PCMP	GEI	04-Jun-01	South Ditch	ISCO1	1170-ISCO1-25	Sample	GEI Imported Data											2								
PCMP	GEI	04-Jun-01	South Ditch	ISCO2	1170-ISCO2-25	Sample	GEI Imported Data										1		4							
PCMP	GEI	04-Jun-01	South Ditch	ISCO2	1170-ISCO2-25	Sample	GEI Imported Data											2								
PCMP	GEI	04-Jun-01	East Ditch	ISCO3	1170-ISCO3-25	Sample	GEI Imported Data										1		4							
PCMP	GEI	04-Jun-01	East Ditch	ISCO3	1170-ISCO3-25	Sample	GEI Imported Data											2								
PCMP	GEI	05-Jun-01	South Ditch	ISCO1	1170-SD26-1	Sample	GEI Imported Data										1									
PCMP	GEI	05-Jun-01	South Ditch	ISCO1	1170-SD26-1	Sample	GEI Imported Data											1								
PCMP	GEI	05-Jun-01	South Ditch	ISCO1	1170-SD26-1	Sample	GEI Imported Data												1							
PCMP	GEI	05-Jun-01	South Ditch	ISCO2	1170-SD26-4	Sample	GEI Imported Data										1									
PCMP	GEI	05-Jun-01	South Ditch	ISCO2	1170-SD26-4	Sample	GEI Imported Data											1								
PCMP	GEI	05-Jun-01	South Ditch	ISCO2	1170-SD26-4	Sample	GEI Imported Data												1							
PCMP	GEI	05-Jun-01	South Ditch	SD26-2	1170-SD26-2	Sample	GEI Imported Data										1									
PCMP	GEI	05-Jun-01	South Ditch	SD26-2	1170-SD26-2	Sample	GEI Imported Data											1								
PCMP	GEI	05-Jun-01	South Ditch	SD26-2	1170-SD26-2	Sample	GEI Imported Data												1							
PCMP	GEI	05-Jun-01	South Ditch	SW11C	1170-SD26-3	Sample	GEI Imported Data										1									
PCMP	GEI	05-Jun-01	South Ditch	SW11C	1170-SD26-3	Sample	GEI Imported Data											1								
PCMP	GEI	05-Jun-01	South Ditch	SW11C	1170-SD26-3	Sample	GEI Imported Data												1							
PCMP	GEI	06-Jun-01	South Ditch	ISCO2	1170-ISCO2-27	Sample	GEI Imported Data										1									
PCMP	GEI	06-Jun-01	South Ditch	ISCO2	1170-ISCO2-27	Sample	GEI Imported Data											1								
PCMP	GEI	07-Jun-01	South Ditch	ISCO2	1170-ISCO2-28	Sample	GEI Imported Data										1									
PCMP	GEI	07-Jun-01	South Ditch	ISCO2	1170-ISCO2-28	Sample	GEI Imported Data											1								
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data	6																		
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data						17													
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data															1				
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data										6									
C-RAM	GEI	07-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L5	Sample	GEI Imported Data											1								
PCMP	GEI	09-Jun-01	South Ditch	NP-1	1170-SD-29	Sample	GEI Imported Data										1									
PCMP	GEI	09-Jun-01	South Ditch	NP-1	1170-SD-29	Sample	GEI Imported Data											1								
PCMP	GEI	11-Jun-01	South Ditch	ISCO2	1170-ISCO2-30	Sample	GEI Imported Data										1		4							
PCMP	GEI	11-Jun-01	South Ditch	ISCO2	1170-ISCO2-30	Sample	GEI Imported Data											2								
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data	6																		
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data															1				
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data										6	2								
C-RAM	GEI	14-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L6	Sample	GEI Imported Data											1								
PCMP	GEI	18-Jun-01	South Ditch	ISCO1	1170-ISCO1-31	Sample	GEI Imported Data										1		4							
PCMP	GEI	18-Jun-01	South Ditch	ISCO1	1170-ISCO1-31	Sample	GEI Imported Data											2								
PCMP	GEI	18-Jun-01	South Ditch	ISCO2	1170-ISCO2-31	Sample	GEI Imported Data										1		4							
PCMP	GEI	18-Jun-01	South Ditch	ISCO2	1170-ISCO2-31	Sample	GEI Imported Data											2								
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data	6																		
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data						17													
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data															1				
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data										6	2								
C-RAM	GEI	20-Jun-01	C-RAM NPDES	NPDES-OUT	1150-OUT-L7	Sample	GEI Imported Data											1								
PCMP	GEI	25-Jun-01	South Ditch	ISCO1	1170-ISCO1-32	Sample	GEI Imported Data										1		4							
PCMP	GEI	25-Jun-01	South Ditch	ISCO1	1170-ISCO1-32	Sample	GEI Imported Data											2								
PCMP	GEI	25-Jun-01	South Ditch	ISCO2	1170-ISCO2-32	Sample	GEI Imported Data										1		4							
PCMP	GEI	25-Jun-01	South Ditch	ISCO2	1170-ISCO2-32	Sample	GEI Imported Data											2								
PCMP	GEI	02-Jul-01	South Ditch	ISCO1	1170-ISCO1-33 MS/MSD	Sample	GEI Imported Data										1		4							
PCMP	GEI	02-Jul-01	South Ditch	ISCO1	1170-ISCO1-33 DISSOLVED MS/MSD	Sample	GEI Imported Data											2								
PCMP	GEI	02-Jul-01	South Ditch	ISCO2	1170-ISCO2-33	Sample	GEI Imported Data										1		4							
PCMP	GEI	02-Jul-01	South Ditch	ISCO2	1170-ISCO2-33 DISSOLVED	Sample	GEI Imported Data											2								
PCMP	GEI	02-Jul-01	East Ditch	ISCO3	1170-ISCO3-33	Sample	GEI Imported Data										1		4							
PCMP	GEI	02-Jul-01	East Ditch	ISCO3	1170-ISCO3-33 DISSOLVED	Sample	GEI Imported Data											2								
PCMP	GEI	09-Jul-01	South Ditch	ISCO1	1170-ISCO1-34	Sample	GEI Imported Data										1		4							
PCMP	GEI	09-Jul-01	South Ditch	ISCO1	1170-ISCO1-34	Sample	GEI Imported Data											2								
PCMP	GEI	09-Jul-01	South Ditch	ISCO2	1170-ISCO2-34	Sample	GEI Imported Data										1		4							

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	09-Jul-01	South Ditch	ISCO2	1170-ISCO2-34	Sample	GEI Imported Data												2								
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data						17														
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data																	1			
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data	6																			
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data											6	2								
C-RAM	GEI	09-Jul-01	C-RAM NPDES	NPDES-OUT	1150-OUT-M1	Sample	GEI Imported Data												1								
PCMP	GEI	16-Jul-01	South Ditch	ISCO2	1170-ISCO2-35	Sample	GEI Imported Data											1		4							
PCMP	GEI	16-Jul-01	South Ditch	ISCO2	1170-ISCO2-35	Sample	GEI Imported Data												1								
PCMP	GEI	23-Jul-01	South Ditch	ISCO1	1170-ISCO1-36 MS/MSD	Sample	GEI Imported Data											1		4							
PCMP	GEI	23-Jul-01	South Ditch	ISCO1	1170-ISCO1-36 DISOLVED MS/MSD	Sample	GEI Imported Data												2								
PCMP	GEI	30-Jul-01	South Ditch	ISCO1	1170-ISCO1-37 MS/MSD	Sample	GEI Imported Data											1		4							
PCMP	GEI	30-Jul-01	South Ditch	ISCO1	1170-ISCO1-37 MS/MSD DISSOLVED	Sample	GEI Imported Data												2								
PCMP	GEI	30-Jul-01	South Ditch	TD1	1170-TD1-37	Sample	GEI Imported Data											1									
PCMP	GEI	30-Jul-01	South Ditch	TD1	1170-TD1-37 DISSOLVED	Sample	GEI Imported Data												2								
PCMP	GEI	30-Jul-01	South Ditch	TD2	1170-TD2-37	Sample	GEI Imported Data											1									
PCMP	GEI	30-Jul-01	South Ditch	TD2	1170-TD2-37 DISSOLVED	Sample	GEI Imported Data												2								
PCMP	GEI	30-Jul-01	South Ditch	TD3	1170-TD3-37	Sample	GEI Imported Data											1									
PCMP	GEI	30-Jul-01	South Ditch	TD3	1170-TD3-37 DISSOLVED	Sample	GEI Imported Data												2								
PCMP	GEI	06-Aug-01	South Ditch	ISCO1	1170-ISCO1-38	Sample												1		4							
PCMP	GEI	06-Aug-01	South Ditch	ISCO1	1170-ISCO1-38 DISSOLVED	Sample													2								
PCMP	GEI	06-Aug-01	South Ditch	ISCO2	1170-ISCO2-38 MS/MSD	Sample												1		4							
PCMP	GEI	06-Aug-01	South Ditch	ISCO2	1170-ISCO2-38 DISSOLVED MS/MSD	Sample													2								
PCMP	GEI	06-Aug-01	East Ditch	ISCO3	1170-ISCO3-38	Sample												1		4							
PCMP	GEI	06-Aug-01	East Ditch	ISCO3	1170-ISCO3-38 DISSOLVED	Sample													2								
PCMP	GEI	13-Aug-01	South Ditch	ISCO1	1170-ISCO1-39	Sample												1		4							
PCMP	GEI	13-Aug-01	South Ditch	ISCO1	1170-ISCO1-39	Sample													2								
PCMP	GEI	13-Aug-01	South Ditch	ISCO2	1170-ISCO2-39	Sample												1		4							
PCMP	GEI	13-Aug-01	South Ditch	ISCO2	1170-ISCO2-39	Sample													2								
PCMP	GEI	20-Aug-01	South Ditch	ISCO1	1170-ISCO1-40	Sample												1		4							
PCMP	GEI	20-Aug-01	South Ditch	ISCO1	1170-ISCO1-40	Sample													2								
PCMP	GEI	20-Aug-01	South Ditch	ISCO2	1170-ISCO2-40	Sample												1		4							
PCMP	GEI	20-Aug-01	South Ditch	ISCO2	1170-ISCO2-40	Sample													2								
PCMP	GEI	27-Aug-01	South Ditch	ISCO1	1170-ISCO1-41	Sample												1		4							
PCMP	GEI	27-Aug-01	South Ditch	ISCO1	1170-ISCO1-41	Sample													2								
PCMP	GEI	27-Aug-01	South Ditch	ISCO2	1170-ISCO2-41	Sample												1		4							
PCMP	GEI	27-Aug-01	South Ditch	ISCO2	1170-ISCO2-41	Sample													2								
PCMP	GEI	04-Sep-01	South Ditch	ISCO1	1170-ISCO1-42	Sample												1		4							
PCMP	GEI	04-Sep-01	South Ditch	ISCO1	1170-ISCO1-42	Sample													2								
PCMP	GEI	04-Sep-01	East Ditch	ISCO3	1170-ISCO3-42	Sample												1		4							
PCMP	GEI	04-Sep-01	East Ditch	ISCO3	1170-ISCO3-42	Sample													2								
PCMP-RAM SW	GEI	04-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-N1 MS/MSD	Sample		6			17							6									
PCMP-RAM SW	GEI	04-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-N1 DISSOLVED MS/MSD	Sample													1								
PCMP-RAM SW	GEI	04-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-N1 DRO MS/MSD	Sample																		6			
PCMP-RAM SW	GEI	28-Sep-01	C-RAM NPDES	NPDES-IN	1150-IN-P1 MS/MSD	Sample					67															12	22
DISPOSAL	GEI	08-Oct-01		DRUM	1140-DR-L1 MS/MSD	Sample		65			65							23		3							
DISPOSAL	GEI	08-Oct-01		DRUM	1140-DR-G1	Sample		65			65							23		3							
PCMP	GEI	08-Oct-01	East Ditch	ISCO3	1170-ISCO3-43	Sample												1		4							
PCMP	GEI	08-Oct-01	East Ditch	ISCO3	1170-ISCO3-43 DISSOLVED	Sample													2								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 D	Sample												5		3							
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 MS/MSD	Sample												5		3							
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1D DISSOLVED	Sample													5								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 MS/MSD DISSOLVED	Sample													5								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample												5		3							
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2 DISSOLVED	Sample													5								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample												5		3							
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3 DISSOLVED	Sample													5								
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample												5		3							
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6 DISSOLVED	Sample													5								

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Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-7	MMB-SW7	Sample												5		3						
Maple Meadow Brook	HARDING ESE	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-7	MMB-SW7 DISSOLVED	Sample													5							
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4	Sample												5		3						
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4 DISSOLVED	Sample													5							
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5	Sample												5		3						
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5 DISSOLVED	Sample													5							
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample												5		3						
Maple Meadow Brook	HARDING ESE	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A DISSOLVED	Sample													5							
PCMP	GEI	12-Nov-01	South Ditch	ISCO1	1170-ISCO1-44	Sample												1		4						
PCMP	GEI	12-Nov-01	South Ditch	ISCO1	1170-ISCO1-44 DISSOLVED	Sample													2							
PCMP	GEI	12-Nov-01	South Ditch	ISCO2	1170-ISCO2-44	Sample												1		4						
PCMP	GEI	12-Nov-01	South Ditch	ISCO2	1170-ISCO2-44 DISSOLVED	Sample													2							
PCMP	GEI	12-Nov-01	East Ditch	ISCO3	1170-ISCO3-44	Sample												1		4						
PCMP	GEI	12-Nov-01	East Ditch	ISCO3	1170-ISCO3-44 DISSOLVED	Sample													2							
PCMP	GEI	12-Nov-01	South Ditch	PZ-16RSW	1170-PZ16-44	Sample												1		4						
PCMP	GEI	12-Nov-01	South Ditch	PZ-16RSW	1170-PZ16-44 DISSOLVED	Sample													2							
PCMP	GEI	12-Nov-01	South Ditch	SD-17	1170-PZ17-44 MS/MSD	Sample												1		4						
PCMP	GEI	12-Nov-01	South Ditch	SD-17	1170-PZ17-44 DISSOLVED MS/MSD	Sample													2							
PCMP	GEI	03-Dec-01	South Ditch	ISCO1	1170-ISCO1-45 MS/MSD	Sample												1		4						
PCMP	GEI	03-Dec-01	South Ditch	ISCO1	1170-ISCO1-45 DISSOLVED MS/MSD	Sample													2							
PCMP	GEI	03-Dec-01	South Ditch	ISCO2	1170-ISCO2-45	Sample												1		4						
PCMP	GEI	03-Dec-01	South Ditch	ISCO2	1170-ISCO2-45 DISSOLVED	Sample													2							
PCMP	GEI	10-Dec-01	South Ditch	ISCO1	1170-ISCO1-46 MS/MSD	Sample												1		4						
PCMP	GEI	10-Dec-01	South Ditch	ISCO1	1170-ISCO1-46 DISSOLVED MS/MSD	Sample													2							
PCMP	GEI	10-Dec-01	South Ditch	ISCO2	1170-ISCO2-46	Sample												1		4						
PCMP	GEI	10-Dec-01	South Ditch	ISCO2	1170-ISCO2-46 DISSOLVED	Sample													2							
PCMP	GEI	10-Dec-01	East Ditch	ISCO3	1170-ISCO3-46	Sample												1		4						
PCMP	GEI	10-Dec-01	East Ditch	ISCO3	1170-ISCO3-46 DISSOLVED	Sample													2							
PCMP	GEI	10-Dec-01	South Ditch	PZ-16RSW	1170-PZ16-46	Sample												1		4						
PCMP	GEI	10-Dec-01	South Ditch	PZ-16RSW	1170-PZ16-46 DISSOLVED	Sample													2							
PCMP	GEI	10-Dec-01	South Ditch	SD-17	1170-PZ17-46	Sample												1		4						
PCMP	GEI	10-Dec-01	South Ditch	SD-17	1170-PZ17-46 DISSOLVED	Sample													2							
PCMP	GEI	17-Dec-01	South Ditch	ISCO1	1170-ISCO1-47 MS/MSD	Sample												1		4						
PCMP	GEI	17-Dec-01	South Ditch	ISCO1	1170-ISCO1-47 MS/MSD DISSOLVED	Sample													2							
PCMP	GEI	17-Dec-01	South Ditch	ISCO2	1170-ISCO2-47	Sample												1		4						
PCMP	GEI	17-Dec-01	South Ditch	ISCO2	1170-ISCO2-47 DISSOLVED	Sample													2							
PCMP	GEI	26-Dec-01	South Ditch	ISCO1	1170-ISCO1-48 MS/MSD	Sample												1		4						
PCMP	GEI	26-Dec-01	South Ditch	ISCO1	1170-ISCO1-48 DISSOLVED MS/MSD	Sample													2							
PCMP	GEI	26-Dec-01	South Ditch	ISCO2	1170-ISCO2-48	Sample												1		4						
PCMP	GEI	26-Dec-01	South Ditch	ISCO2	1170-ISCO2-48 DISSOLVED	Sample													2							
PCMP	GEI	31-Dec-01	South Ditch	ISCO1	1170-ISCO1-49	Sample												1		4						
PCMP	GEI	31-Dec-01	South Ditch	ISCO1	1170-ISCO1-49 DISSOLVED	Sample													2							
PCMP	GEI	31-Dec-01	South Ditch	ISCO2	1170-ISCO2-49 MS/MSD	Sample												1		4						
PCMP	GEI	31-Dec-01	South Ditch	ISCO2	1170-ISCO2-49 DISSOLVED MS/MSD	Sample													2							
PCMP	GEI	07-Jan-02	South Ditch	ISCO1	1170-ISCO1-50 MS/MSD	Sample												1		8						
PCMP	GEI	07-Jan-02	South Ditch	ISCO1	1170-ISCO1-50 DISSOLVED MS/MSD	Sample													2							
PCMP	GEI	07-Jan-02	South Ditch	ISCO2	1170-ISCO2-50	Sample												1		8						
PCMP	GEI	07-Jan-02	South Ditch	ISCO2	1170-ISCO2-50 DISSOLVED	Sample													2							
PCMP	GEI	07-Jan-02	East Ditch	ISCO3	1170-ISCO3-50	Sample												1		8						
PCMP	GEI	07-Jan-02	East Ditch	ISCO3	1170-ISCO3-50 DISSOLVED	Sample													2							
PCMP	GEI	07-Jan-02	South Ditch	PZ-16RSW	1170-PZ16-50	Sample												1		8						
PCMP	GEI	07-Jan-02	South Ditch	PZ-16RSW	1170-PZ16-50 DISSOLVED	Sample													2							
PCMP	GEI	07-Jan-02	South Ditch	SD-17	1170-PZ17-50	Sample												1		8						
PCMP	GEI	07-Jan-02	South Ditch	SD-17	1170-PZ17-50 DISSOLVED	Sample													2							
PCMP	GEI	04-Feb-02	South Ditch	ISCO1	1170-ISCO1-51 MS/MSD	Sample												1		8						

Table 2.1-7
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Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	04-Feb-02	South Ditch	ISCO1	1170-ISCO1-51 DISSOLVED MS/MSD	Sample												2								
PCMP	GEI	04-Feb-02	South Ditch	ISCO2	1170-ISCO2-51	Sample											1		8							
PCMP	GEI	04-Feb-02	South Ditch	ISCO2	1170-ISCO2-51 DISSOLVED	Sample												2								
PCMP	GEI	04-Feb-02	East Ditch	ISCO3	1170-ISCO3-51	Sample											1		8							
PCMP	GEI	04-Feb-02	East Ditch	ISCO3	1170-ISCO3-51 DISSOLVED	Sample												2								
PCMP	GEI	04-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-51	Sample											1		8							
PCMP	GEI	04-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-51 DISSOLVED	Sample												2								
PCMP	GEI	04-Feb-02	South Ditch	SD-17	1170-PZ17-51	Sample											1		8							
PCMP	GEI	04-Feb-02	South Ditch	SD-17	1170-PZ17-51 DISSOLVED	Sample												2								
PCMP	GEI	25-Feb-02	South Ditch	ISCO1	1170-ISCO1-52 MS/MSD	Sample											1		9							
PCMP	GEI	25-Feb-02	South Ditch	ISCO1	1170-ISCO1-52 DISSOLVED MS/MSD	Sample												2								
PCMP	GEI	25-Feb-02	South Ditch	ISCO2	1170-ISCO2-52	Sample											1		8							
PCMP	GEI	25-Feb-02	South Ditch	ISCO2	1170-ISCO2-52 DISSOLVED	Sample												2								
PCMP	GEI	25-Feb-02	East Ditch	ISCO3	1170-ISCO3-52	Sample											1		8							
PCMP	GEI	25-Feb-02	East Ditch	ISCO3	1170-ISCO3-52 DISSOLVED	Sample												2								
PCMP	GEI	25-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-52	Sample											1		8							
PCMP	GEI	25-Feb-02	South Ditch	PZ-16RSW	1170-PZ16-52 DISSOLVED	Sample												2								
PCMP	GEI	25-Feb-02	South Ditch	SD-17	1170-PZ17-52	Sample											1		8							
PCMP	GEI	25-Feb-02	South Ditch	SD-17	1170-PZ17-52 DISSOLVED	Sample												2								
Biocell Management	GEI	15-Mar-02	Biocell	BIOCELL	1140-BIO-COMP MS/MSD	Sample																6				
Biocell Management	GEI	15-Mar-02	Biocell	BIOCELL	1140-BIO-COMP MS/MSD	Sample						68														
PCMP	GEI	25-Mar-02	South Ditch	ISCO1	1170-ISCO1-53 MS/MSD	Sample											1		8	1						
PCMP	GEI	25-Mar-02	South Ditch	ISCO1	1170-ISCO1-53 DISSOLVED MS/MSD	Sample												2								
PCMP	GEI	25-Mar-02	South Ditch	ISCO2	1170-ISCO2-53	Sample											1		8	1						
PCMP	GEI	25-Mar-02	South Ditch	ISCO2	1170-ISCO2-53 DISSOLVED	Sample												2								
PCMP	GEI	25-Mar-02	East Ditch	ISCO3	1170-ISCO3-53	Sample											1		8	1						
PCMP	GEI	25-Mar-02	East Ditch	ISCO3	1170-ISCO3-53 DISSOLVED	Sample												2								
PCMP	GEI	25-Mar-02	South Ditch	PZ-16RSW	1170-PZ16-53	Sample											1		8	1						
PCMP	GEI	25-Mar-02	South Ditch	PZ-16RSW	1170-PZ16-53 DISSOLVED	Sample												2								
PCMP	GEI	25-Mar-02	South Ditch	SD-17	1170-PZ17-53	Sample											1		8	1						
PCMP	GEI	25-Mar-02	South Ditch	SD-17	1170-PZ17-53 DISSOLVED	Sample												2								
PCMP	GEI	22-Apr-02	South Ditch	ISCO1	1170-ISCO1-54 MS/MSD	Sample											1		9							
PCMP	GEI	22-Apr-02	South Ditch	ISCO1	1170-ISCO1-54 DISSOLVED MS/MSD	Sample												2								
PCMP	GEI	22-Apr-02	South Ditch	ISCO2	1170-ISCO2-54	Sample											1		8							
PCMP	GEI	22-Apr-02	South Ditch	ISCO2	1170-ISCO2-54 DISSOLVED	Sample												2								
PCMP	GEI	22-Apr-02	East Ditch	ISCO3	1170-ISCO3-54	Sample											1		8							
PCMP	GEI	22-Apr-02	East Ditch	ISCO3	1170-ISCO3-54 DISSOLVED	Sample												2								
PCMP	GEI	22-Apr-02	South Ditch	PZ-16RSW	1170-PZ16-54	Sample											1		8							
PCMP	GEI	22-Apr-02	South Ditch	PZ-16RSW	1170-PZ16-54 DISSOLVED	Sample												2								
PCMP	GEI	22-Apr-02	South Ditch	SD-17	1170-PZ17-54	Sample											1		8							
PCMP	GEI	22-Apr-02	South Ditch	SD-17	1170-PZ17-54 DISSOLVED	Sample												2								
PCMP	GEI	20-May-02	South Ditch	ISCO1	1170-ISCO1-55	Sample											1	2	6							
PCMP	GEI	20-May-02	South Ditch	ISCO2	1170-ISCO2-55	Sample											1	2	6							
PCMP	GEI	20-May-02	East Ditch	ISCO3	1170-ISCO3-55	Sample											1	2	6							
PCMP	GEI	20-May-02	South Ditch	SD-17	1170-PZ17-55	Sample											1	2	6							
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-1	MMBSW1-02	Sample											5	5	3							
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-2	MMBSW2-02	Sample											5	5	3							
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-3	MMBSW3-02	Sample											5	5	3							
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-6	MMBSW6-02	Sample											5	5	3							
Maple Meadow Brook	HARDING ESE	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-7	MMBSW7-02	Sample											5	5	3							
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW04-02	Sample											5	5	3							
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW04-02D	Duplicate											5	5	3							
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW05-02	Sample											5	5	3							
Maple Meadow Brook	HARDING ESE	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A-02	Sample											5	5	3							
PCMP	GEI	24-Jun-02	South Ditch	ISCO1	1170-ISCO1-56	Sample											1	2	6							
PCMP	GEI	24-Jun-02	South Ditch	ISCO2	1170-ISCO2-56	Sample											1	2	6							
PCMP	GEI	24-Jun-02	East Ditch	ISCO3	1170-ISCO3-56	Sample											1	2	6							
PCMP	GEI	24-Jun-02	South Ditch	SD-17	1170-PZ17-56	Sample											1	2	6							
PCMP	GEI	22-Jul-02	South Ditch	ISCO1	1170-ISCO1-57	Sample											1	2	6							

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Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	GEI	22-Jul-02	East Ditch	ISCO3	1170-ISCO3-57	Sample												1	2	6						
PCMP	GEI	22-Jul-02	South Ditch	SD-17	1170-PZ17-57	Sample												1	2	6						
PCMP	GEI	12-Aug-02	South Ditch	ISCO1	1170-ISCO1-58	Sample												1	2	6						
PCMP	GEI	12-Aug-02	South Ditch	SD-17	1170-PZ17-58	Sample												1	2	6						
PCMP	GEI	09-Sep-02	South Ditch	ISCO1	1170-ISCOL-59	Sample												1	2	6						
PCMP	GEI	09-Sep-02	South Ditch	SD-17	1170-PZ17-59	Sample												1	2	6						
PCMP		07-Oct-02	South Ditch	ISCO1	1170-ISC01-60	Sample												1	2	6						
PCMP		07-Oct-02	South Ditch	SD-17	1170-PZ17-60	Sample												1	2	6						
PCMP		04-Nov-02	South Ditch	ISCO1	1170-ISC01-61	Sample												1	2	6						
PCMP		04-Nov-02	South Ditch	ISCO2	1170-ISC02-61	Sample												1	2	6						
PCMP		04-Nov-02	East Ditch	ISCO3	1170-ISC03-61	Sample												1	2	6						
PCMP		04-Nov-02	South Ditch	SD-17	1170-PZ17-61	Sample												1	2	6						
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample												17	15	8						
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample												17	15	8						
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample												17	15	8						
OPWD		14-Nov-02	Off-property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample												17	15	8						
PCMP		09-Dec-02	South Ditch	ISCO1	1170-ISCO1-62	Sample												1	2	6						
PCMP		09-Dec-02	South Ditch	ISCO2	1170-ISCO2-62	Sample												1	2	6						
PCMP		09-Dec-02	East Ditch	ISCO3	1170-ISCO3-62	Sample												1	2	6						
OPWD		09-Dec-02	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample				1				1												
OPWD		09-Dec-02	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample				1				1												
OPWD		09-Dec-02	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample				1				1												
OPWD		09-Dec-02	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample				1				1												
PCMP		09-Dec-02	South Ditch	SD-17	1170-PZ17-62	Sample												1	2	6						
PCMP	MACTEC	03-Feb-03	South Ditch	ISCO1	1170-ISCO1-63	Sample												1	2	4						
PCMP	MACTEC	03-Feb-03	South Ditch	ISCO2	1170-ISCO2-63	Sample												1	2	4						
PCMP	MACTEC	03-Feb-03	East Ditch	ISCO3	1170-ISCO3-63	Sample												1	2	4						
PCMP	MACTEC	03-Feb-03	South Ditch	SD-17	1170-PZ-17-63	Sample												1	2	4						
OPWD	MACTEC	04-Feb-03	Off-Property West Ditch	OPWD-SWRUN1	OPWD-SWRUN1	Sample												7	7	3						
OPWD	MACTEC	04-Feb-03	Off-Property West Ditch	OPWD-SWRUN2	OPWD-SWRUN2	Sample												7	7	3						
OPWD	MACTEC	04-Feb-03	Off-Property West Ditch	OPWD-SWRUN3	OPWD-SWRUN3	Sample												7	7	3						
PCMP	MACTEC	06-Feb-03	South Ditch	ISCO1	1170-ISCO1-63	Sample														2						
PCMP	MACTEC	06-Feb-03	South Ditch	ISCO2	1170-ISCO2-63	Sample														2						
PCMP	MACTEC	06-Feb-03	East Ditch	ISCO3	1170-ISCO3-63	Sample														2						
PCMP	MACTEC	06-Feb-03	South Ditch	SD-17	1170-PZ-17-63	Sample														2						
OPWD	MACTEC	12-Feb-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample				1				1				17	15	6						
OPWD	MACTEC	12-Feb-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample				1				1				17	15	6						
OPWD	MACTEC	12-Feb-03	Off-property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample				1				1				17	15	6						
PCMP	MACTEC	05-May-03	South Ditch	ISCO1	1170-ISCO1-64	Sample												1	2	4		1				
PCMP	MACTEC	05-May-03	South Ditch	ISCO2	1170-ISCO2-64	Sample												1	2	4		1				
PCMP	MACTEC	05-May-03	East Ditch	ISCO3	1170-ISCO3-64	Sample												1	2	4		1				
PCMP	MACTEC	05-May-03	South Ditch	SD-17	1170-PZ-17-64	Sample												1	2	4		1				
PCMP	MACTEC	19-May-03	South Ditch	ISCO1	1170-ISCO1-64	Sample														2						
PH2 OPWD FS	GEI	19-May-03	South Ditch	ISCO1	1170-ISC01-AC	Sample												1		1	1	1				
PCMP	MACTEC	19-May-03	South Ditch	ISCO2	1170-ISCO2-64	Sample														2						
PCMP	MACTEC	19-May-03	East Ditch	ISCO3	1170-ISCO3-64	Sample														2						
PCMP	MACTEC	19-May-03	South Ditch	SD-17	1170-PZ-17-64	Sample														2						
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample				1				1				17	15	7		1				
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample					1															
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample				1				1				17	15	7		1				
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample					1															
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample				1				1				17	15	7		1				
OPWD	MACTEC	21-May-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample					1															
OPWD	MACTEC	21-May-03	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample				1				1				17	15	7		1				
OPWD	MACTEC	21-May-03	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample					1															
PH2 OPWD FS	GEI	23-May-03	South Ditch	ISCO1	1170-ISC01-AG	Sample												1		1	1	1				
PH2 OPWD FS	GEI	26-May-03	South Ditch	ISCO1	1170-ISC01-AJ	Sample												1		1	1	1				
PH2 OPWD FS	GEI	26-May-03	South Ditch	ISCO1	1170-ISC01-AK	Sample												1		1	1	1				
PH2 OPWD FS	GEI	26-May-03	South Ditch	ISCO1	1170-ISC01-AL	Sample												1		1	1	1				
PH2 OPWD FS	GEI	27-May-03	South Ditch	ISCO1	1170-ISC01-AM	Sample												1		1	1	1				
PH2 OPWD FS	GEI	27-May-03	South Ditch	ISCO1	1170-ISC01-AN	Sample												1		1	1	1				
PH2 OPWD FS	GEI	27-May-03	South Ditch	ISCO1	1170-ISC01-AO	Sample												1		1	1	1				
PH2 OPWD FS	GEI	28-May-03	South Ditch	ISCO1	1170-ISC01-AP	Sample												1		1	1	1				

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PH2 OPWD FS	GEI	30-May-03	South Ditch	ISCO1	1170-ISC01-AR	Sample													3		3							
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AT	Sample													3		3							
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AU	Sample													3		3							
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AV	Sample													3		3							
PH2 OPWD FS	GEI	01-Jun-03	South Ditch	ISCO1	1170-ISC01-AX	Sample													3		3							
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3-03	Sample						1											1					
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4-03	Sample						1											1					
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6-03	Sample						1											1					
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW8-03	Sample						1											1					
Maple Meadow Brook	MACTEC	03-Jun-03	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW9-03	Sample						1											1					
PH2 OPWD FS	GEI	07-Jun-03	South Ditch	ISCO1	1170-ISC01-BD	Sample													3		3	1	1					
PH2 OPWD FS	GEI	07-Jun-03	South Ditch	ISCO2	1170-ISC02-AA	Sample													3		3	1	1					
PH2 OPWD FS	GEI	08-Jun-03	South Ditch	ISCO2	1170-ISC02-AB	Sample													3		3	1	1					
PH2 OPWD FS	GEI	12-Jun-03	South Ditch	ISCO1	1170-ISCO1-BG	Sample													3		3	1	1					
PH2 OPWD FS	GEI	12-Jun-03	South Ditch	ISCO2	1170-ISCO2-AF	Sample													3		3	1	1					
PH2 OPWD FS	GEI	14-Jun-03	South Ditch	ISCO1	1170-ISCO1-BI	Sample													3		3	1	1					
PH2 OPWD FS	GEI	14-Jun-03	South Ditch	ISCO2	1170-ISCO2-AH	Sample													3		3	1	1					
East Ditch	MACTEC	18-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample		68			65				20	9			24	23	16							
East Ditch	MACTEC	18-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample								16														
East Ditch	MACTEC	18-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample						1																
Floc	MACTEC	19-Jun-03	East Ditch	BACKFLOC	BACKFLOC-2003	Sample													6		2							
Floc	MACTEC	19-Jun-03	East Ditch	BACKFLOC	BACKFLOCSW-2003	Sample														6	1							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample		68			65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample								16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample						1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample											2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	Sample												18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample		68			65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample								16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample						1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample											2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	Sample												18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample		68			65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample								16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample						1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample											2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	Sample												18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample		68			65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate		68			65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample								16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate								16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample						1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-01	Duplicate						1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample											2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate											2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	Sample												18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-01	Duplicate												18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample		68			65				20	9			24	23	16							
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample								16														
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample						1																
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample											2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	Sample												18										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample											2											
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample												17										
East Ditch	MACTEC	19-Jun-03	East Ditch	EDSD/SW6	EDSW6-01	Sample												1										
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BR	Sample													3		3	1	1					
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BU	Sample													3		3	1	1					
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BV	Sample													3		3	1	1					
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO1	1170-ISC01-BW	Sample													3		3							
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO2	1170-ISC02-AP	Sample													3		3	1	1					
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO2	1170-ISC02-AQ	Sample													3		3	1	1					
PH2 OPWD FS	GEI	22-Jun-03	South Ditch	ISCO2	1170-ISC02-AR	Sample													3		3	1	1					
PH2 OPWD FS	GEI	23-Jun-03	South Ditch	ISCO1	1170-ISC01-BX	Sample													3		3	1	1					

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PH2 OPWD FS	GEI	23-Jun-03	South Ditch	ISCO2	1170-ISC02-AS	Sample												3		3	1	1				
PH2 OPWD FS	GEI	23-Jun-03	South Ditch	ISCO2	1170-ISC02-AT	Sample												3		3	1	1				
PH2 OPWD FS	GEI	25-Jun-03	South Ditch	ISCO1	1170-ISC01-BZ	Sample												3		3	1	1				
PH2 OPWD FS	GEI	25-Jun-03	South Ditch	ISCO2	1170-ISC02-AV	Sample												3		3	1	1				
Floc	MACTEC	25-Jun-03	On-Property West Ditch	RAM-9	REDFLOC-2003	Sample												6		2						
Floc	MACTEC	25-Jun-03	Off-Property West Ditch	REDFLOC	REDFLOCSW-2003	Sample													6	1						
Floc	MACTEC	25-Jun-03	East Ditch	SOEAST	SOEASTSW-2003	Sample													6	1						
PCMP	MACTEC	10-Jul-03	South Ditch	ISCO1	1170-ISCO1-64	Sample					1															
PCMP	MACTEC	10-Jul-03	South Ditch	ISCO2	1170-ISCO2-64	Sample					1															
PCMP	MACTEC	10-Jul-03	East Ditch	ISCO3	1170-ISCO3-64	Sample					1															
PCMP	MACTEC	10-Jul-03	South Ditch	SD-17	1170-P217R-64	Sample					1															
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN1	OPWD-SWRUN1	Sample	Stormwater Runoff							19				4	4	4						
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN1	OPWD-SWRUN1	Sample											18									
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN2	OPWD-SWRUN2	Sample	Stormwater Runoff							19				4	4	4						
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN2	OPWD-SWRUN2	Sample											18									
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN3	OPWD-SWRUN3	Sample	Stormwater Runoff							19				4	4	4						
OPWD	GEI	22-Jul-03	Off-Property West Ditch	OPWD-SWRUN3	OPWD-SWRUN3	Sample											18									
PCMP	MACTEC	11-Aug-03	South Ditch	ISCO1	1170-ISCO1-65	Sample												1	2	6						
PCMP	MACTEC	11-Aug-03	South Ditch	ISCO2	1170-ISCO2-65	Sample												1	2	6						
PCMP	MACTEC	11-Aug-03	East Ditch	ISCO3	1170-ISCO3-65	Sample												1	2	6						
PCMP	MACTEC	11-Aug-03	South Ditch	SD-17	1170-PZ-17-65	Sample												1	2	6						
OPWD	MACTEC	20-Aug-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N	Sample				1				1				17	15	7						
OPWD	MACTEC	20-Aug-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S	Sample				1				1				17	15	7						
OPWD	MACTEC	20-Aug-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS	Sample				1				1				17	15	7						
OPWD	MACTEC	20-Aug-03	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW	Sample				1				1				17	15	7						
Floc	MACTEC	08-Sep-03	Off-Property West Ditch	WHITE FLOC	Whitefloc-2003	Sample												6		2						
Floc	MACTEC	08-Sep-03	Off-Property West Ditch	WHITE FLOC	WhitefiocSW-2003	Sample													6	1						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-02	Sample						1														
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-02	Sample						1														
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-02	Sample						1														
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-02	Duplicate		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-02	Sample						1														
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW4 (EDBS10)	EDSW4DUP-02	Duplicate						1														
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-02	Sample						1														
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW6	EDSW6-02	Sample		74			68			18	19	9	2	11	24	23	16						
East Ditch	MACTEC	23-Sep-03	East Ditch	EDSD/SW6	EDSW6-02	Sample						1														
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1														
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	10-Nov-03	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1														
Maple Meadow Brook	MACTEC	11-Nov-03	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	11-Nov-03	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1														
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1														
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1														
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	12-Nov-03	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1														
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1														
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1														
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1														
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1														
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample			2									1	19	10						
Maple Meadow Brook	MACTEC	13-Nov-03	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1														

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	MACTEC	17-Nov-03	South Ditch	ISCO1	1170-ISCO1-66	Sample												1	2	6						
PCMP	MACTEC	17-Nov-03	South Ditch	ISCO2	1170-ISCO2-66	Sample												1	2	6						
PCMP	MACTEC	17-Nov-03	East Ditch	ISCO3	1170-ISCO3-66	Sample												1	2	6						
PCMP	MACTEC	17-Nov-03	South Ditch	SD-17	1170-PZ17-66	Sample												1	2	6						
PCMP	MACTEC	02-Feb-04	South Ditch	ISCO1	1170-ISCO1-67	Sample												1	2	6	1					
PCMP	MACTEC	02-Feb-04	East Ditch	ISCO3	1170-ISCO3-67	Sample												1	2	6	1					
PCMP	MACTEC	02-Feb-04	South Ditch	SD-17	1170-PZ-17-67	Sample												1	2	6	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample													19	9						
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1															
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample													19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample					1															
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample													19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample					1															
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample													19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1															
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample													19	9						
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1										1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample													19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample					1															
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample													19	9	1					
Maple Meadow Brook	MACTEC	03-Feb-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1															
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample													19	9	1					
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1															
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample													19	9	1					
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample					1															
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample													19	9	1					
Maple Meadow Brook	MACTEC	04-Feb-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample					1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-03	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-03	Sample					1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-03	Sample										2										
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW6	EDSW6-03	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW6	EDSW6-03	Sample					1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW6	EDSW6-03	Sample										2										
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW7	EDSW7-01	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW7	EDSW7-01	Sample					1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW7	EDSW7-01	Sample										2										
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW8	EDSW8-01	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW8	EDSW8-01	Sample					1															
East Ditch	MACTEC	28-Apr-04	East Ditch	EDSD/SW8	EDSW8-01	Sample										2										
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW0	EDSW0-01	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW0	EDSW0-01	Sample					1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW0	EDSW0-03	Sample										2										
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-03	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-03	Sample					1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-03	Sample										2										
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-03	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-03	Sample					1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-03	Sample										2										
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-03	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-03	Sample					1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-03	Sample										2										
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-03	Sample		75		68				19	7			25	23	16	1					
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-03	Duplicate		75		68				19	7			25	23	16						
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-03	Sample					1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-03	Duplicate					1															
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-03	Sample										2										
East Ditch	MACTEC	29-Apr-04	East Ditch	EDSD/SW4 (EDBS10)	EDSW4 DUP-03	Duplicate										2										
PCMP	MACTEC	10-May-04	South Ditch	ISCO1	1170-ISCO1-68	Sample												1	2	6	1					
PCMP	MACTEC	10-May-04	South Ditch	ISCO1	1170-ISCO1-68 DUPLICATE	Duplicate												1	2	6						
PCMP	MACTEC	10-May-04	South Ditch	ISCO2	1170-ISCO2-68	Sample												1	2	6	1					
PCMP	MACTEC	10-May-04	East Ditch	ISCO3	1170-ISCO3-68	Sample												1	2	6	1					
PCMP	MACTEC	10-May-04	South Ditch	SD-17	1170-PZ-17-68	Sample												1	2	6	1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample													19	9	1					

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Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1														
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9		1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1														
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9		1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1														
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9		1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1														
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9		1					
Maple Meadow Brook	MACTEC	11-May-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1														
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9		1					
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1														
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9		1					
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1														
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1					
Maple Meadow Brook	MACTEC	12-May-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1														
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9		1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19	9		1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1														
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate						1														
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9		1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1														
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1					
Maple Meadow Brook	MACTEC	13-May-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1														
PCMP	MACTEC	09-Aug-04	South Ditch	ISCO1	1170-ISCO1-69	Sample											1	2	6		1					
PCMP	MACTEC	09-Aug-04	South Ditch	ISCO2	1170-ISCO2-69	Sample											1	2	6		1					
PCMP	MACTEC	09-Aug-04	East Ditch	ISCO3	1170-ISCO3-69	Sample											1	2	6		1					
PCMP	MACTEC	09-Aug-04	South Ditch	SD-17	1170-PZ-17-69	Sample											1	2	6		1					
Maple Meadow Brook	MACTEC	11-Aug-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1					
Maple Meadow Brook	MACTEC	11-Aug-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1														
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9		1					
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19	9							
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1														
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1-DUP	Duplicate						1														
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9		1					
Maple Meadow Brook	MACTEC	12-Aug-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1														
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Aug-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1														
East Ditch	MACTEC	05-Oct-04	East Ditch	EDLBSW1	EDLBSW1-01	Sample		75	2	3	68			18	19	7		11	25	23	15		1				
East Ditch	MACTEC	05-Oct-04	East Ditch	EDLBSW1	EDLBSW1-01	Sample						1														
East Ditch	MACTEC	05-Oct-04	East Ditch	EDLBSW1	EDLBSW1-01	Sample											2									
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW7	EDSW7-02	Sample		75	2	3	68			18	19	7		11	25	23	15		1				
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW7	EDSW7-02	Sample						1														
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW7	EDSW7-02	Sample											2									
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02	Sample		75	2	3	68			18	19	7		11	25	23	15		1				
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8DUP-02	Duplicate		75	2	3	68			18	19	7		11	25	23	15						
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02	Sample						1														
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8DUP-02	Duplicate						1														
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02	Sample											2									
East Ditch	MACTEC	05-Oct-04	East Ditch	EDSD/SW8	EDSW8-02 DUP	Duplicate											2									

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO1	1170-ISCO1-70	Sample												1		6	1					
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO1	1170-ISCO1-70	Sample													2							
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO2	1170-ISCO2-70	Sample												1		6	1					
PCMP	MACTEC	01-Nov-04	South Ditch	ISCO2	1170-ISCO2-70	Sample													2							
PCMP	MACTEC	01-Nov-04	East Ditch	ISCO3	1170-ISCO3-70	Sample												1		6	1					
PCMP	MACTEC	01-Nov-04	East Ditch	ISCO3	1170-ISCO3-70	Sample													2							
PCMP	MACTEC	01-Nov-04	South Ditch	SD-17	1170-PZ-17-70	Sample												1		6	1					
PCMP	MACTEC	01-Nov-04	South Ditch	SD-17	1170-PZ-17-70	Sample													2							
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample												19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11	Sample					1															
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5	Sample					1															
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample					1															
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9		1					
Maple Meadow Brook	MACTEC	15-Nov-04	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample					1															
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9		1					
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample					1															
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9		1					
Maple Meadow Brook	MACTEC	16-Nov-04	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample					1															
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW10	Sample					1															
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1					
Maple Meadow Brook	MACTEC	17-Nov-04	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4	Sample					1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9		1					
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 Duplicate	Duplicate												19	9							
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1	Sample					1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1DUP	Duplicate					1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9		1					
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW8	Sample					1															
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1					
Maple Meadow Brook	MACTEC	18-Nov-04	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW9	Sample					1															
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO1	1170-ISCO1-71	Sample												1		6	1					
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO1	1170-ISCO1-71	Sample													2							
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO2	1170-ISCO2-71	Sample												1		6	1					
PCMP	MACTEC	31-Jan-05	South Ditch	ISCO2	1170-ISCO2-71	Sample													2							
PCMP	MACTEC	31-Jan-05	East Ditch	ISCO3	1170-ISCO3-71	Sample												1		1	1					
PCMP	MACTEC	31-Jan-05	East Ditch	ISCO3	1170-ISCO3-71	Sample													2							
PCMP	MACTEC	31-Jan-05	South Ditch	SD-17	1170-PZ-17-71	Sample												1		6	1					
PCMP	MACTEC	31-Jan-05	South Ditch	SD-17	1170-PZ-17-71	Sample													2							
PCMP	MACTEC	01-Feb-05	East Ditch	ISCO3	1170-ISCO3-71	Sample														5						
East Ditch	MACTEC	15-Feb-05	East Ditch	EDLBSW1	EDLBSW1-02	Sample		75	2	3	68			18	19	7	2	10	25		15					
East Ditch	MACTEC	15-Feb-05	East Ditch	EDLBSW1	EDLBSW1-02	Sample													23							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDLBSW1	EDLBSW1-02	Sample					1															
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW7	EDSW7-03	Sample		75	2	3	68			18	19	7	2	10	25		15					
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW7	EDSW7-03	Sample													23							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW7	EDSW7-03	Sample					1															
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8-03	Sample		75	2	3	68			18	19	7	2	10	25		15					
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8DUP-03	Duplicate		75	2	3	68			18	19	7	2	10	25		15					
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8-03	Sample													23							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8DUP-03	Duplicate													23							
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8-03	Sample					1															
East Ditch	MACTEC	15-Feb-05	East Ditch	EDSD/SW8	EDSW8 DUP-03	Duplicate					1															
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72	Sample												1		6	1					
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72 DUPLICATE	Duplicate												1		6						
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72	Sample													2							
PCMP	MACTEC	09-May-05	South Ditch	ISCO1	1170-ISCO1-72 DUPLICATE	Duplicate													2							
PCMP	MACTEC	09-May-05	South Ditch	ISCO2	1170-ISCO2-72	Sample												1		6	1					
PCMP	MACTEC	09-May-05	South Ditch	ISCO2	1170-ISCO2-72	Sample													2							
PCMP	MACTEC	09-May-05	East Ditch	ISCO3	1170-ISCO3-72	Sample												1		6	1					
PCMP	MACTEC	09-May-05	East Ditch	ISCO3	1170-ISCO3-72	Sample													2							
PCMP	MACTEC	09-May-05	South Ditch	SD-17	1170-PZ-17-72	Sample												1		6	1					
PCMP	MACTEC	09-May-05	South Ditch	SD-17	1170-PZ-17-72	Sample													2							

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Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
PCMP	MACTEC	09-May-05	South Ditch	SDSW-A	SDSW-A-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-A	SDSW-A-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-B	SDSW-B-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-B	SDSW-B-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-C	SDSW-C-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-C	SDSW-C-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-D	SDSW-D-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-D	SDSW-D-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-E	SDSW-E-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-E	SDSW-E-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-F	SDSW-F-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-F	SDSW-F-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-G	SDSW-G-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-G	SDSW-G-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-H	SDSW-H-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-H	SDSW-H-01	Sample												2								
PCMP	MACTEC	09-May-05	South Ditch	SDSW-I	SDSW-I-01	Sample												1	6	1						
PCMP	MACTEC	09-May-05	South Ditch	SDSW-I	SDSW-I-01	Sample												2								
Maple Meadow Brook	MACTEC	10-May-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9	1						
Maple Meadow Brook	MACTEC	10-May-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample					1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample												19	9	1						
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9	1						
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample					1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9	1						
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9	1						
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1															
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9	1						
Maple Meadow Brook	MACTEC	11-May-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample					1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample													9	1						
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate													9							
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate					1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9	1						
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample					1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9	1						
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample					1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9	1						
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUPLICATE	Duplicate												19	9							
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1															
Maple Meadow Brook	MACTEC	12-May-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUP	Duplicate					1															
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19								
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19								
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9	1						
Maple Meadow Brook	MACTEC	13-May-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample					1															
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9	1						
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample					1															
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9	1						
Maple Meadow Brook	MACTEC	26-Jul-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample					1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9	1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19	9	1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate					1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample												19	9	1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9	1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9	1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample					1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9	1						
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1															
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9	1						

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1														
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1					
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUPLICATE	Duplicate												19	9		1					
Maple Meadow Brook	MACTEC	28-Jul-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1														
Maple Meadow Brook	MACTEC	29-Jul-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample												19	9		1					
Maple Meadow Brook	MACTEC	29-Jul-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1					
Maple Meadow Brook	MACTEC	29-Jul-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1														
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73	Sample											1		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73 DUPLICATE	Duplicate											1		6							
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73 DISSOLVED	Sample												2								
PCMP	MACTEC	02-Aug-05	South Ditch	ISCO1	1170-ISCO1-73 DISSOLVED DUPLICATE	Duplicate												2								
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73	Sample											1		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73 DUPLICATE	Duplicate											1		6							
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73 DISSOLVED	Sample												2								
PCMP	MACTEC	02-Aug-05	South Ditch	SD-17	1170-PZ-17-73 DISSOLVED DUPLICATE	Duplicate												2								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-A	SD-SW-A-02	Sample											3		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-A	SD-SW-A-02	Sample												3								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-C	SD-SW-C-02	Sample											3		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-C	SD-SW-C-02	Sample												3								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02	Sample											3		6		1					
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02 DUPLICATE	Duplicate											3		6							
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02	Sample												3								
PCMP	MACTEC	02-Aug-05	South Ditch	SDSW-D	SD-SW-D-02 DUPLICATE	Duplicate												3								
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-01	Sample														4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-01	Sample														4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-18R	PZ-18R-SURFACE-F-01	Sample														4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-20	PZ-20-SURFACE-F-01	Sample														4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-21	PZ-21-SURFACE-F-01	Sample														4	1					
South Ditch Field Data	OLIN	22-Sep-05	South Ditch	PZ-22	PZ-22-SURFACE-F-01	Sample														4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-02	Sample														4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-02	Sample														4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-18R	PZ-18R-SURFACE-F-02	Sample														4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-20	PZ-20-SURFACE-F-02	Sample														4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-21	PZ-21-SURFACE-F-02	Sample														4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-22	PZ-22-SURFACE-F-02	Sample														4	1					
South Ditch Field Data	OLIN	26-Oct-05	South Ditch	PZ-23	PZ-23-SURFACE-F-02	Sample														4	1					
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample												19	9		1					
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample						1														
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample												19	9		1					
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample						1														
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample												19	9		1					
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample						1														
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9		1					
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample						1														
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9		1					
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample						1														
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample												19	9		1					
Maple Meadow Brook	MACTEC	08-Nov-05	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample						1														
South Ditch Field Data	OLIN	08-Nov-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-03A	Sample														4	1					
South Ditch Field Data	OLIN	08-Nov-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-03A	Sample														4	1					
South Ditch Field Data	OLIN	08-Nov-05	South Ditch	PZ-20	PZ-20-SURFACE-F-03A	Sample														4	1					
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample												19	9		1					
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUPLICATE	Duplicate												19	9							
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample						1														
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1-DUP	Duplicate						1														
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1					
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample						1														
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample												19	9		1					
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample						1														
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1					
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUPLICATE	Duplicate												19	9							

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Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore	Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample						1															
Maple Meadow Brook	MACTEC	09-Nov-05	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9-DUP	Duplicate						1															
Maple Meadow Brook	MACTEC	17-Nov-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample													19	9		1					
Maple Meadow Brook	MACTEC	17-Nov-05	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample						1															
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74	Sample												1		6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74 DUPLICATE	Duplicate												1		6							
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74	Sample													2								
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO1	1170-ISCO1-74 DUPLICATE	Duplicate													2								
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO2	1170-ISCO2-74	Sample												1		6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	ISCO2	1170-ISCO2-74	Sample													2								
PCMP	MACTEC	21-Nov-05	East Ditch	ISCO3	1170-ISCO3-74	Sample												1		6		1					
PCMP	MACTEC	21-Nov-05	East Ditch	ISCO3	1170-ISCO3-74	Sample													2								
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-18R	PZ-18R-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-20	PZ-20-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-21	PZ-21-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-22	PZ-22-SURFACE-F-03B	Sample															4	1					
South Ditch Field Data	OLIN	21-Nov-05	South Ditch	PZ-23	PZ-23-SURFACE-F-03B	Sample															4	1					
PCMP	MACTEC	21-Nov-05	South Ditch	SD-17	1170-PZ-17-74	Sample												1		6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SD-17	1170-PZ-17-74	Sample													2								
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-A	SD-SW-A-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-A	SD-SW-A-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-B	SD-SW-B-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-B	SD-SW-B-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-C	SD-SW-C-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-C	SD-SW-C-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03 DUPLICATE	Duplicate													3	6							
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-D	SD-SW-D-03 DUPLICATE	Duplicate												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-E	SD-SW-E-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-E	SD-SW-E-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-F	SD-SW-F-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-F	SD-SW-F-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-G	SD-SW-G-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-G	SD-SW-G-03	Sample												3									
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-H	SD-SW-H-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	South Ditch	SDSW-H	SD-SW-H-03	Sample												3									
PCMP	MACTEC	21-Nov-05	Ephemeral Ditch	SDSW-J	SD-SW-J-03	Sample													3	6		1					
PCMP	MACTEC	21-Nov-05	Ephemeral Ditch	SDSW-J	SD-SW-J-03	Sample												3									
South Ditch Field Data	OLIN	05-Dec-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-04A	Sample															4	1					
South Ditch Field Data	OLIN	05-Dec-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-04A	Sample															4	1					
South Ditch Field Data	OLIN	05-Dec-05	South Ditch	PZ-20	PZ-20-SURFACE-F-04A	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-20	PZ-20-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-21	PZ-21-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-22	PZ-22-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	19-Dec-05	South Ditch	PZ-23	PZ-23-SURFACE-F-04B	Sample															4	1					
South Ditch Field Data	OLIN	09-Jan-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-05A	Sample															4	1					
South Ditch Field Data	OLIN	09-Jan-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-05A	Sample															4	1					
South Ditch Field Data	OLIN	09-Jan-06	South Ditch	PZ-20	PZ-20-SURFACE-F-05A	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-20	PZ-20-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-21	PZ-21-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-22	PZ-22-SURFACE-F-05B	Sample															4	1					
South Ditch Field Data	OLIN	24-Jan-06	South Ditch	PZ-23	PZ-23-SURFACE-F-05B	Sample															4	1					
PCMP	MACTEC	20-Feb-06	South Ditch	ISCO1	1170-ISCO1-75	Sample														3							
PCMP	MACTEC	20-Feb-06	South Ditch	ISCO1	1170-ISCO1-75-Duplicate	Duplicate														4							
PCMP	MACTEC	20-Feb-06	South Ditch	ISCO2	1170-ISCO2-75	Sample														4							

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PCMP	MACTEC	20-Feb-06	East Ditch	ISCO3	1170-ISCO3-75	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SD-17	1170-PZ-17-75	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-A	SDSW-A-03	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-B	SDSW-B-03	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-C	SDSW-C-03	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-D	SDSW-D-03 Duplicate	Duplicate														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-D	SDSW-D-03	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-E	SDSW-E-03	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-F	SDSW-F-03	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-G	SDSW-G-03	Sample														4						
PCMP	MACTEC	20-Feb-06	South Ditch	SDSW-H	SDSW-H-03	Sample														4						
PCMP	MACTEC	20-Feb-06	Ephemeral Ditch	SDSW-J	SDSW-J-03	Sample														2						
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-06	Sample															4	1				
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-06	Sample															4	1				
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-20	PZ-20-SURFACE-F-06	Sample															4	1				
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-21	PZ-21-SURFACE-F-06	Sample															4	1				
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-22	PZ-22-SURFACE-F-06	Sample															4	1				
South Ditch Field Data	OLIN	21-Feb-06	South Ditch	PZ-23	PZ-23-SURFACE-F-06	Sample															4	1				
South Ditch Field Data	OLIN	07-Mar-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-07A	Sample															4	1				
South Ditch Field Data	OLIN	07-Mar-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-07A	Sample															4	1				
South Ditch Field Data	OLIN	07-Mar-06	South Ditch	PZ-20	PZ-20-SURFACE-F-07A	Sample															4	1				
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-07B	Sample															4	1				
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-07B	Sample															4	1				
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-07B	Sample															4	1				
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-20	PZ-20-SURFACE-F-07B	Sample															4	1				
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-21	PZ-21-SURFACE-F-07B	Sample															4	1				
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-22	PZ-22-SURFACE-F-07B	Sample															4	1				
South Ditch Field Data	OLIN	20-Mar-06	South Ditch	PZ-23	PZ-23-SURFACE-F-07B	Sample															4	1				
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-08	Sample															4	1				
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-08	Sample															4	1				
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-18R	PZ-18RR-SURFACE-F-08	Sample															4	1				
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-20	PZ-20-SURFACE-F-08	Sample															4	1				
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-21	PZ-21-SURFACE-F-08	Sample															4	1				
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-22	PZ-22-SURFACE-F-08	Sample															4	1				
South Ditch Field Data	OLIN	24-Apr-06	South Ditch	PZ-23	PZ-23-SURFACE-F-08	Sample															4	1				
South Ditch Field Data	OLIN	08-May-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-09A	Sample															4	1				
South Ditch Field Data	OLIN	08-May-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-09A	Sample															4	1				
South Ditch Field Data	OLIN	08-May-06	South Ditch	PZ-20	PZ-20-SURFACE-F-09A	Sample															4	1				
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-09B	Sample															4	1				
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-09B	Sample															4	1				
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-09B	Sample															4	1				
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-20	PZ-20-SURFACE-F-09B	Sample															4	1				
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-21	PZ-21-SURFACE-F-09B	Sample															4	1				
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-22	PZ-22-SURFACE-F-09B	Sample															4	1				
South Ditch Field Data	OLIN	23-May-06	South Ditch	PZ-23	PZ-23-SURFACE-F-09B	Sample															4	1				
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample													19	9		1				
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample													3							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 Duplicate	Duplicate													19	9						
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 Duplicate	Duplicate													3							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1 DUP	Duplicate					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample													19	9		1				
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample													3							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11	Sample													19	9		1				
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11	Sample													3							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample													19	9		1				
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2	Sample													3							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample													19	9		1				
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3	Sample													3							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3	Sample					1															

Table 2.1-7
Summary of Surface Water Samples Collected To Date - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Date Sampled	Area	Location	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Semivolatiles - Low Level	Polynuclear Aromatics	Pesticides	PCBs	Opex/Kemppore Herbicides	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field - pH	Total Petroleum Hydrocarbons	Oil & Grease	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample												3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample												3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample												19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6	Sample												3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample												3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample												19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A	Sample												3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												19	9		1					
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample												3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 Duplicate	Duplicate												19	9							
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 Duplicate	Duplicate												3								
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9	Sample					1															
Maple Meadow Brook	MACTEC	25-May-06	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9 DUP	Duplicate					1															
South Ditch Field Data	OLIN	05-Jun-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-10A	Sample														4	1					
South Ditch Field Data	OLIN	05-Jun-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-10A	Sample														4	1					
South Ditch Field Data	OLIN	05-Jun-06	South Ditch	PZ-20	PZ-20-SURFACE-F-10A	Sample														4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-10B	Sample														4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-10B	Sample														4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-10B	Sample														4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-20	PZ-20-SURFACE-F-10B	Sample														4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-21	PZ-21-SURFACE-F-10B	Sample														4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-22	PZ-22-SURFACE-F-10B	Sample														4	1					
South Ditch Field Data	OLIN	19-Jun-06	South Ditch	PZ-23	PZ-23-SURFACE-F-10B	Sample														4	1					
South Ditch Field Data	OLIN	05-Jul-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-11A	Sample														4	1					
South Ditch Field Data	OLIN	05-Jul-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-11A	Sample														4	1					
South Ditch Field Data	OLIN	05-Jul-06	South Ditch	PZ-20	PZ-20-SURFACE-F-11A	Sample														4	1					
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-11B	Sample														4	1					
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-11B	Sample														4	1					
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-11B	Sample														4	1					
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-20	PZ-20-SURFACE-F-11B	Sample														4	1					
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-21	PZ-21-SURFACE-F-11B	Sample														4	1					
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-22	PZ-22-SURFACE-F-11B	Sample														4	1					
South Ditch Field Data	OLIN	18-Jul-06	South Ditch	PZ-23	PZ-23-SURFACE-F-11B	Sample														4	1					
South Ditch Field Data	OLIN	10-Aug-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-12A	Sample														4	1					
South Ditch Field Data	OLIN	10-Aug-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-12A	Sample														4	1					
South Ditch Field Data	OLIN	10-Aug-06	South Ditch	PZ-20	PZ-20-SURFACE-F-12A	Sample														4	1					
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-12B	Sample														4	1					
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-12B	Sample														4	1					
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-12B	Sample														4	1					
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-20	PZ-20-SURFACE-F-12B	Sample														4	1					
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-21	PZ-21-SURFACE-F-12B	Sample														4	1					
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-22	PZ-22-SURFACE-F-12B	Sample														4	1					
South Ditch Field Data	OLIN	22-Aug-06	South Ditch	PZ-23	PZ-23-SURFACE-F-12B	Sample														4	1					
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-13A	Sample														4	1					
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-13A	Sample														4	1					
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-18R	PZ-18R-SURFACE-F-13A	Sample														4	1					
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-20	PZ-20-SURFACE-F-13A	Sample														4	1					
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-21	PZ-21-SURFACE-F-13A	Sample														4	1					
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-22	PZ-22-SURFACE-F-13A	Sample														4	1					
South Ditch Field Data	OLIN	18-Sep-06	South Ditch	PZ-23	PZ-23-SURFACE-F-13A	Sample														4	1					

Prepared/Date: KJC 07/27/07
Checked/Date: MJM 07/27/07

Table 2.1-8
Summary of Construction-Related Release Abatement Measure Submittals

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Release Abatement Measure (RAM) Plans	Plan Modifications	Approvals	Reports
GEI Consultants, 2000. Ltr to Chris Pyott. Re: Part 1 of Construction Related Abatement Measure (RAM) Plan. Olin Corp. Property. 51 Eames St., Wilmington, Ma., RTN: 3-0471, April. [685]		MADEP, 2000. Re: Wilmington, Olin Chemical, 51 Eames Street. RTN 3-0471. Conditional Approval: RAM Plan. June 26. [in Appendix B of 272]	
GEI Consultants, 2000. Part 2 of Construction-Related RAM Plan, July. [1410]		MADEP, 2000. Conditional Approval: Part 2 - RAM Plan, August 9. [in Appendix B of 272]	
		MADEP, 2000. Approval of Pre-Construction Activities, July 13. [in Appendix B of 272]	
	GEI Consultants, 2000. Modification No. 1 of Part 2 Construction Related Release Abatement Measure (RAM), September. [not located]	MADEP, 2000. Conditional Approval: Modification No. 1 Part 2 – RAM Plan, September 28. [in Appendix B of 272]	
	GEI Consultants, 2000. Modification No. 2 of Part 2 Construction Related Release Abatement Measure (RAM), October. [248]	MADEP, 2000. Conditional Approval: Modification No. 2 Part 2 – RAM Plan, November 9. [in Appendix B of 272]	
	GEI Consultants, 2000. Modification No. 3 of Part 2 Construction Related Release Abatement Measure (RAM), October. [not located]	MADEP, 2000. Conditional Approval: Modification No. 3 Part 2 – RAM Plan, November 2. [in Appendix B of 272]	
			GEI Consultants, 2000c. Status Report No. 1, Part 2 Construction Related Release Abatement Measure (RAM), December. [272]
	GEI Consultants, 2001. Modification No. 4 of Part 2 Construction Related Release Abatement Measure (RAM), April. [309]	MADEP, 2001. Ltr to Steve Morrow - RE: Wilmington Olin Chemical, 51 Eames St., Modification No. 4, Part 2 - Construction RAM, August 13. [409]	
	GEI Consultants, 2001. Modification No. 5 of Part 2 Construction Related Release Abatement Measure (RAM), April. [299]		
	GEI Consultants, 2001. Addendum to Modification No. 4 of Part 2 Construction Related Release Abatement Measure (RAM), November. [429]	MADEP, 2002. Ltr to Steve Morrow from Christopher Pyott. Re: Wilmington Olin Chemical, 51 Eames St, RTN 3-0471, Addendum to Modification No. 4, Part 2 - Construction RAM, February 7. [438]	
	GEI Consultants, 2001. Ltr to DEP Re: Modification No. 6 of Part 2 Construction-Related Release Abatement Measure (RAM) Plan, April. [306]		
	GEI Consultants, 2001. Ltr: Modification No. 7 of Part 2 Construction-Related Release Abatement Measure (RAM) Plan and Notification of exceedance of Anticipated Excavation Volume, Olin Corporation Property, 51 Eames St., Wilmington Ma., RTN 3-0471, May. [321]		
	GEI Consultants, 2001. Modification No. 8 of Part 2 Construction-Related Release Abatement Measure (RAM) Plan, June. [This document is presented in Appendix B of Interim Status Rpt. - Former Lake Poly Area Assessment Part 2 Construction-Related Release Abatement Measure Plan, Wilmington, October. [407]]		

Table 2.1-8
Summary of Construction-Related Release Abatement Measure Submittals

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Release Abatement Measure (RAM) Plans	Plan Modifications	Approvals	Reports
			GEI Consultants, 2001. Status Report No. 2, Part 2 Construction-Related Release Abatement Measure, Olin Property. Volume 1 of 2, August. [373]
		MADEP, 2001. Part 2 Construction-Related Release Abatement Measure Review of Status Report No. 2 Conditional Approval: Post Construction Monitoring Plan, October. [1286]	GEI Consultants, 2001. Status Report No. 2, Part 2 Construction-Related Release Abatement Measure, Olin Property. Volume 2 of 2, August. [374]
	GEI Consultants, 2001. Ltr: to C. Pyott, Re: Modification No. 9 of Part 2 Construction-Related RAM Plan, Wilm. Interim Strategy for Management of Former Biocell, October. [408]		
			GEI Consultants, 2001. Rpt. To Chris Pyott: Re - Interim Status Report - Former Lake Poly Area Assessment Part 2 Construction-Related Release Abatement Measure Plan, Wilmington, October. [419]
	GEI Consultants, 2001. Ltr to Christopher Pyott from Margret Hanley. Re: Addendum to Modification #4 of Part 2 Construction-Related Release Abatement Measure (RAM) Plan. Olin Corp. 51 Eames Street. RTN 3-0471, November. [429]		
			GEI Consultants, 2002. Status Report No. 3, Part 2, Construction-Related Release Abatement Measure (RAM) at the Olin Corporation Property in Wilmington, Massachusetts, February. [435]
	GEI Consultants, 2002. Modification No. 10 of Part 2 Construction-Related Release Abatement Measure (RAM) Plan, Central Pond Soil Remediation, July. [1411]		
		MADEP, 2002. Part 2 Construction Related Release Abatement Measure Status Report No. 4 Conditional Approval of Modifications to Post Construction Monitoring Plan, December 6. [1328]	GEI Consultants, 2002. Status Report No. 4. Part 2 Construction-Related Release Abatement Measure (RAM). RTN 3-0471, July. [603]
	GEI Consultants, 2002. Modification No. 11 of Part 2 Construction-Related Release Abatement Measure (RAM) Plan, Containment Area Temporary Cap Modification, November. [1412]		
			GEI Consultants, 2003. Status Report No. 5, Part 2 Construction-Related Release Abatement Measure (RAM). Olin Wilmington Property. RTN 3-0471, January. [701]
			GEI Consultants, 2003. Focused Feasibility Study – Former Lake Poly Area, 51 Eames Street, Wilmington, MA, RTN 3-0471, April. [544]

Table 2.1-8
Summary of Construction-Related Release Abatement Measure Submittals

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Release Abatement Measure (RAM) Plans	Plan Modifications	Approvals	Reports
		MADEP, 2003. Ltr to Stephen Morrow. Re: Wilmington - Olin Chemical, 51 Eames Street, RTN 3-0471. Part 2 Construction-Related Release Abatement Measure Status Report No.6; Approval of Modifications to Construction Release Abatement Measure, November. [862]	GEI Consultants, 2003. Status Report No. 6, Part 2 Construction-Related Release Abatement Measure (RAM). Olin Wilmington Property, 51 Eames St., Wilmington, MA. RTN 3-0471, September. [843]
		MADEP, 2004. Ltr to Steve Morrow. Re: Wilmington Olin Chemical, 51 Eames St., RTN 3-0471. Part 2 Construction-Related Abatement Measure Status Report No.7, June. [938 and 1035]	GEI Consultants, 2004. To Chris Pyott. Re: Status Report No. 7 - Part 2 Construction-Related Release Abatement Measure (RAM). Olin Wilmington Property. 51 Eames Street, Wilmington MA. RTN 3-0471, February. [915]
			GEI Consultants, 2004b. Status Report No. 8, Part 2 Construction-Related Release Abatement Measure (RAM), Olin Wilmington Property. 51 Eames St., Wilmington, MA. RTN 3-0471, September. [1040]
			MACTEC, 2004. Field Activity Report, Former Lake Poly Area, Olin Corporation Site. Wilmington, MA. RTN 3-0471, February. [in 903]
			GEI Consultants, 2004. Report to Chris Pyott. Re: Completion Statement and Addendum to Status Report No. 8, Part 2 Construction-Related Release Abatement Measure (RAM), 51 Eames St. Property, Wilmington, MA. RTN 3-0471, October. [1013]

Prepared/Date: MJM 8/15/07
Checked/Date: MH 10/1/07

Table 2.1-9
July 2001 Soil Samples From Lake Poly Area Submitted for Laboratory Analysis

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Soil Unit	Associated Borings	Confirmatory Suite	Disposal Suite	TCLP Chromium
A1	LPB7, LPB9, LPB23, LPB31, LPB32, LPB34	LPB7-S1 LPB7-S2		
A2	LPB24, LPB26, LPB27, LPB28	LPB28-S1 LPB28-S2		
A3	LPB1, LPB2, LPB13, LPB14	LPB14-S1 LPB14-S2		
B1	LPB3, LPB4, LPB5, LPB6, LPB22	LPB5-S1	LPB5-S2	LPB5-S1 LPB5-S2 LPB6-S2
B2	LPB16, LPB17	LPB16-S1	LPB16-S2	LPB16-S2
C1	LPB8, LPB19, LPB33	LPB8-S1	LPB8-S2	LPB33-S2
C2	LPB10, LPB18, LPB30	LPB10-S1	LPB10-S2	LPB10-S1 LPB10-S2 LPB18-S2
C3	LPB11, LPB12, LPB25	LPB12-S1	LPB12-S2 LPB12-S3	LPB12-S2 LPB12-S3
C4	LPB15, LPB29	LPB15-S1	LPB15-S3	LPB15-S1 LPB15-S3 LPB29-S2

Prepared by: MJM
Checked by: MH

Table 2.1-10
Stockpile / Waste Characterization Sample and Imported Soil Sample Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Volatiles	TCLP Volatiles	Semivolatiles	NDMA	TCLP Semi-volatiles	Pesticides	TCLP Pesticides	PCBs	Herbicides	TCLP Herbicides	Inorganics/Physical	Metals, Total	TCLP Metals	Total Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
			EXCAVATED SOIL AND WASTE DISPOSAL SAMPLES																			
Waste Characteriz	OLIN	S-W	06-Oct-98		ALL 5B	ALL 5B	Sample											1	23			
DISPOSAL	OLIN	S-W	09-Jun-99		WASTE CHARACTERIZATION	WASTE CHARACTERIZATION	Sample	64		67								5	23			
DISPOSAL	OLIN	S-W	09-Jun-99		WASTE CHARACTERIZATION RE	WASTE CHARACTERIZATION RE	Sample	62		67												
C-RAM	GEI	S-W	08-Aug-00		STOCKPILE	BAY1-8/7	Sample			67			22					1	3			
C-RAM	GEI	S-W	08-Aug-00		STOCKPILE	BAY4-8/7	Sample			67			22					1	3			
C-RAM	GEI	S-W	08-Aug-00		STOCKPILE	BAY1-8/7	Sample	63														
C-RAM	GEI	S-W	08-Aug-00		STOCKPILE	BAY4-8/7	Sample	63														
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-1	Sample	64														
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-1	Sample			67			22					1	3			
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-2E	Sample	64														
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-2E	Sample			67			22					1	3			
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-2W	Sample	64														
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-2W	Sample			67			22					1	3			
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-2W	Sample	64														
D-RAM	GEI	S-W	11-Aug-00		STOCKPILE	DB-SP-2W	Sample			67			22					1	3			
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3A	Sample			67			22						3			
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3A	Sample	64														
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3A	Sample											1				
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3B	Sample			67			22						3			
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3B	Sample	64														
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3B	Sample											1				
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3C	Sample			67			22						3			
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3C	Sample	64														
D-RAM	GEI	S-W	26-Aug-00		STOCKPILE	1120-DA-SP-3C	Sample											1				
Plant B	OLIN	S-W	29-Aug-00	Plant B	Plant B Dike Material	DIKE MATERIAL	Sample			67								1	23			
Plant B	OLIN	S-W	29-Aug-00	Plant B	Plant B Dike Material	SPENT FILTERS	Sample			67								1	23			
C-RAM	GEI	S-W	05-Sep-00	Biocell	C-RAM Stockpile - Biocell	1140-BP-SUB1	Sample	62						7				1	8			21
C-RAM	GEI	S-W	05-Sep-00	Biocell	C-RAM Stockpile - Biocell	1140-BP-SUB2	Sample	64						7				1	8			21
C-RAM	GEI	S-W	05-Sep-00	Biocell	C-RAM Stockpile - Biocell	1140-BP-SUB3	Sample	64						7				1	8			21
C-RAM	GEI	S-W	05-Sep-00	Biocell	C-RAM Stockpile - Biocell	1140-BP-SUB4	Sample	64						7				1	8			21
D-RAM	GEI	S-W	05-Sep-00		STOCKPILE	1120-DA-SP3E	Sample			67			19					1	3			
D-RAM	GEI	S-W	05-Sep-00		STOCKPILE	1120-DA-SP4	Sample			67			19					1	3			
D-RAM	GEI	S-W	05-Sep-00		STOCKPILE	1120-DA-SP3E	Sample	64										1				
D-RAM	GEI	S-W	05-Sep-00		STOCKPILE	1120-DA-SP4	Sample	64										1				
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP3D	Sample			67			19					1	3			
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP5A	Sample			67			19					1	3			
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP5B	Sample			67			19					1	3			
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP5C	Sample			67			19					1	3			
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP3D	Sample	64										1				
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP5A	Sample	64										1				
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP5B	Sample	64										1				
D-RAM	GEI	S-W	14-Sep-00		STOCKPILE	1120-DA-SP5C	Sample	64										1				
D-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-DA-SP6A	Sample			67			19					1	3			
D-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-DA-SP6B	Sample			67			19					1	3			

Table 2.1-10
Stockpile / Waste Characterization Sample and Imported Soil Sample Summary

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Sample Event	Company Sampled By	Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Volatiles	TCLP Volatiles	Semivolatiles	NDMA	TCLP Semi-volatiles	Pesticides	TCLP Pesticides	PCBs	Herbicides	TCLP Herbicides	Inorganics/Physical	Metals, Total	TCLP Metals	Total Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
D-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-DA-SP6C	Sample			67			19					1	3			
D-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-DA-SP6A	Sample	64										1				
D-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-DA-SP6B	Sample	64										1				
D-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-DA-SP6C	Sample	64										1				
C-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-BD-SP7A	Sample	64										1				
C-RAM	GEI	S-W	22-Sep-00		STOCKPILE	1120-BD-SP7A	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8A	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8B	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8C	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8D	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8E	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8F	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8G	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8H	Sample			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8H-D	Duplicate			67			19					1	3			
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8A	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8B	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8C	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8D	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8E	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8F	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8G	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8H	Sample	64										1				
D-RAM	GEI	S-W	26-Sep-00		STOCKPILE	1120-DA-SP8H-D	Duplicate	64										1				
C-RAM	GEI	S-W	30-Sep-00		STOCKPILE	1120-BD-9A	Sample	64										1				
C-RAM	GEI	S-W	30-Sep-00		STOCKPILE	1120-BD-9B	Sample	64										1				
C-RAM	GEI	S-W	30-Sep-00		STOCKPILE	1120-BD-9A	Sample			67			19					1	3			
C-RAM	GEI	S-W	30-Sep-00		STOCKPILE	1120-BD-9B	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-B	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-C	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-D	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-A	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-B	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-C	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-D	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-E	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-F	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-A	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP12-A	Sample			67			19					1	3			
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-B	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-C	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-D	Sample	62										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-A	Sample	64										1				

Table 2.1-10
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Sample Event	Company Sampled By	Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Volatiles	TCLP Volatiles	Semivolatiles	NDMA	TCLP Semi-volatiles	Pesticides	TCLP Pesticides	PCBs	Herbicides	TCLP Herbicides	Inorganics/Physical	Metals, Total	TCLP Metals	Total Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-B	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-C	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-D	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-E	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-F	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-A	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP12-A	Sample	64										1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-B	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-C	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-D	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-A	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-B	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-C	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-D	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-E	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-F	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-A	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP12-A	Sample											1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-A	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-B	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-C	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-D	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-E	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP10-F	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-A	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-B	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-C	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP11-D	Sample							7				1				
C-RAM	GEI	S-W	07-Oct-00		STOCKPILE	1130-SP12-A	Sample							7				1				
C-RAM	GEI	S-W	09-Oct-00		STOCKPILE	1140-WD-SP13A	Sample	64		67			19					1	3			
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14A	Sample		11			12		7			2			11		
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14B	Sample		11			12		7			2			11		
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14C	Sample		11			12		7			2			11		
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14A	Sample							7				4				
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14B	Sample							7				4				
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14C	Sample							7				4				
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14A	Sample											1				
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14B	Sample											1				
C-RAM	GEI	S-W	17-Oct-00		STOCKPILE	1120-BD-SP14C	Sample											1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-A	Sample	64										1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-B	Sample	64										1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-C	Sample	64										1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-D	Sample	64										1				

Table 2.1-10
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Wilmington, MA

Sample Event	Company Sampled By	Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Volatiles	TCLP Volatiles	Semivolatiles	NDMA	TCLP Semi-volatiles	Pesticides	TCLP Pesticides	PCBs	Herbicides	TCLP Herbicides	Inorganics/Physical	Metals, Total	TCLP Metals	Total Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-E	Sample	64										1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-F	Sample	64										1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-G	Sample	64										1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-GD	Duplicate	64										1				
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-A	Sample			67			19					2	8			
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-B	Sample			67			19					2	8			
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-C	Sample			67			19					2	8			
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-D	Sample			67			19					2	8			
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-E	Sample			67			19					2	8			
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-F	Sample			67			19					2	8			
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-G	Sample			67			19					2	8			
C-RAM	GEI	S-W	21-Oct-00		STOCKPILE	1130-SP15-GD	Duplicate			67			19					2	8			
C-RAM	GEI	S-W	27-Oct-00		STOCKPILE	1140-SD-SP17A	Sample			67			19					1	3			
C-RAM	GEI	S-W	27-Oct-00		STOCKPILE	1140-SD-SP17A	Sample	64										1				
C-RAM	GEI	S-W	27-Oct-00		STOCKPILE	1140-DA-SP16A	Sample		11			12		7			2	4		11		
C-RAM	GEI	S-W	27-Oct-00		STOCKPILE	1140-BD-SP14D	Sample		11			12		7			2	4		11		
C-RAM	GEI	S-W	31-Oct-00		STOCKPILE	1120-BD-SP14A	Sample	64										1				
C-RAM	GEI	S-W	31-Oct-00		STOCKPILE	1120-BD-SP14B	Sample	64										1				
C-RAM	GEI	S-W	31-Oct-00		STOCKPILE	1120-BD-SP14D	Sample	64										1				
C-RAM	GEI	S-W	31-Oct-00		STOCKPILE	1120-BD-SP14A	Sample			67			19					1	3			
C-RAM	GEI	S-W	31-Oct-00		STOCKPILE	1120-BD-SP14B	Sample			67			19					1	3			
C-RAM	GEI	S-W	31-Oct-00		STOCKPILE	1120-BD-SP14D	Sample			67			19					1	3			
C-RAM	GEI	S-W	14-Nov-00	Biocell	C-RAM Stockpile - Biocell	1140-BP-UND1	Sample			67								1	1			
C-RAM	GEI	S-W	14-Nov-00	Biocell	C-RAM Stockpile - Biocell	1140-BP-UND2	Sample			67								1	1			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-A	Sample							7				6	2			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-B	Sample							7				6	2			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-C	Sample							7				6	2			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-D	Sample							7				6	2			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-E	Sample							7				6	2			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-F	Sample							7				6	2			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-G	Sample							7				6	2			
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-A	Sample											1			5	
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-B	Sample											1			5	
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-C	Sample											1			5	
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-D	Sample											1			5	
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-E	Sample											1			5	
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-F	Sample											1			5	
C-RAM	GEI	S-W	30-Nov-00		STOCKPILE	1130-SP-15-G	Sample											1			5	
C-RAM	GEI	S-W	01-Dec-00		STOCKPILE	1160-SP18A	Sample	64										1				
C-RAM	GEI	S-W	01-Dec-00		STOCKPILE	1160-SP18A	Sample											1			5	
C-RAM	GEI	S-W	01-Dec-00		STOCKPILE	1160-SP18A	Sample		11			12		7			2			11		
C-RAM	GEI	S-W	01-Dec-00		STOCKPILE	1160-SP18A	Sample						19		7			6	8			
C-RAM	GEI	S-W	07-Dec-00		STOCKPILE	1130-SP-19	Sample	64										1				

Table 2.1-10
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C-RAM	GEI	S-W	07-Dec-00		STOCKPILE	1130-SP-19	Sample			67									3			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-A	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-B	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-C	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-D	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-E	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-F	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-A	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-B	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-C	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-D	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP12-A	Sample											5	7			
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-A	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-B	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-C	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-D	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-E	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP10-F	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-A	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-B	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-C	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP11-D	Sample											1			5	
C-RAM	GEI	S-W	12-Dec-00		STOCKPILE	1130-SP12-A	Sample											1			5	
C-RAM	GEI	S-W	02-Apr-01		STOCKPILE	1130-SP-19	Sample								7			1	5			4
C-RAM	GEI	S-W	06-Apr-01		STOCKPILE	1150-SP20A	Sample	64										1				
C-RAM	GEI	S-W	06-Apr-01		STOCKPILE	1150-SP20A	Sample			67			19		7			6	8			
C-RAM	GEI	S-W	06-Apr-01		STOCKPILE	1150-SP20A	Sample											1			5	
C-RAM	GEI	S-W	06-Apr-01		STOCKPILE	1150-SP20A TCLP	Sample													1		
	GEI	S-W	21-Apr-01		DRUM	ENV-SVE-S1-COMP	Sample	64										1				
	GEI	S-W	21-Apr-01		DRUM	ENV-SVE-S3-COMP	Sample	64										1				
	GEI	S-W	23-Apr-01		DRUM	ENV-SVE-S3-COMP 4/23/01	Sample			67								1				
C-RAM	GEI	S-W	23-Apr-01		STOCKPILE	1130-SP21A	Sample	64										1				
C-RAM	GEI	S-W	23-Apr-01		STOCKPILE	1130-SP21A	Sample			67			19		7			6	10			
C-RAM	GEI	S-W	27-Apr-01		STOCKPILE	1130-OLIN LOAM	Sample											1				
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN1	Sample			67					7				8			4
C-RAM	GEI	S-W	18-May-01		STOCKPILE	1130-SP22A	Sample	64										1				
C-RAM	GEI	S-W	18-May-01		STOCKPILE	1130-SP22A	Sample			67			19		7			6	10			
C-RAM	GEI	S-W	18-May-01		STOCKPILE	1130-SP22A	Sample											1			5	
C-RAM	GEI	S-W	18-May-01		STOCKPILE	1130-SP22A	Sample													1		
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1130-SP23A	Sample	64										1				
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1130-SP23B	Sample	64										1				
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1130-SP23A	Sample			67			19		7			6	9			
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1130-SP23B	Sample			67			19		7			6	9			

Table 2.1-10
Stockpile / Waste Characterization Sample and Imported Soil Sample Summary

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Sample Event	Company Sampled By	Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Volatiles	TCLP Volatiles	Semivolatiles	NDMA	TCLP Semi-volatiles	Pesticides	TCLP Pesticides	PCBs	Herbicides	TCLP Herbicides	Inorganics/Physical	Metals, Total	TCLP Metals	Total Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1130-SP23A	Sample													1		
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1130-SP23B	Sample													1		
C-RAM	GEI	S-W	31-May-01		STOCKPILE	1130-SP24	Sample	64									1					
C-RAM	GEI	S-W	31-May-01		STOCKPILE	1130-SP24	Sample			67			19				1	3				
C-RAM	GEI	S-W	13-Jun-01		STOCKPILE	1130-SP-24B	Sample	64									1					
C-RAM	GEI	S-W	13-Jun-01		STOCKPILE	1130-SP-24B	Sample			67							1	3				
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-1	Sample	64									1					
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-2	Sample	64									1					
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-3	Sample	64									1					
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-4	Sample	64									1					
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-5	Sample	64									1					
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-1	Sample			67			19		7		6	13				
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-2	Sample			67			19		7		6	13				
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-3	Sample			67			19		7		6	13				
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-4	Sample			67			19		7		6	13				
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-5	Sample			67			19		7		6	13				
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-1	Sample										1			6		
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-2	Sample										1			6		
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-3	Sample										1			6		
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-4	Sample										1			6		
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-5	Sample										1			6		
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-1	Sample												1			
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-2	Sample												1			
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-3	Sample												1			
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-4	Sample												1			
C-RAM	GEI	S-W	15-Jun-01	Biocell	C-RAM Stockpile - Biocell	1140-BP-DIS-5	Sample												1			
C-RAM	GEI	S-W	15-Jun-01		STOCKPILE	1130-SP-25	Sample	64									1					
C-RAM	GEI	S-W	15-Jun-01		STOCKPILE	1130-SP-25	Sample			67			19		7		6	13				
C-RAM	GEI	S-W	15-Jun-01		STOCKPILE	1130-SP-25	Sample										1			6		
C-RAM	GEI	S-W	15-Jun-01		STOCKPILE	1130-SP-25	Sample												1			
Disposal	GEI	S-W	30-Oct-01		DRUM	1160-DR-LPTP1 GRAB MS/MSD	Sample	64		67			19		7		6	8				
Disposal	GEI	S-W	30-Oct-01		DRUM	1160-DR-LPTP2 GRAB	Sample	64		67			19		7		6	8				
Disposal	GEI	S-W	30-Oct-01		DRUM	1160-DR-LPTP1 GRAB DRO MS/MSD	Sample										1			6		
Disposal	GEI	S-W	30-Oct-01		DRUM	1160-DR-LPTP2 GRAB DRO	Sample										1			6		
Disposal	GEI	S-W	30-Oct-01		STOCKPILE	1160-SP-LPHS GRAB	Sample	64									1					
Disposal	GEI	S-W	30-Oct-01		STOCKPILE	1160-SP-LPHS COMP	Sample			67			19		7		6	8				
Disposal	GEI	S-W	30-Oct-01		STOCKPILE	1160-SP-LPHS COMP DRO	Sample										1			6		
Disposal	GEI	S-W	30-Oct-01		STOCKPILE	1130-SP-24-2	Sample							7			6	7				
Disposal	GEI	S-W	30-Oct-01		STOCKPILE	1130-SP-24B-2	Sample							7			6	7				
Disposal	GEI	S-W	30-Oct-01		STOCKPILE	1130-SP-24-2 DRO	Sample										1			6		
Disposal	GEI	S-W	30-Oct-01		STOCKPILE	1130-SP-24B-2 DRO	Sample										1			6		
DISPOSAL	GEI	S-W	22-Jan-02		DRUM	1160-DR-LPTP1-A MS/MSD	Sample												2			
DISPOSAL	GEI	S-W	22-Jan-02		DRUM	1160-DR-LPTP2-A	Sample												1			

Table 2.1-10
Stockpile / Waste Characterization Sample and Imported Soil Sample Summary

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Sample Event	Company Sampled By	Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Volatiles	TCLP Volatiles	Semivolatiles	NDMA	TCLP Semi-volatiles	Pesticides	TCLP Pesticides	PCBs	Herbicides	TCLP Herbicides	Inorganics/Physical	Metals, Total	TCLP Metals	Total Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
DISPOSAL	GEI	S-W	22-Jan-02		STOCKPILE	1160-SP-LPHS-A	Sample													1		
DISPOSAL	LAW	S-W	01-Mar-02		DRUM	1160-DR-GWS GRAB MS/MSD	Sample	64									1					
DISPOSAL	LAW	S-W	01-Mar-02		DRUM	1160-DR-GWS COMP MS/MSD	Sample			67			19		7		6		8			
DISPOSAL	LAW	S-W	01-Mar-02		DRUM	1160-DR-GWS COMP DRO MS/MSD	Sample										1				6	
DISPOSAL	LAW	S-W	01-Mar-02		DRUM	1160-DR-GWS COMP MS/MSD	Sample													1		
DISPOSAL	LAW	S-W	01-Mar-02		STOCKPILE	1160-SP-KEMP	Sample										1					
Plant B	OLIN	S-W	03-Dec-02		STOCKPILE	1160-SP-Plant B Comp	Sample	1		66							9		8			
Plant B	OLIN	S-W	03-Dec-02		STOCKPILE	1160-SP-Plant B Grab	Sample	62		1							1					
Waste Characteriza	OLIN	S-W	22-May-03		WASTE CHARACTERIZATION	CTB 5/8	Sample	66		67							1		23			
Biocell	GEI	S-W	23-May-03		STOCKPILE	1140-BP-DS1	Sample	1		65							1				1	
Biocell	GEI	S-W	23-May-03		STOCKPILE	1140-BP-DS2	Sample	1		65							1				1	
Biocell	GEI	S-W	23-May-03		STOCKPILE	1140-BP-DS3	Sample	1		65							1				1	
Biocell	GEI	S-W	23-May-03		STOCKPILE	1140-BP-DS4	Sample	1		65							1				1	
Biocell	GEI	S-W	23-May-03		STOCKPILE	1140-BP-DS5	Sample	1		65							1				1	
Waste Characteriza	OLIN	S-W	18-Jun-03		WASTE CHARACTERIZATION	CTB-8	Sample										1			8		
Waste Characteriza	GEI	S-W	26-Aug-03		WASTE CHARACTERIZATION	1170-Capdrum	Sample	68		65			20		9		4		8	1	1	
Waste Characteriza	OLIN	S-W	07-Nov-03		WASTE CHARACTERIZATION	LPSG 11703	Sample						19		9	18	1					
Waste Characteriza	OLIN	S-W	07-Nov-03		WASTE CHARACTERIZATION	PBSG 11703	Sample						19		9	18	1					
Waste Characteriza	OLIN	S-W	07-Nov-03		WASTE CHARACTERIZATION	CPSG 11703	Sample	63		67			19		9	18	1		23			
Waste Characteriza	OLIN	S-W	07-Nov-03		WASTE CHARACTERIZATION	CPSG 11703	Sample													1		
Waste Characteriza	OLIN	S-W	03-Dec-03		WASTE CHARACTERIZATION	LPSG 12303	Sample				1						1					
Waste Characteriza	OLIN	S-W	03-Dec-03		WASTE CHARACTERIZATION	PBSG 12303	Sample				1						1					
Waste Characteriza	OLIN	S-W	03-Dec-03		WASTE CHARACTERIZATION	CPSG 12303	Sample				1						1					
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-1	Sample	75									1					
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-2	Sample	75									1					
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-3	Sample	75									1					
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-1	Sample			68			19		9		6		8		1	
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-2	Sample			68			19		9		6		8		1	
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-3	Sample			68			19		9		6		8		1	
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-1	Sample													1		
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-2	Sample													1		
Lake Poly Stockpil	GEI	S-W	07-Jul-04		STOCKPILE	LP-DIS-3	Sample													1		
			IMPORTED SOIL SAMPLES																			
C-RAM	GEI	S-W	12-Oct-00	C-RAM Stockpile - Imp	CAT-STOCKPILE	1130-CAT TILL-SP1	Sample	64		67					7		1		8			
C-RAM	GEI	S-W	12-Oct-00	C-RAM Stockpile - Imp	CAT-STOCKPILE	1130-CAT TILL-SP2	Sample	64		67					7		1		8			
C-RAM	GEI	S-W	12-Oct-00	C-RAM Stockpile - Imp	CAT-STOCKPILE	1130-CAT TILL-SP3	Sample	64		67					7		1		8			
C-RAM	GEI	S-W	12-Oct-00	C-RAM Stockpile - Imp	CAT-STOCKPILE	1130-CAT TILL-SP4	Sample	64		67					7		1		8			
C-RAM	GEI	S-W	12-Oct-00	C-RAM Stockpile - Imp	CAT-STOCKPILE	1130-CAT TILL-SP5	Sample	64		67					7		1		8			
C-RAM	GEI	S-W	12-Oct-00	C-RAM Stockpile - Imp	CAT-STOCKPILE	1130-CAT TILL-SP6	Sample	64		67					7		1		8			
C-RAM	GEI	S-W	27-Mar-01		STOCKPILE	1140-OSFILL-RLL	Sample			67			19		7	6	3		10			4
C-RAM	GEI	S-W	27-Mar-01		STOCKPILE	1140-OSFILL-BMCL	Sample			67			19		7	6	3		10			4
C-RAM	GEI	S-W	27-Mar-01		STOCKPILE	1140-OSFILL-RLC	Sample						19			6	1					
C-RAM	GEI	S-W	27-Mar-01		STOCKPILE	1140-OSFILL-BMCC	Sample						19			6	1					

Table 2.1-10
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Sample Event	Company Sampled By	Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Volatiles	TCLP Volatiles	Semivolatiles	NDMA	TCLP Semi-volatiles	Pesticides	TCLP Pesticides	PCBs	Herbicides	TCLP Herbicides	Inorganics/Physical	Metals, Total	TCLP Metals	Total Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
C-RAM	GEI	S-W	27-Mar-01		STOCKPILE	1140-OSFILL-RLL	Sample	64										1				
C-RAM	GEI	S-W	27-Mar-01		STOCKPILE	1140-OSFILL-BMCL	Sample	64										1				
C-RAM	GEI	S-W	02-Apr-01		STOCKPILE	1140-OSFILL-DHLL	Sample			67			19		7	6		3	10			4
C-RAM	GEI	S-W	02-Apr-01		STOCKPILE	1140-OSFILL-DHLL	Sample	64										1				
C-RAM	GEI	S-W	30-Apr-01		STOCKPILE	1140-OSFILL-CP1	Sample			67					7				8			4
C-RAM	GEI	S-W	30-Apr-01		STOCKPILE	1140-OSFILL-CP1	Sample	64														
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN2	Sample			67					7				8			4
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN3	Sample			67					7				8			4
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN4	Sample			67					7				8			4
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN5	Sample			67					7				8			4
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN1	Sample	64														
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN2	Sample	64														
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN3	Sample	64														
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN4	Sample	64														
C-RAM	GEI	S-W	01-May-01		STOCKPILE	1140-OSFILL-BEN5	Sample	64														
C-RAM	GEI	S-W	04-May-01		STOCKPILE	1140-OSPILL RL2	Sample	64										1				
C-RAM	GEI	S-W	04-May-01		STOCKPILE	1140-OSPILL RL2	Sample			67			19		7	6		3	10			5
C-RAM	GEI	S-W	10-May-01		STOCKPILE	1140-OSFILL-RL3	Sample	64														
C-RAM	GEI	S-W	10-May-01		STOCKPILE	1140-OSFILL-RL3	Sample			67								3	10			3
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1140-OSFILL-RL4	Sample	64										1				
C-RAM	GEI	S-W	22-May-01		STOCKPILE	1140-OSFILL-RL4	Sample			48						6		3	8			22
C-RAM	GEI	S-W	31-May-01		STOCKPILE	1140-OSFILL-RL5	Sample	64										1				
C-RAM	GEI	S-W	31-May-01		STOCKPILE	1140-OSFILL-RL5	Sample	3		64					7			1	8			22
C-RAM	GEI	S-W	31-May-01		STOCKPILE	1140-OSFILL-RL-5 RX (175543)	Sample											1				22
C-RAM	GEI	S-W	11-Jun-01		STOCKPILE	1140-OSFILL-RL6	Sample	64										1				
C-RAM	GEI	S-W	11-Jun-01		STOCKPILE	1140-OSFILL-RL6	Sample			66			19		7	6		3	10			5

Prepared/Date: KJC 07/27/07
Checked/Date: MJM 07/27/07

Table 2.1-11
Chronological Summary of Surface Water and Sediment Investigations

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Year	Study	Company	Surface Water	Sediment
1977 - 1978	Report on Groundwater and Surface Water Study, Stepan Chemical Company	GEI	X	
1981	Special Study Report, Hydrogeologic Investigation for Olin Chemicals Group	Malcolm-Pirnie	X	
May 1990	Olin Sediment Sampling in On-Property West Ditch and South Ditch	Olin		X
1992 - 1993	Phase II Surface Water/Sediment Investigations	CRA	X	X
June 1993	Risk Assessment to MADEP - Off-Property Sediment in East Ditch			X
1995	Supplemental Phase II Surface Water/Floc Investigations	Smith	X	
February 1995	South Ditch (SED-17)			X
September 1995	Central Pond Sampling (POND)			X
1996	Surface Water and Sediment Background Investigation	ABB-ES	X	X
1996-1997	Sediment Sampling to Support the Ecological Risk Assessment Activities	ABB-ES		X
August 1999	Sediment Bioremediation RAM	Law		X
2000	Focused Site Characterization Sediment Investigation	Law		X
May 2000	West Ditch Wetland, Central Pond, and South Ditch Pre-Remediation Sediment Characterization	Law		X
August 2000	Pre-Remediation Sediment Characterization (West Ditch Wetland)	GEI		X
September 2000	Central Pond Confirmatory Sampling	GEI		X
October 2000	October 5, 2000 Incident	GEI	X	X
October 2000	C-RAM On-Property West Ditch Wetland Confirmatory Sampling	GEI		X
October 2000	C-RAM Buried Debris Confirmatory Sampling	GEI		X
November 2000	C-RAM On-Property West Ditch Wetland Confirmatory Sampling	GEI		X
2001	Groundwater and Surface Water Elevation and Stream Flow Investigation	Law	X	
May 2001	May 5, 2001 Incident	GEI	X	
2001-2002	Maple Meadow Brook Surface Water and Sediment	Harding ESE	X	X
June 2003	Supplemental Phase II Off-Property West Ditch Sediment Sampling	MACTEC		X
June 2003	Annual PCMP Sediment Sampling - South Ditch and On-Property West Ditch	MACTEC		X
June 2003	East Ditch	MACTEC	X	X
November 2003	North Pond	MACTEC		X
April 2004	East Ditch	MACTEC	X	X
August 2004	Annual PCMP Sediment Sampling - South Ditch and On-Property West Ditch	MACTEC		X
May 2005	Annual PCMP Sediment Sampling - South Ditch and On-Property West Ditch	MACTEC		X
August 2005	Surface Soil and Sediment Sampling - Lower South Ditch Area	MACTEC		X
2005 - 2006	Supplemental South Ditch Investigation of South Ditch Surface Water Quality and Adjacent Groundwater Quality	MACTEC	X	

Prepared/Date: MH 07/27/07
Checked/Date: MJM 07/27/07

Table 2.1-12
Groundwater Monitoring Wells - Chronological Order

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Groundwater Sampling Location	Earliest Date of Sampling
GW-1	11-Nov-77
GW-2	11-Nov-77
GW-3S	11-Nov-77
GW-4	11-Nov-77
GW-5	11-Nov-77
GW-6S	11-Nov-77
GW-7	11-Nov-77
GW-8	11-Nov-77
GW-10S	11-Nov-77
GW-11	11-Nov-77
GW-12	11-Nov-77
W-101	31-May-78
GW-13	01-Mar-81
GW-14	01-Mar-81
GW-15	01-Mar-81
GW-16	01-Mar-81
GW-17D	01-Mar-81
GW-19D	01-Mar-81
GW-19S	01-Mar-81
GW-20	01-Mar-81
GW-21D	01-Mar-81
GW-22D	01-Mar-81
GW-22S	01-Mar-81
GW-17S	01-Apr-81
GW-18D	01-Apr-81
GW-23	01-Aug-81
GW-24	01-Aug-81
GW-25	01-Aug-81
GW-26	01-Aug-81
GW-2A	01-Aug-81
GW-3D	23-Jul-86
GW-21S	23-Jul-86
GW-28D	23-Jul-86
GW-28S	23-Jul-86
GW-29D	23-Jul-86
GW-29S	23-Jul-86
GW-6D	24-Jul-86
GW-10D	24-Jul-86
GW-27D	25-Jul-86
GW-27S	25-Jul-86
GW-30DR	25-Jul-86
GW-30S	25-Jul-86
GW-98	01-Jun-87
OB-1	01-Dec-87
OB-3	01-Dec-87
OB-4	01-Dec-87
PW-1	01-Dec-87
BR-1	19-May-88
GW-31D	19-May-88
GW-31S	19-May-88
GW-32D	19-May-88
GW-32S	19-May-88
IW-11	19-May-88
PW-2	19-May-88
SL-1D	19-May-88
SL-1S	19-May-88
SL-2	19-May-88

Table 2.1-12
Groundwater Monitoring Wells - Chronological Order

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Groundwater Sampling Location	Earliest Date of Sampling
SL-3	19-May-88
SL-5	19-May-88
SL-6	19-May-88
IW-12	08-Dec-88
IW-13	08-Dec-88
GT-4D	01-May-89
GT-4S	01-May-89
GT-5	01-May-89
GT-6D	01-May-89
GT-6S	01-May-89
GT-7	01-May-89
GT-9D	01-May-89
GT-9S	01-May-89
GW-39	01-Nov-89
GW-33D	16-Feb-90
GW-33S	16-Feb-90
GW-34D	16-Feb-90
GW-34S	16-Feb-90
GW-35D	16-Feb-90
GW-35S	16-Feb-90
GW-36	16-Feb-90
GW-37	16-Feb-90
GW-38	16-Feb-90
OB-2	01-May-90
GW-4D	01-Aug-91
GW-40D	01-Aug-91
GW-40S	01-Aug-91
GW-42D	01-Aug-91
GW-42S	01-Aug-91
GW-43D	01-Aug-91
GW-43S	01-Aug-91
GW-47	01-Aug-91
GW-48D	01-Aug-91
GW-48S	01-Aug-91
GW-50D	01-Aug-91
GW-50S	01-Aug-91
GW-51D	01-Aug-91
GW-51S	01-Aug-91
GW-52D	01-Aug-91
GW-52S	01-Aug-91
GW-53D	01-Aug-91
GW-53S	01-Aug-91
GW-54D	01-Aug-91
GW-54S	01-Aug-91
GW-55D	01-Aug-91
GW-55S	01-Aug-91
GW-56D	01-Aug-91
GW-56S	01-Aug-91
GW-45D	13-Dec-91
GW-44D	27-Jan-92
GW-44S	08-Feb-92
GW-46D	08-Feb-92
GW-57D	08-Feb-92
GW-59D	08-Feb-92
GW-59S	08-Feb-92
GW-61D	12-May-92
GW-61S	12-May-92

Table 2.1-12
Groundwater Monitoring Wells - Chronological Order

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Groundwater Sampling Location	Earliest Date of Sampling
GW-62D	12-May-92
GW-62M	12-May-92
GW-62S	12-May-92
GW-60D	13-May-92
GW-60S	13-May-92
GW-68D	06-Aug-92
GW-69D	06-Aug-92
GW-69S	06-Aug-92
GW-45S	10-Aug-92
GW-70D	10-Aug-92
GW-70S	10-Aug-92
GW-58D	11-Aug-92
GW-58S	11-Aug-92
GW-66D	11-Aug-92
GW-66S	11-Aug-92
B-03	12-Aug-92
GW-49D	12-Aug-92
GW-63D	12-Aug-92
GW-63S	12-Aug-92
GW-64D	12-Aug-92
GW-64S	12-Aug-92
IW-4	12-Aug-92
GW-62BR	13-Aug-92
GW-65D	13-Aug-92
GW-65S	13-Aug-92
GW-67D	13-Nov-92
GW-67S	13-Nov-92
GW-72D	17-Nov-92
GW-68BR	17-Dec-92
GW-71D	17-Dec-92
GW-71S	17-Dec-92
GW-61BR	18-Dec-92
GW-62BRD	07-Jan-93
GW-73D	20-Apr-93
GW-73S	20-Apr-93
GW-74D	20-Apr-93
GW-74S	20-Apr-93
GW-75D	07-May-93
GW-75S	07-May-93
GW-78S	01-Feb-95
GW-79S	01-Feb-95
GW-76S	02-Feb-95
GW-77S	02-Feb-95
GW-65BR	12-Oct-95
GW-80BR	12-Oct-95
GW-80D	12-Oct-95
GW-80S	12-Oct-95
GW-81BR	12-Oct-95
GW-81D	12-Oct-95
MP-1 #16	17-Apr-96
MP-1 #17	17-Apr-96
MP-1 #18	17-Apr-96
MP-1 #01	18-Apr-96
MP-1 #02	18-Apr-96
MP-1 #04	18-Apr-96
MP-1 #05	18-Apr-96
MP-1 #08	18-Apr-96

Table 2.1-12
Groundwater Monitoring Wells - Chronological Order

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Groundwater Sampling Location	Earliest Date of Sampling
MP-1 #10	18-Apr-96
MP-1 #11	18-Apr-96
MP-1 #12	18-Apr-96
MP-1 #13	18-Apr-96
MP-1 #14	18-Apr-96
MP-2 #01	20-May-96
MP-2 #02	20-May-96
MP-2 #03	20-May-96
MP-2 #04	20-May-96
MP-2 #06	20-May-96
MP-2 #07	20-May-96
MP-2 #08	20-May-96
MP-2 #09	20-May-96
MP-2 #10	20-May-96
MP-2 #11	20-May-96
MP-2 #12	20-May-96
MP-2 #13	20-May-96
MP-2 #14	20-May-96
MP-2 #15	20-May-96
MP-2 #16	20-May-96
MP-2 #17	20-May-96
MP-3 #05	21-May-96
MP-3 #06	21-May-96
MP-3 #07	21-May-96
MP-3 #08	21-May-96
MP-3 #09	21-May-96
MP-3 #10	21-May-96
MP-3 #11	21-May-96
MP-3 #12	21-May-96
MP-3 #13	21-May-96
MP-3 #14	21-May-96
MP-3 #15	21-May-96
MP-3 #16	21-May-96
MP-3 #17	21-May-96
MP-3 #18	21-May-96
MP-3 #19	21-May-96
MP-3 #20	21-May-96
MP-3 #21	21-May-96
MP-3 #01	22-May-96
MP-3 #02	22-May-96
MP-3 #03	22-May-96
MP-3 #04	22-May-96
MP-1 #03	23-May-96
MP-1 #06	23-May-96
MP-1 #07	23-May-96
GW-82D	30-Sep-96
GW-82S	01-Oct-96
GW-83D	03-Oct-96
GW-83M	04-Oct-96
GW-83S	04-Oct-96
MB-1	07-Oct-96
MB-2	11-Oct-96
GW-85D	16-Oct-96
GW-85M	17-Oct-96
GW-84D	12-Nov-96
GW-84M	12-Nov-96
MB-3	12-Nov-96

Table 2.1-12
Groundwater Monitoring Wells - Chronological Order

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Groundwater Sampling Location	Earliest Date of Sampling
GW-84S	13-Nov-96
GW-87D	25-Nov-96
GW-86S	26-Nov-96
GW-86D	02-Dec-96
GW-86M	02-Dec-96
IW-6	24-Jul-97
IW-10	24-Jul-97
GW-101	02-Dec-97
SL-7	23-Apr-98
SL-8	23-Apr-98
AN-1	24-Apr-98
AN-2	24-Apr-98
MG-02-A	24-Apr-98
MG-02-C	24-Apr-98
MW-3	29-Apr-98
MW-5	29-Apr-98
MW-8D	29-Apr-98
SB-5	24-Aug-98
E-10	26-Aug-98
SB-1	26-Aug-98
W-10	27-Aug-98
SB-2	28-Aug-98
SB-3	31-Aug-98
SB-4	02-Sep-98
SB-6	03-Sep-98
GW-103BR	25-May-99
GW-103D	25-May-99
B-17	07-Dec-99
GW-16B	07-Jun-00
MP-4 #11	28-Jun-00
MP-4 #12	28-Jun-00
MP-4 #13	28-Jun-00
MP-4 #14	28-Jun-00
MP-4 #01	29-Jun-00
MP-4 #02	29-Jun-00
MP-4 #03	29-Jun-00
MP-4 #05	29-Jun-00
MP-4 #08	29-Jun-00
MP-4 #09	29-Jun-00
MP-4 #10	29-Jun-00
B-10	01-Nov-00
B-07-A	23-May-01
GW-CA1	24-May-01
GW-CA2	24-May-01
GW-LPB-11	27-Jul-01
GW-202D	25-Feb-02
GW-202S	25-Feb-02
GW-34SR	26-Feb-02
GW-201S	26-Feb-02
SL-6D	15-Mar-02
SD-OW3	02-Apr-03
B-05-R	03-Apr-03
GW-100	03-Apr-03
GW-102	03-Apr-03
IW-1	03-Apr-03
IW-3	03-Apr-03
MW-203D	03-Apr-03

Table 2.1-12
Groundwater Monitoring Wells - Chronological Order

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Groundwater Sampling Location	Earliest Date of Sampling
MW-203S	03-Apr-03
MW-204M	03-Apr-03
MW-206D	03-Apr-03
MW-206S	03-Apr-03
P5	03-Apr-03
IW-2	30-Sep-03
MW-204D	02-Oct-03
MW-204S	02-Oct-03
LPB-40	18-Dec-03
LPB-44	18-Dec-03
LPB-47	18-Dec-03
ECS-2	10-Feb-04
ECS-6	10-Feb-04
GW-308	10-Feb-04
GW-301	22-Mar-04
GW-302	23-Mar-04
GW-303	23-Mar-04
GW-304	23-Mar-04
GW-305	24-Mar-04
GW-306	24-Mar-04
GW-307	24-Mar-04
PZ-W1	10-May-04
PZ-W2	10-May-04
SVEMW-9	22-Jul-04
PZ-W3	09-Aug-04
GW-88D	09-Sep-05
GW-88M	09-Sep-05
GW-88S	09-Sep-05
PZ-16RR	19-Sep-05
PZ-17RR	19-Sep-05
PZ-18R	19-Sep-05
PZ-20	19-Sep-05
PZ-22	19-Sep-05
PZ-24	19-Sep-05
PZ-25	19-Sep-05
MP-5	28-Sep-05
MP-5 #06	11-Oct-05
MP-5 #08	11-Oct-05
MP-5 #09	11-Oct-05
MP-5 #12	11-Oct-05
MP-5 #15	11-Oct-05
MP-5 #03	12-Oct-05
MP-5 #05	12-Oct-05
MP-5 #11	12-Oct-05
PZ-21	26-Oct-05
PZ-23	26-Oct-05
Prepared/Date: KJC 07/31/07	
Checked/Date MJM 08/01/07	

Table 2.1-13
Summary of Water Samples Collected from Wells At Private Residences

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	ompany Sampled E	Matrix	RI Status	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-117	DW9	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-117	DW10DUP9	Duplicate	DUP OF 1460799				56	1															
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-54	DW7	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-63	DW1	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-63	DW1A	Duplicate	DUP OF 1460791	66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-64	DW3	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-65	DW5	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-66	DW4	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-72A	DW2	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-87A	DW8	Sample		66			66	1		19	7	2		19		6	2						
CRA WORK PLAN	ABB-ES	GW		15-Oct-90	Private Wells	M-24/L-94	DW6	Sample		66			66	1		19	7	2		19		6	2						
	OLIN	GW		16-Sep-91	Private Wells	M-25/L-03	M-25/L-03	Sample		51			56	1		4		3		19		9							
	OLIN	GW		16-Sep-91	Private Wells	M-25/L-04	M-25/L-04	Sample		51			56	1		4		3		19		9							
	OLIN	GW		16-Sep-91	Private Wells	M-25/L-06	M-25/L-06	Sample		51			56	1		4		3		19		9							
	OLIN	GW		16-Sep-91	Private Wells	M-25/L-07	M-25/L-07	Sample		51			56	1		4		3		19		8							
	OLIN	GW		16-Sep-91	Private Wells	M-25/L-07	M-25/L-07	Duplicate	DUP OF 1460756	51			56	1		4		3		19		9							
	OLIN	GW		16-Sep-91	Private Wells	M-25/L-08-IN	M-25/L-08-IN	Sample		51			56	1		4		2		19		9							
	OLIN	GW		16-Sep-91	Private Wells	M-25/L-08-OUT	M-25/L-08-OUT	Sample		51			56	1		4		3		19		9							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-117	RES-7	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-54	RES-2	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-63	RES-5	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-64	RES-4	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-65	RES-6	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-66	RES-3	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-72A	RES-1	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-87A	RES-8	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-24/L-94	RES-10	Sample												1		3							
	OLIN	GW		10-Mar-92	Private Wells	M-25/L-08-IN	RES-9	Sample												1		3							
		GW		15-Feb-94	Private Wells	M-24/L-63	RES-5	Sample												1		3							
		GW		15-Feb-94	Private Wells	M-24/L-72A	RES-1	Sample	RES-2											1		3							
		GW		15-Feb-94	Private Wells	M-24/L-87A	RES-8	Sample	RES-8											1		3							
		GW		15-Feb-94	Private Wells	M-24/L-94	RES-10	Sample	RES-10											1		3							
		GW		15-Feb-94	Private Wells	M-25/L-04	RES-11	Sample	RES-11											1		3							
		GW		15-Feb-94	Private Wells	M-25/L-08-IN	RES-9	Sample	RES-9											1		3							
		GW		18-May-94	Private Wells	M-24/L-117	POPA	Sample												1		3							
		GW		18-May-94	Private Wells	M-24/L-64	HAR	Sample												1		3							
		GW		20-Jul-95	Private Wells	M-24/L-116	GORDON	Sample												1		3							
		GW		20-Jul-95	Private Wells	M-24/L-54	CANNING	Sample												1		3							
		GW		20-Jul-95	Private Wells	M-24/L-63	SPERANZA	Sample												1		3							
		GW		20-Jul-95	Private Wells	M-24/L-64	HARRIS	Sample												1		3							
		GW		20-Jul-95	Private Wells	M-24/L-87A	LESSARD	Sample												1		3							
		GW		20-Jul-95	Private Wells	M-24/L-94	SULLIVAN	Sample												1		3							
		GW		20-Jul-95	Private Wells	M-25/L-08-IN	GRASSO	Sample												1		3							
		GW		27-Jul-95	Private Wells	M-24/L-72A	RES-1A	Sample												1		3							
		GW		13-Aug-96	Private Wells	M-24/L-54	CANNING	Sample		58			17			16				23		8							
		GW		13-Aug-96	Private Wells	M-24/L-64	HARRIS	Sample		58			17			16				23		8							
		GW		13-Aug-96	Private Wells	M-24/L-66	KRUSE	Sample		58			17			16				23		8							
		GW		13-Aug-96	Private Wells	M-24/L-66	DUP#2	Duplicate		58			17			16				23		8							
		GW		13-Aug-96	Private Wells	M-24/L-87A	LESSARD	Sample		58			17			16				23		8							
		GW		13-Aug-96	Private Wells	M-24/L-94	SULLIVAN	Sample		58			17			16				23		8							
		GW		13-Aug-96	Private Wells	M-25/L-04	GATTA	Sample		58			17			16				23		8							
		GW		14-Aug-96	Private Wells	M-24/L-116	BAKER	Sample		58			4		13	16				23		8							
		GW		14-Aug-96	Private Wells	M-24/L-117	POPA	Sample		58			4		13	16				23		8							

Table 2.1-13
Summary of Water Samples Collected from Wells At Private Residences

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	ompany Sampled E	Matrix	RI Status	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
		GW		14-Aug-96	Private Wells	M-24/L-63	SPERANZA	Sample		58			4		13	16				23		8						
		GW		14-Aug-96	Private Wells	M-24/L-72A	INGRAM	Sample		58			4		13	16				23		8						
		GW		14-Aug-96	Private Wells	M-25/L-07	SPINAZOLA	Sample		58			4		13	16				23		8						
		GW		14-Aug-96	Private Wells	M-25/L-08-IN	DUP#1	Duplicate		58			4		13	16				23		8						
		GW		14-Aug-96	Private Wells	M-25/L-08-IN	GRASSO	Sample		58			4		13	16				23		8						
		GW		01-Oct-96	Private Wells	M-24/L-116	BAKER	Sample		60																		
		GW		21-May-97	Private Wells	M-24/L-65	M-24/L-65	Sample		37			66							23		3		2	1			
		GW		21-May-97	Private Wells	M-24/L-65	M-24/L-65	Duplicate		37			66							23		3						
Private Wells	LAW	GW		23-Apr-98	Private Wells	M-24/L-117	Poppa	Sample												7		8						
Private Wells	LAW	GW		23-Apr-98	Private Wells	M-24/L-87A	Lessard	Sample													7	8						
Private Wells	LAW	GW		23-Apr-98	Private Wells	M-24/L-94	Sullivan	Sample												7		8						
Private Wells	LAW	GW		24-Apr-98	Private Wells	M-24/L-116	Baker	Sample												7		8						
Private Wells	OLIN	GW		14-Sep-99	Private Wells	M-24/L-117	POPA	Sample												7		9						
Private Wells	OLIN	GW		14-Sep-99	Private Wells	M-24/L-63	SPERANZA	Sample												7		9						
Private Wells	OLIN	GW		14-Sep-99	Private Wells	M-24/L-65	SYRING	Sample												7		9						
Private Wells	OLIN	GW		14-Sep-99	Private Wells	M-24/L-65	DUPLICATE	Duplicate												7		9						
Private Wells	OLIN	GW		14-Sep-99	Private Wells	M-24/L-72A	INGRAM	Sample												7		9						
Private Wells	OLIN	GW		14-Sep-99	Private Wells	M-24/L-87A	LESSARD	Sample												7		9						
Private Wells	OLIN	GW		14-Sep-99	Private Wells	M-24/L-94	SULLIVAN	Sample												7		9						
Private Wells	OLIN	GW		20-Oct-99	Private Wells	M-25/L-04	GATTA	Sample												7		9						
Private Wells	OLIN	GW		11-Nov-99	Private Wells	M-24/L-116	Baker	Sample												7		9						
Private Wells	OLIN	GW		25-Oct-00	Private Wells	M-24/L-63	SPERANZA	Sample												7		9						
Private Wells	OLIN	GW		25-Oct-00	Private Wells	M-24/L-87A	LESSARD	Sample												7		9						
Private Wells	OLIN	GW		09-Oct-01	Private Wells	M-24/L-63	SPERANZA MS/MSD	Sample												7		9						
Private Wells	OLIN	GW		09-Oct-01	Private Wells	M-24/L-65	SYRING	Sample												7		9						
Private Wells	OLIN	GW		17-Oct-01	Private Wells	M-24/L-87A	LESSARD MS/MSD	Sample												7		9						
Private Wells	OLIN	GW		28-Nov-01	Private Wells	M-24/L-116	BAKER MS/MSD	Sample												7		7						
Private Wells	OLIN	GW		30-Aug-02	Private Wells	M-2/L-7E	Marshall	Sample												7		9						
Private Wells	OLIN	GW		3/19/2003	Private Wells	M-24/L-117	Ciccariello	Sample												7		9						
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-14/L-2B	234 Chestnut-14/2B	Sample		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-14/L-2B	234 Chestnut-14/2B DUP	Duplicate		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-14/L-2B	234 Chestnut-14/2B	Sample											2									
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-14/L-2B	234 Chestnut-14/2B	Sample							18													
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-14/L-2B	234 Chestnut-14/2B DUP	Duplicate							18													
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-24/L-33A	900 Main-24/33A	Sample		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-24/L-33A	900 Main-24/33A DUP	Duplicate		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-24/L-33A	900 Main-24/33A	Sample											2									
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-24/L-33A	900 Main-24/33A	Sample							18													
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-24/L-33A	900 Main-24/33A DUP	Duplicate							18													
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-38/L-1	850 Main-38/1	Sample		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-38/L-1	850 Main-38/1 DUP	Duplicate		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-38/L-1	850 Main-38/1	Sample											2									
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-38/L-1	850 Main-38/1	Sample							18													
Private Wells	MACTEC	GW		10/29/2003	Private Wells	M-38/L-1	850 Main-38/1 DUP	Duplicate							18													
Private Wells	MACTEC	GW		10/30/2003	Private Wells	M-15/L-2C	86 Butters Row 15/2C	Sample		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/30/2003	Private Wells	M-15/L-2C	86 Butters Row 15/2C DUP	Duplicate		76	2		68								20	10					6	
Private Wells	MACTEC	GW		10/30/2003	Private Wells	M-15/L-2C	86 Butters Row 15/2C	Sample											2									
Private Wells	MACTEC	GW		10/30/2003	Private Wells	M-15/L-2C	86 Butters Row 15/2C	Sample							18													
Private Wells	MACTEC	GW		10/30/2003	Private Wells	M-15/L-2C	86 Butters Row 15/2C DUP	Duplicate							18													
Private Wells	MACTEC	GW		11/18/2003	Private Wells	56/58 Butters Row	56/58 Butters Row	Sample		75	2		70		18				2		20	10					6	
Private Wells	MACTEC	GW		11/18/2003	Private Wells	56/58 Butters Row	56/58 BUTTERS ROW	Sample						1														
Private Wells	MACTEC	GW		11/18/2003	Private Wells	56/58 Butters Row	56/58 BUTTERS ROW DUP	Duplicate						1														
Private Wells	MACTEC	GW		12/2/2003	Private Wells	M-14/L-2B	234 CHESTNUT 14/2B	Sample						1														

Table 2.1-13
Summary of Water Samples Collected from Wells At Private Residences

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	ompany Sampled E	Matrix	RI Status	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Private Wells	MACTEC	GW		12/2/2003	Private Wells	M-14/L-2B	234 CHESTNUT 14/2B DUP	Duplicate						1														
Private Wells	MACTEC	GW		12/2/2003	Private Wells	M-15/L-2C	86 BUTTERS ROW 15/2C	Sample						1														
Private Wells	MACTEC	GW		12/2/2003	Private Wells	M-15/L-2C	86 BUTTERS ROW 15/2C DUP	Duplicate						1														
Private Wells	MACTEC	GW		12/2/2003	Private Wells	M-38/L-1	850 MAIN ST	Sample						1														
Private Wells	MACTEC	GW		12/2/2003	Private Wells	M-38/L-1	850 MAIN ST DUP	Duplicate						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-63	Speranza	Sample			2																	
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-63	SPERANZA 1	Sample						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-63	SPERANZA 2	Duplicate						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-64	Trites	Sample			2																	
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-64	TRITES 1	Sample						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-64	TRITES 2	Duplicate						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-65	SYRING 2	Duplicate						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-65	SYRING 1	Sample						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-72A	Ingram	Sample			2																	
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-72A	INGRAM 1	Sample						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-72A	INGRAM 2	Duplicate						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-74	Syring	Sample			2																	
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-87A	Lessard	Sample			2																	
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-87A	LESSARD 1	Sample						1														
Private Wells	OLIN	GW		1/20/2004	Private Wells	M-24/L-87A	LESSARD 2	Duplicate						1														
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-63	Speranza 1	Sample												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-63	Speranza 2	Duplicate												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-64	Trites 1	Sample												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-64	Trites 2	Duplicate												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-65	Syring 1	Sample												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-65	Syring 2	Duplicate												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-72A	Ingram 1	Sample												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-72A	Ingram 2	Duplicate												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-87A	Lessard 1	Sample												7		10						
Private Wells	OLIN	GW		1/29/2004	Private Wells	M-24/L-87A	Lessard 2	Duplicate												7		10						
Private Wells	OLIN	GW		3/10/2004	Private Wells	M-24/L-117	Ciccariello 1	Sample													7	10						
Private Wells	OLIN	GW		3/10/2004	Private Wells	M-24/L-117	Ciccariello 2	Duplicate													7	10						
Private Wells	OLIN	GW		3/10/2004	Private Wells	M-24/L-117	CICCARIELLO 1	Sample						1														
Private Wells	OLIN	GW		3/10/2004	Private Wells	M-24/L-117	CICCARIELLO 2	Duplicate						1														
Private Wells	MACTEC	GW		5/27/2004	Private Wells	M-25/L-05	905 Main St	Sample			2	3									7	9			1			
Private Wells	MACTEC	GW		5/27/2004	Private Wells	M-25/L-05	905 Main St	Sample						1														
Private Wells	MACTEC	GW		2/2/2005	Private Wells	M-24/L-94	23 Cook Ave - 24/94	Sample		75	2		68		18				2		20	10					6	
Private Wells	MACTEC	GW		2/2/2005	Private Wells	M-24/L-94	23 Cook Ave - 24/94 Dup	Duplicate		75	2										5	9					6	
Private Wells	MACTEC	GW		2/2/2005	Private Wells	M-24/L-94	23 Cook Ave-24/94	Sample						1														
Private Wells	MACTEC	GW		2/2/2005	Private Wells	M-24/L-94	23 Cook Ave-24/94 DUP	Duplicate						1														

Prepared/Date: KJC 07/27/07
Checked/Date: MJM 07/27/07

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Open/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
		GW	3/25/1988	Town Well	BUTTERS ROW 1	1000398			BUTTERS ROW 1	Sample												7		7		2					
		GW	2/13/1989	Town Well	BUTTERS ROW 1	1000399			BUTTERS ROW 1	Sample												8		7		2					
		GW	5/30/1990	Town Well	BUTTERS ROW 1	1000400			BUTTERS ROW 1	Sample												7		7		2					
Town & Sentinel		GW	2/22/1992	Town Well	BUTTERS ROW 1	1000401	92053	92053001	BUTTERS ROW 1	Sample												1		3							
		GW	9/10/1992	Town Well	BUTTERS ROW 1	1460001			BUTTERS ROW 1	Sample		13			5							9		6							
Town & Sentinel		GW	10/20/1993	Town Well	BUTTERS ROW 1	1000403	WJ-1283	WJ-1283-2	BUTTERS ROW 1	Sample												1		3							
Town & Sentinel		GW	2/15/1994	Town Well	BUTTERS ROW 1	1000404	WK-0170	WK-0170-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel		GW	5/10/1994	Town Well	BUTTERS ROW 1	1000405	WK-0584/WK-0594	WK-0594-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel		GW	5/10/1994	Town Well	BUTTERS ROW 1	1000442	WK-0584/WK-0594	WK-0594-1	BUTTERS ROW 1	Replicate	REPLICATE1000443											4		5							
Town & Sentinel		GW	5/10/1994	Town Well	BUTTERS ROW 1	1000443	WK-0584/WK-0594	WK-0594-1	BUTTERS ROW 1	Duplicate	DUP OF 1000405													3							
Town & Sentinel		GW	8/24/1994	Town Well	BUTTERS ROW 1	1460700	WK-1160/WK-1164	WK-1164-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel		GW	11/15/1994	Town Well	BUTTERS ROW 1	1460705	WK-1673/WK-1674	WK-1674-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel	LAW	GW	12/5/1994	Town Well	BUTTERS ROW 1	1460968	151	940010485	BUTTERS ROW 1	Sample												4		4							
Town & Sentinel		GW	2/8/1995	Town Well	BUTTERS ROW 1	1460710	WL-0225/WL-0230	WL-0225-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel		GW	5/31/1995	Town Well	BUTTERS ROW 1	1460429	WL-0848/WL-0850	WL-0848-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel		GW	9/27/1995	Town Well	BUTTERS ROW 1	1460485	WL-1491/WL-1492	WL-1492-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel		GW	12/13/1995	Town Well	BUTTERS ROW 1	1460957	WL-2122/WL-2116	WL-2122-1	BUTTERS ROW 1	Sample												4		6							
Town & Sentinel		GW	3/27/1996	Town Well	BUTTERS ROW 1	1460728	WM-0570	WM-0570	BUTTERS ROW 1	Sample												4		6							
		GW	6/19/1996	Town Well	BUTTERS ROW 1	1460971	O107-006	O107-006-01	BUTTERS ROW #1	Sample												4		5							
Town & Sentinel		GW	7/31/1996	Town Well	BUTTERS ROW 1	1461079	961462A	961462A-05	BUTTERS ROW 1	Sample	FILTERED 1461098												4	5							
Town & Sentinel		GW	7/31/1996	Town Well	BUTTERS ROW 1	1461098	961462A	961462A-09	BUTTERS ROW 1	Sample												1				2	1				
Town & Sentinel		GW	7/31/1996	Town Well	BUTTERS ROW 1	1461085	961462A	961462A-09	BUTTERS ROW 1	Duplicate	FILTDUP 1461079												4	5							
Town & Sentinel		GW	7/31/1996	Town Well	BUTTERS ROW 1	1461104	961462A	961462A-05	BUTTERS ROW 1	Duplicate	DUP OF 1461098											1									
Town & Sentinel		GW	8/27/1996	Town Well	BUTTERS ROW 1	1461053	961654A	961654A-01	BUTTERS ROW 1	Sample	FILTERED												4	7		2	1				
Town & Sentinel		GW	8/27/1996	Town Well	BUTTERS ROW 1	1461069	961654A	961654A-15	BUTTERS ROW 1	Duplicate	FILTDUP 1461053												4	7							
Town & Sentinel		GW	9/24/1996	Town Well	BUTTERS ROW 1	1461113	961908A	961908A-01	BUTTERS ROW 1	Sample	FILTERED												4	6		3	1				
Town & Sentinel		GW	9/24/1996	Town Well	BUTTERS ROW 1	1461129	961908A	961908A-15	BUTTERS ROW 1	Duplicate	FILTDUP 1461113												4	6							
Town & Sentinel		GW	10/24/1996	Town Well	BUTTERS ROW 1	1461208	962201A	962201A-02	BUTTERS ROW 1	Sample	FILTERED												6	7		3	1				
Town & Sentinel		GW	10/24/1996	Town Well	BUTTERS ROW 1	H000078	F962203A	F962203A-02	Butters Row No. 1-1	Sample												1		3							
Town & Sentinel		GW	10/24/1996	Town Well	BUTTERS ROW 1	H000079	F962203A	F962203A-01	Butters Row No. 1-0	Sample												1		3							
Town & Sentinel		GW	10/25/1996	Town Well	BUTTERS ROW 1	H000077	F962203A	F962203A-03	Butters Row No. 1-2	Sample												1		3							
Town & Sentinel		GW	10/26/1996	Town Well	BUTTERS ROW 1	H000076	F962203A	F962203A-04	Butters Row No. 1-3	Sample												1		3							
Town & Sentinel		GW	10/29/1996	Town Well	BUTTERS ROW 1	H000065	F962203A	F962203A-05	Butters Row No. 1-4	Sample												1		3							
Town & Sentinel		GW	12/18/1996	Town Well	BUTTERS ROW 1	1461426	962687A	962687A-01	BUTTERS ROW 1	Sample	FILTERED												6	7		3	1				
Town & Sentinel		GW	1/23/1997	Town Well	BUTTERS ROW 1	1461539	970096A	970096A-02	BUTTERS ROW 1	Sample	FILTERED												6	7		3	1				
Town & Sentinel		GW	2/25/1997	Town Well	BUTTERS ROW 1	H000083	F970395A	F970395A-02	BUTTERS ROW 1	Sample												7		7		1					
Town & Sentinel		GW	3/25/1997	Town Well	BUTTERS ROW 1	H000082	F970575A	F970575A-01	BUTTERS ROW 1	Sample												6		7							
		GW	4/23/1997	Town Well	BUTTERS ROW 1	1461652				Sample												6		10		1	1				
		GW	5/20/1997	Town Well	BUTTERS ROW 1	1461673				Sample												6		9		1	1				
		GW	6/24/1997	Town Well	BUTTERS ROW 1	1461700				Sample												6		9		1	1				
		GW	9/9/1997	Town Well	BUTTERS ROW 1	2000020				Sample													6		6						
	LAW	GW	10/22/1997	Town Well	BUTTERS ROW 1	2000059				Sample													6		6						
	LAW	GW	11/10/1997	Town Well	BUTTERS ROW 1	2000072				Sample														6	6						
		GW	12/3/1997	Town Well	BUTTERS ROW 1	2000084				Sample														6	6						
Town & Sentinel	LAW	GW	1/6/1998	Town Well	BUTTERS ROW 1	2000100	O107-119	O107-119-04	Butters Row 1	Sample													6		6						
Town & Sentinel	LAW	GW	2/11/1998	Town Well	BUTTERS ROW 1	2000131	O107-130	O107-130-04	Butters Row 1	Sample														6	7						
Town & Sentinel	LAW	GW	2/11/1998	Town Well	BUTTERS ROW 1	2000242	O107-130	O107-130-09	Town Well Duplicate	Duplicate														6	7						
Town & Sentinel	LAW	GW	3/10/1998	Town Well	BUTTERS ROW 1	2000262	O107-138	O107-138-19	Butters Row	Sample														7	7						
Town & Sentinel	LAW	GW	4/14/1998	Town Well	BUTTERS ROW 1	2000132	O107-145	O107-145-02	Butters Row 1	Sample														7	7						
Town & Sentinel	LAW	GW	7/8/1998	Town Well	BUTTERS ROW 1	2000502	O107-177	O107-177-04	BUTTERS ROW 1	Sample														7	7						
Town & Sentinel	LAW	GW	7/8/1998	Town Well	BUTTERS ROW 1	2000334	O107-177	O107-177-10	TOWN WELL DUP	Duplicate														7	7						
Town & Sentinel	LAW	GW	8/12/1998	Town Well	BUTTERS ROW 1	108646	O107-196	108646	BUTTER ROW #1	Sample														7	7						
Town & Sentinel	LAW	GW	8/12/1998	Town Well	BUTTERS ROW 1	108648	O107-196	108648	TOWN WELL DUP	Duplicate														7	7						
Town & Sentinel	TOWN	GW	9/1/1998	Town Well	BUTTERS ROW 1	2000396				Sample														7	7						
Town & Sentinel	TOWN	GW	9/8/1998	Town Well	BUTTERS ROW 1	2000395				Sample														7	7						
Town & Sentinel	LAW	GW	9/9/1998	Town Well	BUTTERS ROW 1	2000376				Sample														7	7						
Town & Sentinel	TOWN	GW	9/15/1998	Town Well	BUTTERS ROW 1	2000397				Sample														7	7						
Town & Sentinel	OLIN	GW	9/22/1998	Town Well	BUTTERS ROW 1	110651	O107-226	110651	BUTTERS ROW WELL #1	Sample														7	7						
Town & Sentinel	LAW	GW	10/14/1998	Town Well	BUTTERS ROW 1	111948	O107-235	111948	BUTTERS ROW #1	Sample														7	7						
Town & Sentinel	LAW	GW	11/10/1998	Town Well	BUTTERS ROW 1	113394	13871	113394	BUTTERS ROW #1	Sample														7	6						
Town & Sentinel	LAW	GW	12/9/1998	Town Well	BUTTERS ROW 1	115136	14406	115136	BUTTERS ROW #1	Sample														7	6						
Town & Sentinel	Town	GW	1/27/1999	Town Well	BUTTERS ROW 1	117262	15010	117262	BUTTERS ROW #1	Sample														7	7						
Town & Sentinel	Town	GW	1/27/1999	Town Well	BUTTERS ROW 1	117267	15010	117267	DUPLICATE	Duplicate														7	7						
Town & Sentinel	Town	GW	2/17/1999	Town Well	BUTTERS ROW 1	118810	15367	118810	Butters Row #1	Sample															7						
Town & Sentinel	Town	GW	2/17/1999	Town Well	BUTTERS ROW 1	118811	15367	118811	Butters Row #1	Sample														7							
Town & Sentinel	OLIN	GW	3/17/1999	Town Well	BUTTERS ROW 1	120202	15741	120202	BUTTERS ROW#1	Sample														7	7						
Town & Sentinel	OLIN	GW	4/28/1999	Town Well	BUTTERS ROW 1	123186	16372	123186	BUTTERS ROW#1	Sample														7	7						
Town & Sentinel	LAW	GW	5/19/1999	Town Well	BUTTERS ROW 1	124836	16749	124836	BUTTERS ROW #1	Sample														7	7						
Town & Sentinel	OLIN	GW	6/17/1999	Town Well	BUTTERS ROW 1	127013	17264	127013	BUTTERS#1	Sample														7	7						
Town & Sentinel	Town	GW	7/22/1999	Town Well	BUTTERS ROW 1	129479	17866	129479	BUTTERS ROW#1	Sample														7	7						
Town & Sentinel	Town	GW	8/19/1999	Town Well	BUTTERS ROW 1	131296	18320	131296	BUTTERS ROW #1	Sample														7	7						
Town & Sentinel	OLIN	GW	9/22/1999	Town Well	BUTTERS ROW 1	133352	18857	133352	BUTTERS ROW #1	Sample														7	7						
Town & Sentinel	OLIN	GW	9/22/1999	Town Well	BUTTERS ROW 1	133357	18857	133357	DUPLICATE	Duplicate														7	7						

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Open/Kemmore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Town & Sentinel	OLIN	GW	10/20/1999	Town Well	BUTTERS ROW 1	135185	19350	135185	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	LAW	GW	11/3/1999	Town Well	BUTTERS ROW 1	135990	19546	135990	BUTTER`S ROW #1	Sample												7	7							
Town & Sentinel	LAW	GW	11/3/1999	Town Well	BUTTERS ROW 1	135992	19546	135992	DUPLICATE	Duplicate												7	7							
Town Well	Town	GW	12/22/1999	Town Well	BUTTERS ROW 1	139108	20307	139108	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	OLIN	GW	1/26/2000	Town Well	BUTTERS ROW 1	140963	20776	140963	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	OLIN	GW	1/26/2000	Town Well	BUTTERS ROW 1	140966	20776	140966	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	2/9/2000	Town Well	BUTTERS ROW 1	141656	20959	141656	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	LAW	GW	2/9/2000	Town Well	BUTTERS ROW 1	141658	20959	141658	TOWN DUP	Duplicate												7	7							
Town & Sentinel	OLIN	GW	3/22/2000	Town Well	BUTTERS ROW 1	144169	21583	144169	BUTTERS ROW #1	Sample												7	9							
Town & Sentinel	Town	GW	4/19/2000	Town Well	BUTTERS ROW 1	146225	22037	146225	BUTTERS ROW #1	Sample												7	9							
Town & Sentinel	LAW	GW	5/4/2000	Town Well	BUTTERS ROW 1	147291	22271	147291	BUTTER ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	6/21/2000	Town Well	BUTTERS ROW 1	150447	23069	150447	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	OLIN	GW	6/21/2000	Town Well	BUTTERS ROW 1	150452	23069	150452	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	7/19/2000	Town Well	BUTTERS ROW 1	152533	23519	152533	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	Town	GW	8/16/2000	Town Well	BUTTERS ROW 1	154631	24044	154631	BUTTERS ROW #1	Sample												7	9							
Town & Sentinel	OLIN	GW	9/28/2000	Town Well	BUTTERS ROW 1	157650	24800	157650	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	OLIN	GW	10/18/2000	Town Well	BUTTERS ROW 1	159278	25161	159278	BUTTERS ROW #1	Sample												7	7							
Supersampling October200	GEI	GW	10/25/2000	Town Well	BUTTERS ROW 1	002448A-03	7000-2448A	002448A-03	97598-BR1	Sample		68			1														
Supersampling October200	GEI	GW	10/25/2000	Town Well	BUTTERS ROW 1	159804	25296	159804	97598-BR1	Sample											1		22							
Supersampling October200	GEI	GW	10/25/2000	Town Well	BUTTERS ROW 1	22-00997-3	9922	22-00997-3	97598-BR1	Sample		5					15		11		1		7							
Supersampling October200	GEI	GW	10/25/2000	Town Well	BUTTERS ROW 1	3489063	BRT02	3489063	97598-BR1	Sample					66		16	21	7	12	2							10	20	
Supersampling October200	GEI	GW	10/25/2000	Town Well	BUTTERS ROW 1	3489064	BRT02	3489064	97598-BR1	Sample											24	1								
Supersampling October200	GEI	GW	10/25/2000	Town Well	BUTTERS ROW 1	55733-3	7000-2448A	55733-3	97598-BR1	Sample		64			1														
Town & Sentinel	LAW	GW	11/7/2000	Town Well	BUTTERS ROW 1	160883	25505	160883	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	OLIN	GW	12/20/2000	Town Well	BUTTERS ROW 1	164541	26271	164541	BUTTERS ROW #1	Sample												7	7							
Town & Sentinel	OLIN	GW	1/17/2001	Town Well	BUTTERS ROW 1	166517	26660	166517	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	LAW	GW	2/13/2001	Town Well	BUTTERS ROW 1	167904	26978	167904	BUTTERS ROW NO. 1	Sample												7	7							
Town & Sentinel	OLIN	GW	3/21/2001	Town Well	BUTTERS ROW 1	170288	27514	170288	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	4/25/2001	Town Well	BUTTERS ROW 1	172809	28051	172809	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	LAW	GW	5/16/2001	Town Well	BUTTERS ROW 1	174435	28412	174435	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	LAW	GW	5/16/2001	Town Well	BUTTERS ROW 1	174436	28412	174436	TOWN DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	6/20/2001	Town Well	BUTTERS ROW 1	177006	28997	177006	BUTTER ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	6/20/2001	Town Well	BUTTERS ROW 1	177011	28997	177011	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	7/19/2001	Town Well	BUTTERS ROW 1	179091	29474	179091	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	LAW	GW	8/21/2001	Town Well	BUTTERS ROW 1	181715	30019	181715	BUTTERS ROW NO 1	Sample												7	7							
Town & Sentinel	OLIN	GW	9/19/2001	Town Well	BUTTERS ROW 1	183540	30433	183540	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	10/17/2001	Town Well	BUTTERS ROW 1	185701	30880	185701	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	LAW	GW	11/6/2001	Town Well	BUTTERS ROW 1	187202	31197	187202	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	12/19/2001	Town Well	BUTTERS ROW 1	189728	31832	189728	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	1/16/2002	Town Well	BUTTERS ROW 1	191032	32147	191032	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	1/16/2002	Town Well	BUTTERS ROW 1	191037	32147	191037	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	2/27/2002	Town Well	BUTTERS ROW 1	193568	32697	193568	BUTTERS ROW NO 1	Sample												7	7							
Town & Sentinel	OLIN	GW	3/20/2002	Town Well	BUTTERS ROW 1	195018	33059	195018	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	OLIN	GW	4/17/2002	Town Well	BUTTERS ROW 1	196221	33386	196221	BUTTERS ROW 1	Sample												7	7							
Town & Sentinel	LAW	GW	5/24/2002	Town Well	BUTTERS ROW 1	200505-005	200505	200505-005	Butters Row No. 1	Sample												7	7							
Town & Sentinel	OLIN	GW	6/19/2002	Town Well	BUTTERS ROW 1	200652-001	200652	200652-001	Butters Row 1	Sample												7	7							
Town Well	OLIN	GW	7/17/2002	Town Well	BUTTERS ROW 1	201092-003	201092	201092-003	Butters Row 1	Sample												7	7							
Town Well	OLIN	GW	7/17/2002	Town Well	BUTTERS ROW 1	201092-006	201092	201092-006	Town Duplicate	Duplicate												7	7							
29 POTENTIAL COCS	Harding ESE	GW	7/24/2002	Town Well	BUTTERS ROW 1	201534-001	201534	201534-001	Butters Row 1	Sample		2			7							2	4				13		
29 POTENTIAL COCS	Harding ESE	GW	7/24/2002	Town Well	BUTTERS ROW 1	311363	201534	311363	Butters Row 1 Grab	Sample		2	1																
Town & Sentinel	Harding ESE	GW	8/21/2002	Town Well	BUTTERS ROW 1	201567-003	201567	201567-003	Butters Row No. 1	Sample												7	7							
Town Well	OLIN	GW	9/18/2002	Town Well	BUTTERS ROW 1	202010-003	202010	202010-003	Butters Row 1	Sample												7	7							
Town Well		GW	10/22/2002	Town Well	BUTTERS ROW 1	202687-003	202687	202687-003	Butters Row 1	Sample												7	7							
Town & Sentinel		GW	11/13/2002	Town Well	BUTTERS ROW 1	203111-003	203111	203111-003	Butters Row 1	Sample												7	7							
Town Well		GW	12/19/2002	Town Well	BUTTERS ROW 1	203877-003	203877	203877-003	Butters Row 1	Sample												7	7							
Town Well	MACTEC	GW	1/15/2003	Town Well	BUTTERS ROW 1	204362-003	204362	204362-003	Butters Row 1	Sample												7	7							
Town & Sentinel	MACTEC	GW	2/7/2003	Town Well	BUTTERS ROW 1	204681-001	204681	204681-001	Butters Row No. 1	Sample												7	7							
Distribution System	MACTEC	DW	2/26/2003	Town Well	BUTTERS ROW 1	205446-020	205446	205446-020	Butters Row #1	Sample													3		3					
Distribution System	MACTEC	DW	2/26/2003	Town Well	BUTTERS ROW 1	2302270250	106376	2302270250	Butters Row 1	Sample						1														
Town Well	OLIN	GW	3/19/2003	Town Well	BUTTERS ROW 1	205525-003	205525	205525-003	Butters Row 1	Sample												7	7							
Town Well	OLIN	GW	3/19/2003	Town Well	BUTTERS ROW 1	205525-006	205525	205525-006	Duplicate	Duplicate												7	7							
Town Well	OLIN	GW	4/16/2003	Town Well	BUTTERS ROW 1	206126-003	206126	206126-003	Butters Row 1	Sample												7	8							
		GW	4/11/1986	Town Well	BUTTERS ROW 2	1000406			BUTTERS ROW 2	Sample											7		7		2					
		GW	3/24/1987	Town Well	BUTTERS ROW 2	1000407			BUTTERS ROW 2	Sample											7		7		2					
		GW	3/25/1988	Town Well	BUTTERS ROW 2	1000408			BUTTERS ROW 2	Sample											7		8		2					
Town & Sentinel		GW	2/22/1992	Town Well	BUTTERS ROW 2	1000409	92053	92053002	BUTTERS ROW 2	Sample											1		3							
		GW	9/3/1992	Town Well	BUTTERS ROW 2	1460002			BUTTERS ROW 2	Sample		13			5						9		6							
Town & Sentinel		GW	10/20/1993	Town Well	BUTTERS ROW 2	1000411	WJ-1283	WJ-1283-3	BUTTERS ROW 2	Sample											1		3							
Town & Sentinel		GW	2/15/1994	Town Well	BUTTERS ROW 2	1000412	WK-0170	WK-0170-2	BUTTERS ROW 2	Sample											4		6							
Town & Sentinel		GW	5/10/1994	Town Well	BUTTERS ROW 2	1000413	WK-0584/WK-0594	WK-0594-4	BUTTERS ROW 2	Sample											4		6							
Town & Sentinel		GW	8/24/1994	Town Well	BUTTERS ROW 2	1460701	WK-1160/WK-1164	WK-1164-4	BUTTERS ROW 2	Sample											4		6							
Town & Sentinel		GW	11/15/1994	Town Well	BUTTERS ROW 2	1460706	WK-1673/WK-1674	WK-1674-3	BUTTERS ROW 2	Sample											4		6							
Town & Sentinel	LAW	GW	12/5/1994	Town Well	BUTTERS ROW 2	1460969	151	940010486	BUTTERS ROW 2	Sample											4		4							

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Town & Sentinel		GW	2/8/1995	Town Well	BUTTERS ROW 2	1460711	WL-0225/WL-0230	WL-0225-4	BUTTERS ROW 2	Sample												4		6							
Town & Sentinel		GW	5/31/1995	Town Well	BUTTERS ROW 2	1460433	WL-0848/WL-0850	WL-0848-5	BUTTERS ROW 2	Sample												4		6							
Town & Sentinel		GW	9/27/1995	Town Well	BUTTERS ROW 2	1460489	WL-1491/WL-1492	WL-1492-5	BUTTERS ROW 2	Sample												4		6							
Town & Sentinel		GW	12/13/1995	Town Well	BUTTERS ROW 2	1460958	WL-2122/WL-2116	WL-2122-5	BUTTERS ROW 2	Sample												4		6							
Town & Sentinel		GW	3/27/1996	Town Well	BUTTERS ROW 2	1460731	WM-0570	WM-0570	BUTTERS ROW 2	Sample												4		6							
		GW	6/19/1996	Town Well	BUTTERS ROW 2	1460972	O107-006	O107-006-02	BUTTERS ROW #2	Sample												4		5							
Town & Sentinel		GW	7/31/1996	Town Well	BUTTERS ROW 2	1461084	961462A	961462A-08	BUTTERS ROW 2	Sample	FILTERED 1461103												4	5							
Town & Sentinel		GW	7/31/1996	Town Well	BUTTERS ROW 2	1461103	961462A	961462A-08	BUTTERS ROW 2	Sample												1			2	1					
Town & Sentinel		GW	8/27/1996	Town Well	BUTTERS ROW 2	1461065	961654A	961654A-11	BUTTERS ROW 2	Sample	FILTERED												4	7	2	1					
Town & Sentinel		GW	9/24/1996	Town Well	BUTTERS ROW 2	1461123	961908A	961908A-09	BUTTERS ROW 2	Sample	FILTERED												4	6	3	1					
Town & Sentinel		GW	10/24/1996	Town Well	BUTTERS ROW 2	1461211	962201A	962201A-03	BUTTERS ROW 2	Sample	FILTERED												6	7	3	1					
Town & Sentinel		GW	11/21/1996	Town Well	BUTTERS ROW 2	1461336	962487A	962487A-01	BUTTERS ROW 2	Sample	FILTERED												6	7	3	1					
Town & Sentinel		GW	12/18/1996	Town Well	BUTTERS ROW 2	1461427	962687A	962687A-02	BUTTERS ROW 2	Sample	FILTERED												6	7	3	1					
Town & Sentinel		GW	1/23/1997	Town Well	BUTTERS ROW 2	1461540	970096A	970096A-03	BUTTERS ROW 2	Sample	FILTERED												6	7	3	1					
Town & Sentinel		GW	2/25/1997	Town Well	BUTTERS ROW 2	H000081	F970395A	F970395A-03	BUTTERS ROW 2	Sample													7	7	1						
Town & Sentinel		GW	3/25/1997	Town Well	BUTTERS ROW 2	H000080	F970575A	F970575A-02	BUTTERS ROW 2	Sample													6	7							
		GW	4/23/1997	Town Well	BUTTERS ROW 2	1461653				Sample													6	10	1	1					
		GW	5/20/1997	Town Well	BUTTERS ROW 2	1461674				Sample													6	9	1	1					
		GW	6/24/1997	Town Well	BUTTERS ROW 2	1461701				Sample													6	9	1	1					
		GW	9/9/1997	Town Well	BUTTERS ROW 2	2000021				Sample												6		6							
	LAW	GW	10/22/1997	Town Well	BUTTERS ROW 2	2000058				Sample												6		6							
Town & Sentinel	LAW	GW	6/9/1998	Town Well	BUTTERS ROW 2	2000279	O107-168	O107-168-03	Butters Row 2	Sample													7	6							
Town & Sentinel	LAW	GW	6/9/1998	Town Well	BUTTERS ROW 2	2000277	O107-168	O107-168-01	Town Well Duplicate	Duplicate													7	6							
Town & Sentinel	LAW	GW	7/8/1998	Town Well	BUTTERS ROW 2	2000503	O107-177	O107-177-05	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	LAW	GW	8/12/1998	Town Well	BUTTERS ROW 2	108647	O107-196	108647	BUTTER ROW #2	Sample													7	7							
Town & Sentinel	LAW	GW	9/9/1998	Town Well	BUTTERS ROW 2	2000377				Sample													7	7							
Town & Sentinel	LAW	GW	10/14/1998	Town Well	BUTTERS ROW 2	111949	O107-235	111949	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	LAW	GW	11/10/1998	Town Well	BUTTERS ROW 2	113395	13871	113395	BUTTERS ROW #2	Sample													7	6							
Town & Sentinel	LAW	GW	12/9/1998	Town Well	BUTTERS ROW 2	115137	14406	115137	BUTTERS ROW #2	Sample													7	6							
Town & Sentinel	Town	GW	1/27/1999	Town Well	BUTTERS ROW 2	117263	15010	117263	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	BUTTERS ROW 2	118812	15367	118812	Butters Row #2	Sample														7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	BUTTERS ROW 2	118813	15367	118813	Butters Row #2	Sample													7								
Town & Sentinel	OLIN	GW	3/17/1999	Town Well	BUTTERS ROW 2	120203	15741	120203	BUTTERS ROW#2	Sample													7	7							
Town & Sentinel	OLIN	GW	4/28/1999	Town Well	BUTTERS ROW 2	123187	16372	123187	BUTTERS ROW#2	Sample													7	7							
Town & Sentinel	LAW	GW	5/19/1999	Town Well	BUTTERS ROW 2	124837	16749	124837	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	LAW	GW	5/19/1999	Town Well	BUTTERS ROW 2	124840	16749	124840	DUPLICATE	Duplicate													7	7							
Town & Sentinel	OLIN	GW	6/17/1999	Town Well	BUTTERS ROW 2	127014	17264	127014	BUTTERS#2	Sample													7	7							
Town & Sentinel	Town	GW	7/22/1999	Town Well	BUTTERS ROW 2	129480	17866	129480	BUTTERS ROW#2	Sample													7	7							
Town & Sentinel	Town	GW	8/19/1999	Town Well	BUTTERS ROW 2	131297	18320	131297	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	9/22/1999	Town Well	BUTTERS ROW 2	133353	18857	133353	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	10/20/1999	Town Well	BUTTERS ROW 2	135186	19350	135186	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	10/20/1999	Town Well	BUTTERS ROW 2	135190	19350	135190	DUPLICATE	Duplicate													7	7							
Town & Sentinel	LAW	GW	11/3/1999	Town Well	BUTTERS ROW 2	135991	19546	135991	BUTTER`S ROW #2	Sample													7	7							
Town Well	Town	GW	12/22/1999	Town Well	BUTTERS ROW 2	139109	20307	139109	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	1/26/2000	Town Well	BUTTERS ROW 2	140964	20776	140964	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	LAW	GW	2/9/2000	Town Well	BUTTERS ROW 2	141659	20959	141659	BUTTERS ROW #2 MS/MSD	Sample													7	7							
Town & Sentinel	OLIN	GW	3/22/2000	Town Well	BUTTERS ROW 2	144170	21583	144170	BUTTERS ROW #2	Sample													7	9							
Town & Sentinel	Town	GW	4/19/2000	Town Well	BUTTERS ROW 2	146226	22037	146226	BUTTERS ROW #2	Sample													7	9							
Town & Sentinel	Town	GW	4/19/2000	Town Well	BUTTERS ROW 2	146231	22037	146231	DUPLICATE	Duplicate													7	9							
Town & Sentinel	LAW	GW	5/4/2000	Town Well	BUTTERS ROW 2	147292	22271	147292	BUTTER ROW 2	Sample													7	7							
Town & Sentinel	OLIN	GW	6/21/2000	Town Well	BUTTERS ROW 2	150448	23069	150448	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	7/19/2000	Town Well	BUTTERS ROW 2	152534	23519	152534	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	Town	GW	8/16/2000	Town Well	BUTTERS ROW 2	154632	24044	154632	BUTTERS ROW #2	Sample													7	9							
Town & Sentinel	OLIN	GW	9/28/2000	Town Well	BUTTERS ROW 2	157651	24800	157651	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	10/18/2000	Town Well	BUTTERS ROW 2	159279	25161	159279	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	LAW	GW	11/7/2000	Town Well	BUTTERS ROW 2	160884	25505	160884	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	12/20/2000	Town Well	BUTTERS ROW 2	164542	26271	164542	BUTTERS ROW #2	Sample													7	7							
Town & Sentinel	OLIN	GW	12/20/2000	Town Well	BUTTERS ROW 2	164547	26271	164547	DUPLICATE	Duplicate													7	7							
Town & Sentinel	OLIN	GW	1/17/2001	Town Well	BUTTERS ROW 2	166518	26660	166518	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	LAW	GW	2/13/2001	Town Well	BUTTERS ROW 2	167905	26978	167905	BUTTERS ROW NO. 2	Sample													7	7							
Town & Sentinel	OLIN	GW	3/21/2001	Town Well	BUTTERS ROW 2	170289	27514	170289	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	OLIN	GW	4/25/2001	Town Well	BUTTERS ROW 2	172810	28051	172810	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	LAW	GW	5/16/2001	Town Well	BUTTERS ROW 2	174434	28412	174434	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	OLIN	GW	6/20/2001	Town Well	BUTTERS ROW 2	177007	28997	177007	BUTTER ROW 2	Sample													7	7							
Town & Sentinel	OLIN	GW	7/19/2001	Town Well	BUTTERS ROW 2	179092	29474	179092	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	LAW	GW	8/21/2001	Town Well	BUTTERS ROW 2	181716	30019	181716	BUTTERS ROW NO 2	Sample													7	7							
Town & Sentinel	OLIN	GW	9/19/2001	Town Well	BUTTERS ROW 2	183541	30433	183541	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	OLIN	GW	10/17/2001	Town Well	BUTTERS ROW 2	185702	30880	185702	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	LAW	GW	11/6/2001	Town Well	BUTTERS ROW 2	187203	31197	187203	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	OLIN	GW	12/19/2001	Town Well	BUTTERS ROW 2	189729	31832	189729	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	OLIN	GW	12/19/2001	Town Well	BUTTERS ROW 2	189734	31832	189734	DUPLICATE	Duplicate													7	7							
Town & Sentinel	OLIN	GW	1/16/2002	Town Well	BUTTERS ROW 2	191033	32147	191033	BUTTERS ROW 2	Sample													7	7							
Town & Sentinel	LAW	GW	2/27/2002	Town Well	BUTTERS ROW 2	193569	32697	193569	BUTTERS ROW NO 2	Sample													7	7							

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/(U)DMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Town & Sentinel	OLIN	GW	3/20/2002	Town Well	BUTTERS ROW 2	195019	33059	195019	BUTTERS ROW 2	Sample												7	7							
Town & Sentinel	OLIN	GW	4/17/2002	Town Well	BUTTERS ROW 2	196222	33386	196222	BUTTERS ROW 2	Sample												7	7							
Town & Sentinel	LAW	GW	5/24/2002	Town Well	BUTTERS ROW 2	200505-006	200505	200505-006	Butters Row No. 2	Sample												7	7							
Town & Sentinel	OLIN	GW	6/19/2002	Town Well	BUTTERS ROW 2	200652-002	200652	200652-002	Butters Row 2	Sample												7	7							
Town Well	OLIN	GW	7/17/2002	Town Well	BUTTERS ROW 2	201092-004	201092	201092-004	Butters Row 2	Sample												7	7							
Town & Sentinel	Harding ESE	GW	8/21/2002	Town Well	BUTTERS ROW 2	201567-004	201567	201567-004	Butters Row No. 2	Sample												7	7							
Town Well	OLIN	GW	9/18/2002	Town Well	BUTTERS ROW 2	202010-004	202010	202010-004	Butters Row 2	Sample												7	7							
Town & Sentinel		GW	11/13/2002	Town Well	BUTTERS ROW 2	203111-004	203111	203111-004	Butters Row 2	Sample												7	7							
Town Well		GW	12/19/2002	Town Well	BUTTERS ROW 2	203877-004	203877	203877-004	Butters Row 2	Sample												7	7							
Town Well	MACTEC	GW	1/15/2003	Town Well	BUTTERS ROW 2	204362-004	204362	204362-004	Butters Row 2	Sample												7	7							
Town & Sentinel	MACTEC	GW	2/7/2003	Town Well	BUTTERS ROW 2	204681-002	204681	204681-002	Butters Row No. 2	Sample												7	7							
Distribution System	MACTEC	DW	2/26/2003	Town Well	BUTTERS ROW 2	205446-019	205446	205446-019	Butters Row #2	Sample													3		3					
Distribution System	MACTEC	DW	2/26/2003	Town Well	BUTTERS ROW 2	2302270249	106376	2302270249	Butters Row 2	Sample					1															
Town Well	OLIN	GW	3/19/2003	Town Well	BUTTERS ROW 2	205525-004	205525	205525-004	Butters Row 2	Sample												7	7							
Town Well	OLIN	GW	4/16/2003	Town Well	BUTTERS ROW 2	206126-004	206126	206126-004	Butters Row 2	Sample												7	8							
Town & Sentinel	OLIN	TG	10/20/1999		BUTTERS ROW PLANT FINISHED	135192	19350	135192	FINISHED RAW	Sample												7	7							
Town & Sentinel	LAW	TG	11/3/1999		BUTTERS ROW PLANT FINISHED	135987	19546	135987	TOWN FINISH	Sample												7	7							
Town Well	Town	TG	12/22/1999		BUTTERS ROW PLANT FINISHED	139114	20307	139114	FINISHED WATER	Sample												7	9							
Town & Sentinel	OLIN	TG	1/26/2000		BUTTERS ROW PLANT FINISHED	140968	20776	140968	FINISHED WATER	Sample												7	9							
Town & Sentinel	LAW	TG	2/9/2000		BUTTERS ROW PLANT FINISHED	141661	20959	141661	TOWN WATER FINISHED	Sample												7	9							
Town & Sentinel	OLIN	TG	3/22/2000		BUTTERS ROW PLANT FINISHED	144173	21583	144173	FINISHED WATER	Sample												7	9							
Town & Sentinel	Town	TG	4/19/2000		BUTTERS ROW PLANT FINISHED	146229	22037	146229	FINISHED WATER	Sample												7	9							
Town & Sentinel	LAW	TG	5/4/2000		BUTTERS ROW PLANT FINISHED	147293	22271	147293	TOWN FINISH	Sample												7	9							
Town & Sentinel	OLIN	TG	6/21/2000		BUTTERS ROW PLANT FINISHED	150454	23069	150454	TOWN FINISHED	Sample												7	9							
Town & Sentinel	OLIN	TG	7/19/2000		BUTTERS ROW PLANT FINISHED	152540	23519	152540	TOWN FINISHED	Sample												7	9							
Town & Sentinel	Town	TG	8/16/2000		BUTTERS ROW PLANT FINISHED	154638	24044	154638	TOWN FINISHED	Sample												7	9							
Town & Sentinel	OLIN	TG	9/28/2000		BUTTERS ROW PLANT FINISHED	157657	24800	157657	FINISHED WATER	Sample												7	9							
Town & Sentinel	OLIN	TG	10/18/2000		BUTTERS ROW PLANT FINISHED	159286	25161	159286	FINISHED WATER	Sample												7	9							
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	002448A-01	7000-2448A	002448A-01	97598-FWTAP	Sample		68			1															
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	002448A-06	7000-2448A	002448A-06	97598-FWTAP-THIO	Sample		68			1															
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	159802	25296	159802	97598-FWTAP	Sample											1		22							
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	22-00997-1	9922	22-00997-1	97598-FWTAP	Sample		5					15		11		1		7							
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	3489059	BRT02	3489059	97598-FWTAP	Sample					66	16	21	7	12	2								10	20
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	3489060	BRT02	3489060	97598-FWTAP	Sample											24	1							
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	55733-1	7000-2448A	55733-1	97598-FWTAP	Sample		64			1															
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	55733-8	7000-2448A	55733-8	97598-FWTAP-THIO	Sample		64			1															
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	002448A-02	7000-2448A	002448A-02	97598-FDFWT	Duplicate		68			1															
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	159803	25296	159803	97598-FDFWT	Duplicate											1		22							
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	22-00997-2	9922	22-00997-2	97598-FDFWT	Duplicate		5					15		11		1		7							
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	3489061	BRT02	3489061	97598-FDFWT	Duplicate					66	16	21	7	12	2								10	20
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	3489062	BRT02	3489062	97598-FDFWT	Duplicate											24	1							
Supersampling October200	GEI	TG	10/25/2000		BUTTERS ROW PLANT FINISHED	55733-2	7000-2448A	55733-2	97598-FDFWT	Duplicate		64			1															
Town & Sentinel	LAW	TG	11/7/2000		BUTTERS ROW PLANT FINISHED	160885	25505	160885	FINISHED MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	TG	12/20/2000		BUTTERS ROW PLANT FINISHED	164549	26271	164549	TOWN FINISHED	Sample												7	9							
Supersampling October200	GEI	TG	12/27/2000		BUTTERS ROW PLANT FINISHED	3527789	745243	3527789	Tap1	Sample	kempore resampling									1			1							
Town & Sentinel	OLIN	TG	1/17/2001		BUTTERS ROW PLANT FINISHED	166524	26660	166524	FINISHED WATER	Sample												7	9							
Town & Sentinel	LAW	TG	2/13/2001		BUTTERS ROW PLANT FINISHED	167911	26978	167911	TOWN FINISHED	Sample												7	9							
Town & Sentinel	OLIN	TG	3/21/2001		BUTTERS ROW PLANT FINISHED	170287	27514	170287	FINISHED WATER	Sample												7	9							
Town & Sentinel	OLIN	TG	4/25/2001		BUTTERS ROW PLANT FINISHED	172817	28051	172817	FINISHED WATER	Sample												7	9							
Town & Sentinel	LAW	TG	5/16/2001		BUTTERS ROW PLANT FINISHED	174431	28412	174431	COMBINED FINISHED MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	TG	6/20/2001		BUTTERS ROW PLANT FINISHED	177013	28997	177013	FINISHED WATER	Sample												7	9							
Town & Sentinel	OLIN	TG	7/19/2001		BUTTERS ROW PLANT FINISHED	179098	29474	179098	FINISHED WATER MS/MSD	Sample												7	9							
Town & Sentinel	LAW	TG	8/21/2001		BUTTERS ROW PLANT FINISHED	181718	30019	181718	TOWN FINISHED	Sample												7	9							
Town & Sentinel	OLIN	TG	9/19/2001		BUTTERS ROW PLANT FINISHED	183548	30433	183548	FINISHED WATER	Sample												7	9							
Town & Sentinel	OLIN	TG	10/17/2001		BUTTERS ROW PLANT FINISHED	185709	30880	185709	FINISHED WATER	Sample												7	9							
Town & Sentinel	LAW	TG	11/6/2001		BUTTERS ROW PLANT FINISHED	187207	31197	187207	TOWN FINISHED	Sample												7	9							
Town & Sentinel	OLIN	TG	12/19/2001		BUTTERS ROW PLANT FINISHED	189736	31832	189736	FINISHED WATER	Sample												7	9							
Town & Sentinel	OLIN	TG	1/16/2002		BUTTERS ROW PLANT FINISHED	191039	32147	191039	FINISHED WATER	Sample												7	9							
Town & Sentinel	LAW	TG	2/27/2002		BUTTERS ROW PLANT FINISHED	193573	32697	193573	TOWN FINISHED	Sample												7	9							
Town & Sentinel	OLIN	TG	3/20/2002		BUTTERS ROW PLANT FINISHED	195025	33059	195025	FINISHED WATER	Sample												7	9							
Town & Sentinel	OLIN	TG	3/20/2002		BUTTERS ROW PLANT FINISHED	195023	33059	195023	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	TG	4/17/2002		BUTTERS ROW PLANT FINISHED	196228	33386	196228	FINISHED WATER	Sample												7	9							
Town & Sentinel	LAW	TG	5/24/2002		BUTTERS ROW PLANT FINISHED	200505-003	200505	200505-003	Finished	Sample												7	9							
Town & Sentinel	OLIN	TG	6/19/2002		BUTTERS ROW PLANT FINISHED	200652-009	200652	200652-009	Town Finished	Sample												7	9							
Town Well	OLIN	TG	7/17/2002		BUTTERS ROW PLANT FINISHED	201092-009	201092	201092-009	Combined Finished	Sample												7	9							
29 POTENTIAL COCS	Harding ESE	TG	7/24/2002		BUTTERS ROW PLANT FINISHED	201534-004	201534	201534-004	Butters Row Finished	Sample		2			7							2	4				13			
29 POTENTIAL COCS	Harding ESE	TG	7/24/2002		BUTTERS ROW PLANT FINISHED	311366	201534	311366	Butters Row Finish Grab(MS/D)	Sample		2	1																	
29 POTENTIAL COCS	Harding ESE	TG	7/24/2002		BUTTERS ROW PLANT FINISHED	201534-005	201534	201534-005	Butters Row Finished Dup	Duplicate		2			7							2	4				13			
29 POTENTIAL COCS	Harding ESE	TG	7/24/2002		BUTTERS ROW PLANT FINISHED	311367	201534	311367	Butters Row Finish Grab Dup	Duplicate		2	1																	
Town & Sentinel	Harding ESE	TG	8/21/2002		BUTTERS ROW PLANT FINISHED	201567-006	201567	201567-006	BRTP Finished Water	Sample												7	9							
Town Well	OLIN	TG	9/18/2002		BUTTERS ROW PLANT FINISHED	202010-009	202010	202010-009	Combined Finished	Sample												7	9							
Town Well		TG	10/22/2002		BUTTERS ROW PLANT FINISHED	202687-009	202687	202687-009	Combined Finished	Sample												7	9							
Town & Sentinel		TG	11/13/2002		BUTTERS ROW PLANT FINISHED	203111-009	203111	203111-009	Combined Finished	Sample												7	9							

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Town Well		TG	12/19/2002		BUTTERS ROW PLANT FINISHED	203877-009	203877	203877-009	Combined Finished	Sample												7	9							
Town Well	MACTEC	TG	1/15/2003		BUTTERS ROW PLANT FINISHED	204362-009	204362	204362-009	Combined Finished	Sample												7	9							
Town & Sentinel	MACTEC	TG	2/7/2003		BUTTERS ROW PLANT FINISHED	204681-009	204681	204681-009	BRTP Finished	Sample												7	9							
Distribution System	MACTEC	TG	2/25/2003		BUTTERS ROW PLANT FINISHED	205446-001	205446	205446-001	BRTP Finished	Sample													3		3				22
Distribution System	MACTEC	TG	2/25/2003		BUTTERS ROW PLANT FINISHED	2302260150	106350	2302260150	BRTP Finished	Sample					1														
Distribution System	MACTEC	TG	2/25/2003		BUTTERS ROW PLANT FINISHED	205446-002	205446	205446-002	BRTP Finished Dup	Duplicate													3							
Distribution System	MACTEC	TG	2/25/2003		BUTTERS ROW PLANT FINISHED	2302260151	106350	2302260151	BRTP Finished Dup	Duplicate					1														
Town Well	OLIN	TG	3/19/2003		BUTTERS ROW PLANT FINISHED	205525-009	205525	205525-009	Combined Finished	Sample												7	9							
Town Well	OLIN	TG	3/19/2003		BUTTERS ROW PLANT FINISHED	205525-011	205525	205525-011	Combined Finished RE	Sample													1							
Town Well	OLIN	TG	4/16/2003		BUTTERS ROW PLANT FINISHED	206126-009	206126	206126-009	Combined Finished	Sample												7	10							
Town & Sentinel	OLIN	GW	10/20/1999		BUTTERS ROW PLANT RAW	135191	19350	135191	COMBINED RAW	Sample												7	7							
Town & Sentinel	LAW	GW	11/3/1999		BUTTERS ROW PLANT RAW	135986	19546	135986	TOWN RAW	Sample												7	7							
Town Well	Town	GW	12/22/1999		BUTTERS ROW PLANT RAW	139113	20307	139113	COMBINED RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	1/26/2000		BUTTERS ROW PLANT RAW	140967	20776	140967	COMBINED RAW	Sample												7	9							
Town & Sentinel	LAW	GW	2/9/2000		BUTTERS ROW PLANT RAW	141660	20959	141660	TOWN WATER RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	3/22/2000		BUTTERS ROW PLANT RAW	144172	21583	144172	COMBINED ROW	Sample												7	9							
Town & Sentinel	Town	GW	4/19/2000		BUTTERS ROW PLANT RAW	146228	22037	146228	COMBINED RAW	Sample												7	9							
Town & Sentinel	LAW	GW	5/4/2000		BUTTERS ROW PLANT RAW	147294	22271	147294	TOWN RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	6/21/2000		BUTTERS ROW PLANT RAW	150453	23069	150453	TOWN RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	7/19/2000		BUTTERS ROW PLANT RAW	152539	23519	152539	TOWN RAW	Sample												7	9							
Town & Sentinel	Town	GW	8/16/2000		BUTTERS ROW PLANT RAW	154637	24044	154637	TOWN RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	9/28/2000		BUTTERS ROW PLANT RAW	157656	24800	157656	COMBINED RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	10/18/2000		BUTTERS ROW PLANT RAW	159285	25161	159285	RAW WATER MS/MSD	Sample												7	9							
Town & Sentinel	LAW	GW	11/7/2000		BUTTERS ROW PLANT RAW	160886	25505	160886	RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	12/20/2000		BUTTERS ROW PLANT RAW	164548	26271	164548	TOWN RAW	Sample												7	9							
Supersampling October200	GEI	GW	12/27/2000		BUTTERS ROW PLANT RAW	3527792	745243	3527792	Influent1	Sample	kempore resampling									1			1							
Supersampling October200	GEI	GW	12/27/2000		BUTTERS ROW PLANT RAW	3527793	745243	3527793	Influent2	Duplicate	kempore resampling									1			1							
Town & Sentinel	OLIN	GW	1/17/2001		BUTTERS ROW PLANT RAW	166523	26660	166523	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	LAW	GW	2/13/2001		BUTTERS ROW PLANT RAW	167910	26978	167910	TOWN RAW MS/MSD	Sample												7	9							
Town & Sentinel	LAW	GW	2/13/2001		BUTTERS ROW PLANT RAW	167909	26978	167909	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	3/21/2001		BUTTERS ROW PLANT RAW	170286	27514	170286	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	GW	4/25/2001		BUTTERS ROW PLANT RAW	172816	28051	172816	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	LAW	GW	5/16/2001		BUTTERS ROW PLANT RAW	174433	28412	174433	COMBINED RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	6/20/2001		BUTTERS ROW PLANT RAW	177012	28997	177012	RAW WATER MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	GW	7/19/2001		BUTTERS ROW PLANT RAW	179099	29474	179099	COMBINED RAW	Sample												7	9							
Town & Sentinel	LAW	GW	8/21/2001		BUTTERS ROW PLANT RAW	181717	30019	181717	TOWN RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	9/19/2001		BUTTERS ROW PLANT RAW	183547	30433	183547	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	GW	10/17/2001		BUTTERS ROW PLANT RAW	185708	30880	185708	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	LAW	GW	11/6/2001		BUTTERS ROW PLANT RAW	187206	31197	187206	TOWN RAW	Sample												7	9							
Town & Sentinel	OLIN	GW	12/19/2001		BUTTERS ROW PLANT RAW	189735	31832	189735	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	GW	1/16/2002		BUTTERS ROW PLANT RAW	191038	32147	191038	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	LAW	GW	2/27/2002		BUTTERS ROW PLANT RAW	193572	32697	193572	TOWN RAW MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	GW	3/20/2002		BUTTERS ROW PLANT RAW	195024	33059	195024	COMBINED RAW MS/MSD	Sample												7	9							
Town & Sentinel	OLIN	GW	4/17/2002		BUTTERS ROW PLANT RAW	196227	33386	196227	RAW COMPOSITE MS/MSD	Sample												7	9							
Town & Sentinel	LAW	GW	5/24/2002		BUTTERS ROW PLANT RAW	200505-002	200505	200505-002	Raw	Sample												7	9							
Town & Sentinel	OLIN	GW	6/19/2002		BUTTERS ROW PLANT RAW	200652-006	200652	200652-006	Town Raw	Sample												7	9							
Town Well	OLIN	GW	7/17/2002		BUTTERS ROW PLANT RAW	201092-008	201092	201092-008	Combined Raw	Sample												7	9							
29 POTENTIAL COCS	Harding ESE	GW	7/24/2002		BUTTERS ROW PLANT RAW	201534-003	201534	201534-003	Butters Row Raw	Sample		2			7							2	4				13			
29 POTENTIAL COCS	Harding ESE	GW	7/24/2002		BUTTERS ROW PLANT RAW	311365	201534	311365	Butters Row Raw Grab	Sample		2	1																	
Town & Sentinel	Harding ESE	GW	8/21/2002		BUTTERS ROW PLANT RAW	201567-008	201567	201567-008	BRTP Combined Raw Water	Sample												7	9							
Town Well	OLIN	GW	9/18/2002		BUTTERS ROW PLANT RAW	202010-008	202010	202010-008	Combined Raw	Sample												7	9							
Town Well		GW	10/22/2002		BUTTERS ROW PLANT RAW	202687-008	202687	202687-008	Combined Raw	Sample												7	9							
Town & Sentinel		GW	11/13/2002		BUTTERS ROW PLANT RAW	203111-008	203111	203111-008	Combined Raw	Sample												7	9							
Town Well		GW	12/19/2002		BUTTERS ROW PLANT RAW	203877-008	203877	203877-008	Combined Raw	Sample												7	9							
Town Well	MACTEC	GW	1/15/2003		BUTTERS ROW PLANT RAW	204362-008	204362	204362-008	Combined Raw	Sample												7	9							
Town & Sentinel	MACTEC	GW	2/7/2003		BUTTERS ROW PLANT RAW	204681-008	204681	204681-008	BRTP Raw	Sample												7	9							
Distribution System	MACTEC	GW	2/25/2003		BUTTERS ROW PLANT RAW	205446-003	205446	205446-003	BRTP Raw	Sample													3		3				22
Distribution System	MACTEC	GW	2/25/2003		BUTTERS ROW PLANT RAW	2302260152	106350	2302260152	BRTP Raw	Sample					1														
Distribution System	MACTEC	GW	2/25/2003		BUTTERS ROW PLANT RAW	2302270133	106350	2302270133	BRTP Raw 1:5	Sample					1														
Distribution System	MACTEC	GW	2/25/2003		BUTTERS ROW PLANT RAW	205446-004	205446	205446-004	BRTP Dup	Duplicate													3						22
Distribution System	MACTEC	GW	2/25/2003		BUTTERS ROW PLANT RAW	2302260153	106350	2302260153	BRTP Raw Dup	Duplicate					1														
Distribution System	MACTEC	GW	2/25/2003		BUTTERS ROW PLANT RAW	2302270134	106350	2302270134	BRTP Raw 1:5 Dup	Duplicate					1														
Town Well	OLIN	GW	3/19/2003		BUTTERS ROW PLANT RAW	205525-008	205525	205525-008	Combined Raw	Sample												7	9							
Town Well	OLIN	GW	3/19/2003		BUTTERS ROW PLANT RAW	205525-010	205525	205525-010	Combined Raw RE	Sample													1							
Town Well	OLIN	GW	4/16/2003		BUTTERS ROW PLANT RAW	206126-008	206126	206126-008	Combined Raw	Sample												7	10							
		TG	4/23/1997	Town Well	BUTTERS ROW TREATMENT PLANT	1461642			BRTP	Sample		34									2		5		1					
		GW	4/11/1986	Town Well	CHESTNUT ST 1	1000416			CHESTNUT ST 1	Sample											7		7		2					
		GW	3/24/1987	Town Well	CHESTNUT ST 1	1000417			CHESTNUT ST 1	Sample											7		7		2					
		GW	3/25/1988	Town Well	CHESTNUT ST 1	1000418			CHESTNUT ST 1	Sample											7		7							
		GW	2/13/1989	Town Well	CHESTNUT ST 1	1000419			CHESTNUT ST 1	Sample											8		7		2					
		GW	5/30/1990	Town Well	CHESTNUT ST 1	1000420			CHESTNUT ST 1	Sample											7		7		2					
Town & Sentinel		GW	2/22/1992	Town Well	CHESTNUT ST 1	1000421	92053	92053004	CHESTNUT ST 1	Sample											1		3							
		GW	9/3/1992	Town Well	CHESTNUT ST 1	1460004			CHESTNUT ST 1	Sample		13			5						9		6							

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Open/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
		GW	9/3/1992	Town Well	CHESTNUT ST 1	1460005			CHESTNUT ST 1	Duplicate	DUP OF 1460004	13			5						9	6								
Town & Sentinel		GW	10/20/1993	Town Well	CHESTNUT ST 1	1000423	WJ-1283	WJ-1283-4	CHESTNUT ST 1	Sample											1	3								
Town & Sentinel		GW	2/15/1994	Town Well	CHESTNUT ST 1	1000424	WK-0170	WK-0170-3	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel		GW	5/10/1994	Town Well	CHESTNUT ST 1	1000425	WK-0584/WK-0594	WK-0594-3	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel		GW	8/24/1994	Town Well	CHESTNUT ST 1	1460702	WK-1160/WK-1164	WK-1164-3	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel		GW	11/15/1994	Town Well	CHESTNUT ST 1	1460707	WK-1673/WK-1674	WK-1674-4	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel	LAW	GW	12/5/1994	Town Well	CHESTNUT ST 1	1460970	151	940010487	CHESTNUT ST 1	Sample											4	4								
Town & Sentinel		GW	2/8/1995	Town Well	CHESTNUT ST 1	1460712	WL-0225/WL-0230	WL-0225-2	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel		GW	5/31/1995	Town Well	CHESTNUT ST 1	1460431	WL-0848/WL-0850	WL-0848-3	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel		GW	9/27/1995	Town Well	CHESTNUT ST 1	1460487	WL-1491/WL-1492	WL-1492-3	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel		GW	12/13/1995	Town Well	CHESTNUT ST 1	1460959	WL-2122/WL-2116	WL-2122-3	CHESTNUT ST 1	Sample											4	6								
Town & Sentinel		GW	3/27/1996	Town Well	CHESTNUT ST 1	1460729	WM-0570	WM-0570	CHESTNUT ST 1	Sample											4	6								
		GW	6/19/1996	Town Well	CHESTNUT ST 1	1460974	O107-006	O107-006-04	CHESTNUT #1	Sample											4	5								
Town & Sentinel		GW	7/31/1996	Town Well	CHESTNUT ST 1	1461076	961462A	961462A-02	CHESTNUT ST 1	Sample	FILTERED 1461095											4	5							
Town & Sentinel		GW	7/31/1996	Town Well	CHESTNUT ST 1	1461095	961462A	961462A-02	CHESTNUT ST 1	Sample											1			2	1					
Town & Sentinel		GW	8/27/1996	Town Well	CHESTNUT ST 1	1461059	961654A	961654A-05	CHESTNUT ST 1	Sample	FILTERED											4	7	2	1					
Town & Sentinel		GW	9/24/1996	Town Well	CHESTNUT ST 1	1461119	961908A	961908A-05	CHESTNUT ST 1	Sample	FILTERED											4	6	3	1					
Town & Sentinel		GW	10/24/1996	Town Well	CHESTNUT ST 1	1461212	962201A	962201A-04	CHESTNUT ST 1	Sample	FILTERED											6	7	3	1					
Town & Sentinel		GW	12/18/1996	Town Well	CHESTNUT ST 1	1461428	962687A	962687A-03	CHESTNUT ST 1	Sample	FILTERED											6	7	3	1					
Town & Sentinel		GW	1/23/1997	Town Well	CHESTNUT ST 1	1461541	970096A	970096A-04	CHESTNUT ST 1	Sample	FILTERED											6	7	3	1					
Town & Sentinel		GW	2/25/1997	Town Well	CHESTNUT ST 1	H000019	F970395A	F970395A-04	CHESTNUT ST 1	Sample												7	7	1						
		GW	4/23/1997	Town Well	CHESTNUT ST 1	1461654				Sample												6	10	1	1					
		GW	5/20/1997	Town Well	CHESTNUT ST 1	1461675				Sample												6	9	1	1					
		GW	6/24/1997	Town Well	CHESTNUT ST 1	1461702				Sample												6	9	1	1					
		GW	9/9/1997	Town Well	CHESTNUT ST 1	2000022				Sample											6		6							
	LAW	GW	10/21/1997	Town Well	CHESTNUT ST 1	2000049				Sample											6		6							
	LAW	GW	10/21/1997	Town Well	CHESTNUT ST 1	2000050				Duplicate											6		6							
	LAW	GW	11/10/1997	Town Well	CHESTNUT ST 1	2000074				Sample												6	6							
	LAW	GW	11/10/1997	Town Well	CHESTNUT ST 1	2000075				Duplicate	FILTDUP 2000074											6	6							
		GW	12/3/1997	Town Well	CHESTNUT ST 1	2000085				Sample												6	6							
		GW	12/3/1997	Town Well	CHESTNUT ST 1	2000086				Duplicate												6	6							
Town & Sentinel	LAW	GW	1/6/1998	Town Well	CHESTNUT ST 1	2000101	O107-119	O107-119-05	Chestnut Street 1	Sample											6		6							
Town & Sentinel	LAW	GW	1/6/1998	Town Well	CHESTNUT ST 1	2000102	O107-119	O107-119-06	Chestnut Street DUP	Duplicate											6		6							
Town & Sentinel	LAW	GW	2/11/1998	Town Well	CHESTNUT ST 1	2000133	O107-130	O107-130-05	Chestnut St 1	Sample												6	7							
Town & Sentinel	LAW	GW	3/10/1998	Town Well	CHESTNUT ST 1	2000263	O107-138	O107-138-20	Chestnut St. 1	Sample												7	7							
Town & Sentinel	LAW	GW	4/14/1998	Town Well	CHESTNUT ST 1	2000134	O107-145	O107-145-03	Chestnut 1	Sample												7	7							
Town & Sentinel	LAW	GW	4/14/1998	Town Well	CHESTNUT ST 1	2000241	O107-145	O107-145-05	Town Well Dup	Duplicate												7	7							
Town & Sentinel	LAW	GW	5/12/1998	Town Well	CHESTNUT ST 1	2000135	O107-159	O107-159-01	Chestnut 1	Sample												7	7							
Town & Sentinel	LAW	GW	6/9/1998	Town Well	CHESTNUT ST 1	2000280	O107-168	O107-168-04	Chestnut 1	Sample												7	6							
Town & Sentinel	LAW	GW	7/8/1998	Town Well	CHESTNUT ST 1	2000325	O107-177	O107-177-02	CHESTNUT ST 1	Sample												7	7							
Town & Sentinel	LAW	GW	8/12/1998	Town Well	CHESTNUT ST 1	108644	O107-196	108644	CHESTNUT #1	Sample												7	7							
Town & Sentinel	LAW	GW	9/9/1998	Town Well	CHESTNUT ST 1	2000381				Sample												7	7							
Town & Sentinel	LAW	GW	10/14/1998	Town Well	CHESTNUT ST 1	111946	O107-235	111946	CHESTNUT #1	Sample												7	7							
Town & Sentinel	LAW	GW	11/10/1998	Town Well	CHESTNUT ST 1	113392	13871	113392	CHESTNUT #1	Sample												7	6							
Town & Sentinel	LAW	GW	11/10/1998	Town Well	CHESTNUT ST 1	113396	13871	113396	TOWN WELL DUPLICATE	Duplicate												7	6							
Town & Sentinel	LAW	GW	12/9/1998	Town Well	CHESTNUT ST 1	115134	14406	115134	CHESTNUT #1	Sample												7	6							
Town & Sentinel	Town	GW	1/27/1999	Town Well	CHESTNUT ST 1	117265	15010	117265	CHESTNUT STREET #1	Sample												7	7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	CHESTNUT ST 1	118818	15367	118818	Chestnut #1	Sample													7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	CHESTNUT ST 1	118819	15367	118819	Chestnut #1	Sample												7								
Town & Sentinel	OLIN	GW	3/17/1999	Town Well	CHESTNUT ST 1	120206	15741	120206	CHESTNUT STREET	Sample												7	7							
Town & Sentinel	OLIN	GW	4/28/1999	Town Well	CHESTNUT ST 1	123189	16372	123189	CHESTNUT ST.	Sample												7	7							
Town & Sentinel	OLIN	GW	4/28/1999	Town Well	CHESTNUT ST 1	123191	16372	123191	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	5/19/1999	Town Well	CHESTNUT ST 1	124838	16749	124838	CHESTNUT (OLD)	Sample												7	7							
Town & Sentinel	OLIN	GW	6/17/1999	Town Well	CHESTNUT ST 1	127016	17264	127016	CHESTNUT STREET	Sample												7	7							
Town & Sentinel	Town	GW	7/22/1999	Town Well	CHESTNUT ST 1	129482	17866	129482	CHESTNUT STREET- OLD	Sample												7	7							
Town & Sentinel	Town	GW	7/22/1999	Town Well	CHESTNUT ST 1	129484	17866	129484	DUPLICATE	Duplicate												7	7							
Town & Sentinel	Town	GW	8/19/1999	Town Well	CHESTNUT ST 1	131299	18320	131299	CHESTNUT ST. (OLD)	Sample												7	7							
Town & Sentinel	OLIN	GW	9/22/1999	Town Well	CHESTNUT ST 1	133355	18857	133355	CHESTNUT St. Old	Sample												7	7							
Town & Sentinel	OLIN	GW	10/20/1999	Town Well	CHESTNUT ST 1	135188	19350	135188	CHESTNUT STREET (OLD)	Sample												7	7							
Town & Sentinel	LAW	GW	11/3/1999	Town Well	CHESTNUT ST 1	135989	19546	135989	CHESTNUT OLD	Sample												7	7							
Town Well	Town	GW	12/22/1999	Town Well	CHESTNUT ST 1	139111	20307	139111	CHESTNUT STREET (OLD)	Sample												7	7							
Town Well	Town	GW	12/22/1999	Town Well	CHESTNUT ST 1	139112	20307	139112	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	5/4/2000	Town Well	CHESTNUT ST 1	147289	22271	147289	CHESTNUT OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	6/21/2000	Town Well	CHESTNUT ST 1	150450	23069	150450	CHESTNUT ST. OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2000	Town Well	CHESTNUT ST 1	152536	23519	152536	CHESTNUT ST (OLD)	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2000	Town Well	CHESTNUT ST 1	152538	23519	152538	DUPLICATE	Duplicate												7	7							
Town & Sentinel	Town	GW	8/16/2000	Town Well	CHESTNUT ST 1	154634	24044	154634	CHESTNUT ST OLD	Sample												7	9							
Town & Sentinel	OLIN	GW	9/28/2000	Town Well	CHESTNUT ST 1	157653	24800	157653	CHESTNUT ST (OLD)	Sample												7	7							
Town & Sentinel	OLIN	GW	10/18/2000	Town Well	CHESTNUT ST 1	159281	25161	159281	CHESTNUT ST (OLD)	Sample												7	7							
Supersampling October200	GEI	GW	10/25/2000	Town Well	CHESTNUT ST 1	002448A-04	7000-2448A	002448A-04	97598-CHESTNUT1	Sample		68			1														
Supersampling October200	GEI	GW	10/25/2000	Town Well	CHESTNUT ST 1	159805	25296	159805	97598-CHESTNUT 1	Sample											1		22							
Supersampling October200	GEI	GW	10/25/2000	Town Well	CHESTNUT ST 1	22-00997-4	9922	22-00997-4	97598-CHESTNUT1	Sample		5					15		11		1		7							
Supersampling October200	GEI	GW	10/25/2000	Town Well	CHESTNUT ST 1	3489065	BRT02	3489065	97598-CHESTNUT 1	Sample					66		16	21	7	12	2							10	20	

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Oper/Kemmore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Supersampling October200	GEI	GW	10/25/2000	Town Well	CHESTNUT ST 1	3489066	BRT02	3489066	97598-CHESTNUT 1	Sample												24	1							
Supersampling October200	GEI	GW	10/25/2000	Town Well	CHESTNUT ST 1	55733-4	7000-2448A	55733-4	97598-CHESTNUT1	Sample		64			1															
Town & Sentinel	LAW	GW	11/7/2000	Town Well	CHESTNUT ST 1	160887	25505	160887	CHESTNUT ST #1/OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	12/20/2000	Town Well	CHESTNUT ST 1	164544	26271	164544	OLD CHESTNUT	Sample												7	7							
Town & Sentinel	OLIN	GW	1/17/2001	Town Well	CHESTNUT ST 1	166519	26660	166519	CHESTNUT ST. (OLD)	Sample												7	7							
Town & Sentinel	LAW	GW	2/13/2001	Town Well	CHESTNUT ST 1	167907	26978	167907	CHESTNUT ST. OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	3/21/2001	Town Well	CHESTNUT ST 1	170291	27514	170291	CHESTNUT (OLD)	Sample												7	7							
Town & Sentinel	OLIN	GW	4/25/2001	Town Well	CHESTNUT ST 1	172812	28051	172812	CHESTNUT (OLD)	Sample												7	7							
Town & Sentinel	OLIN	GW	4/25/2001	Town Well	CHESTNUT ST 1	172815	28051	172815	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	5/16/2001	Town Well	CHESTNUT ST 1	174429	28412	174429	CHESTNUT ST OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	6/20/2001	Town Well	CHESTNUT ST 1	177008	28997	177008	CHESTNUT ST OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2001	Town Well	CHESTNUT ST 1	179094	29474	179094	CHESTNUT OLD	Sample												7	7							
Town & Sentinel	LAW	GW	8/21/2001	Town Well	CHESTNUT ST 1	181713	30019	181713	CHESTNUT ST OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	9/19/2001	Town Well	CHESTNUT ST 1	183543	30433	183543	CHESTNUT OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	10/17/2001	Town Well	CHESTNUT ST 1	185704	30880	185704	CHESTNUT OLD	Sample												7	7							
Town & Sentinel	LAW	GW	11/6/2001	Town Well	CHESTNUT ST 1	187201	31197	187201	CHESTNUT ST NO 1	Sample	SAMPLE ID SWITCHED WITH CHESTNUT ST 1A/2 - LABSAMPID 187200											7	7							
Town & Sentinel	OLIN	GW	12/19/2001	Town Well	CHESTNUT ST 1	189731	31832	189731	CHESTNUT OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	1/16/2002	Town Well	CHESTNUT ST 1	191034	32147	191034	CHESTNUT OLD	Sample												7	7							
Town & Sentinel	LAW	GW	2/27/2002	Town Well	CHESTNUT ST 1	193567	32697	193567	CHESTNUT ST OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	3/20/2002	Town Well	CHESTNUT ST 1	195020	33059	195020	CHESTNUT OLD	Sample												7	7							
Town & Sentinel	OLIN	GW	4/17/2002	Town Well	CHESTNUT ST 1	196223	33386	196223	CHESTNUT ST OLD	Sample												7	7							
Town & Sentinel	LAW	GW	5/24/2002	Town Well	CHESTNUT ST 1	200505-008	200505	200505-008	Chestnut St. No. 1	Sample												7	7							
Town & Sentinel	OLIN	GW	6/19/2002	Town Well	CHESTNUT ST 1	200652-005	200652	200652-005	Chestnut Street Old	Sample												7	7							
Town Well	OLIN	GW	7/17/2002	Town Well	CHESTNUT ST 1	201092-001	201092	201092-001	Chestnut St. Old	Sample												7	7							
29 POTENTIAL COCS	Harding ESE	GW	7/24/2002	Town Well	CHESTNUT ST 1	201534-002	201534	201534-002	Chestnut St 1	Sample		2			7							2	4				13			
29 POTENTIAL COCS	Harding ESE	GW	7/24/2002	Town Well	CHESTNUT ST 1	311364	201534	311364	Chestnut St. 1 Grab	Sample		2	1																	
Town & Sentinel	Harding ESE	GW	8/21/2002	Town Well	CHESTNUT ST 1	201567-001	201567	201567-001	Chestnut Street No. 1	Sample												7	7							
Town Well	OLIN	GW	9/18/2002	Town Well	CHESTNUT ST 1	202010-001	202010	202010-001	Chestnut St. Old	Sample												7	7							
Town Well	OLIN	GW	9/18/2002	Town Well	CHESTNUT ST 1	202010-006	202010	202010-006	Duplicate	Duplicate												7	7							
Town Well		GW	10/22/2002	Town Well	CHESTNUT ST 1	202687-001	202687	202687-001	Chestnut St.Old	Sample												7	7							
Town & Sentinel		GW	11/13/2002	Town Well	CHESTNUT ST 1	203111-001	203111	203111-001	Chestnut St. Old	Sample												7	7							
Town Well		GW	12/19/2002	Town Well	CHESTNUT ST 1	203877-001	203877	203877-001	Chestnut St. Old	Sample												7	7							
Town & Sentinel	MACTEC	GW	2/7/2003	Town Well	CHESTNUT ST 1	204681-003	204681	204681-003	Chestnut St. No.1 (Old)	Sample												7	7							
Distribution System	MACTEC	DW	2/26/2003	Town Well	CHESTNUT ST 1	205446-018	205446	205446-018	Chestnut St #1	Sample													3		3					
Distribution System	MACTEC	DW	2/26/2003	Town Well	CHESTNUT ST 1	2302270248	106376	2302270248	Chestnut St. 1	Sample						1														
Town Well	OLIN	GW	3/19/2003	Town Well	CHESTNUT ST 1	205525-001	205525	205525-001	Chestnut St. Old	Sample												7	7							
Town Well	OLIN	GW	4/16/2003	Town Well	CHESTNUT ST 1	206126-001	206126	206126-001	Chestnut St. Old	Sample												7	8							
Town & Sentinel		GW	2/22/1992	Town Well	CHESTNUT ST 1A/2	1000426	92053	92053003	CHESTNUT ST 2/1A	Sample											1		3							
		GW	9/3/1992	Town Well	CHESTNUT ST 1A/2	1460006			CHESTNUT ST 2/1A	Sample		13			5						9		6							
Town & Sentinel		GW	10/20/1993	Town Well	CHESTNUT ST 1A/2	1000428	WJ-1283	WJ-1283-5	CHESTNUT ST 2/1A	Sample											1		3							
Town & Sentinel		GW	2/15/1994	Town Well	CHESTNUT ST 1A/2	1000429	WK-0170	WK-0170-5	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel		GW	5/10/1994	Town Well	CHESTNUT ST 1A/2	1000430	WK-0584/WK-0594	WK-0594-2	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel		GW	8/24/1994	Town Well	CHESTNUT ST 1A/2	1460703	WK-1160/WK-1164	WK-1164-2	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel		GW	11/15/1994	Town Well	CHESTNUT ST 1A/2	1460708	WK-1673/WK-1674	WK-1674-5	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel	LAW	GW	12/5/1994	Town Well	CHESTNUT ST 1A/2	1460966	151	940010488	CHESTNUT ST 2/1A	Sample											4		4							
Town & Sentinel		GW	2/8/1995	Town Well	CHESTNUT ST 1A/2	1460713	WL-0225/WL-0230	WL-0225-3	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel		GW	5/31/1995	Town Well	CHESTNUT ST 1A/2	1460432	WL-0848/WL-0850	WL-0848-4	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel		GW	9/27/1995	Town Well	CHESTNUT ST 1A/2	1460488	WL-1491/WL-1492	WL-1492-4	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel		GW	12/13/1995	Town Well	CHESTNUT ST 1A/2	1460956	WL-2122/WL-2116	WL-2122-4	CHESTNUT ST 2/1A	Sample											4		6							
Town & Sentinel		GW	3/27/1996	Town Well	CHESTNUT ST 1A/2	1460730	WM-0570	WM-0570	CHESTNUT ST 2/1A	Sample											4		6							
		GW	6/19/1996	Town Well	CHESTNUT ST 1A/2	1460973	O107-006	O107-006-03	CHESTNUT #1A	Sample											4		5							
Town & Sentinel		GW	7/31/1996	Town Well	CHESTNUT ST 1A/2	1461075	961462A	961462A-01	CHESTNUT ST 2/1A	Sample	FILTERED 1461094												4	5							
Town & Sentinel		GW	7/31/1996	Town Well	CHESTNUT ST 1A/2	1461094	961462A	961462A-01	CHESTNUT ST 2/1A	Sample											1				2	1				
Town & Sentinel		GW	8/27/1996	Town Well	CHESTNUT ST 1A/2	1461060	961654A	961654A-06	CHESTNUT ST 2/1A	Sample	FILTERED												4	7		2	1				
Town & Sentinel		GW	9/24/1996	Town Well	CHESTNUT ST 1A/2	1461120	961908A	961908A-06	CHESTNUT ST 2/1A	Sample	FILTERED												4	6		3	1				
Town & Sentinel		GW	11/21/1996	Town Well	CHESTNUT ST 1A/2	1461337	962487A	962487A-02	CHESTNUT ST 2/1A	Sample	FILTERED												6	7		3	1				
Town & Sentinel		GW	12/18/1996	Town Well	CHESTNUT ST 1A/2	1461429	962687A	962687A-04	CHESTNUT ST 2/1A	Sample	FILTERED												6	7		3	1				
Town & Sentinel		GW	1/23/1997	Town Well	CHESTNUT ST 1A/2	1461542	970096A	970096A-05	CHESTNUT ST 2/1A	Sample	FILTERED												6	7		3	1				
Town & Sentinel		GW	2/25/1997	Town Well	CHESTNUT ST 1A/2	H000018	F970395A	F970395A-05	CHESTNUT ST 1A/2	Sample													7	7		1					
Town & Sentinel		GW	3/25/1997	Town Well	CHESTNUT ST 1A/2	H000017	F970575A	F970575A-03	CHESTNUT ST 1A/2	Sample													6	7							
		GW	4/23/1997	Town Well	CHESTNUT ST 1A/2	1461655				Sample													6	10		1	1				
		GW	6/24/1997	Town Well	CHESTNUT ST 1A/2	1461703				Sample													6	9		1	1				
		GW	9/9/1997	Town Well	CHESTNUT ST 1A/2	2000023				Sample												6		6							
		GW	9/9/1997	Town Well	CHESTNUT ST 1A/2	2000024				Duplicate												6		6							
	LAW	GW	10/21/1997	Town Well	CHESTNUT ST 1A/2	2000051				Sample												6		6							
	LAW	GW	11/10/1997	Town Well	CHESTNUT ST 1A/2	2000076				Sample													6	6							
Town & Sentinel	LAW	GW	1/6/1998	Town Well	CHESTNUT ST 1A/2	2000103	O107-119	O107-119-07	Chestnut Street 2	Sample											6		6							
Town & Sentinel	LAW	GW	2/11/1998	Town Well	CHESTNUT ST 1A/2	2000136	O107-130	O107-130-21	Chestnut St 2	Sample												6	7							
Town & Sentinel	LAW	GW	3/10/1998	Town Well	CHESTNUT ST 1A/2	2000264	O107-138	O107-138-21	Chestnut St.2	Sample												7	7							

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Open/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Town & Sentinel	LAW	GW	4/14/1998	Town Well	CHESTNUT ST 1A/2	2000137	O107-145	O107-145-04	Chestnut 1A/2	Sample												7	7							
Town & Sentinel	LAW	GW	5/12/1998	Town Well	CHESTNUT ST 1A/2	2000138	O107-159	O107-159-02	Chestnut 1A-2	Sample												7	7							
Town & Sentinel	LAW	GW	5/12/1998	Town Well	CHESTNUT ST 1A/2	2000243	O107-159	O107-159-03	Town Well Duplicate	Duplicate												7	7							
Town & Sentinel	LAW	GW	6/9/1998	Town Well	CHESTNUT ST 1A/2	2000281	O107-168	O107-168-05	Chestnut 1A 2	Sample												7	6							
Town & Sentinel	LAW	GW	7/8/1998	Town Well	CHESTNUT ST 1A/2	2000326	O107-177	O107-177-03	CHESTNUT ST 1A/2	Sample												7	7							
Town & Sentinel	LAW	GW	8/12/1998	Town Well	CHESTNUT ST 1A/2	108645	O107-196	108645	CHESTNUT #2	Sample												7	7							
Town & Sentinel	LAW	GW	9/9/1998	Town Well	CHESTNUT ST 1A/2	2000382				Sample												7	7							
Town & Sentinel	LAW	GW	9/9/1998	Town Well	CHESTNUT ST 1A/2	2000386				Duplicate												7	7							
Town & Sentinel	LAW	GW	10/14/1998	Town Well	CHESTNUT ST 1A/2	111947	O107-235	111947	CHESTNUT #2	Sample												7	7							
Town & Sentinel	LAW	GW	11/10/1998	Town Well	CHESTNUT ST 1A/2	113393	13871	113393	CHESTNUT #2	Sample												7	6							
Town & Sentinel	LAW	GW	12/9/1998	Town Well	CHESTNUT ST 1A/2	115135	14406	115135	CHESTNUT #2	Sample												7	6							
Town & Sentinel	LAW	GW	12/9/1998	Town Well	CHESTNUT ST 1A/2	115138	14406	115138	TOWN WELL DUPLICATE	Duplicate												7	6							
Town & Sentinel	Town	GW	1/27/1999	Town Well	CHESTNUT ST 1A/2	117266	15010	117266	CHESTNUT STREET #2	Sample												7	6							
Town & Sentinel	Town	GW	2/17/1999	Town Well	CHESTNUT ST 1A/2	118816	15367	118816	Chestnut #1A/2	Sample													7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	CHESTNUT ST 1A/2	118817	15367	118817	Chestnut #1A/2	Sample												7								
Town & Sentinel	Town	GW	2/17/1999	Town Well	CHESTNUT ST 1A/2	118820	15367	118820	Duplicate	Duplicate													7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	CHESTNUT ST 1A/2	118821	15367	118821	Duplicate	Duplicate												7								
Town & Sentinel	OLIN	GW	3/17/1999	Town Well	CHESTNUT ST 1A/2	120205	15741	120205	CHESTNUT STREET 1A/2	Sample												7	7							
Town & Sentinel	OLIN	GW	4/28/1999	Town Well	CHESTNUT ST 1A/2	123190	16372	123190	CHESTNUT ST. #1A	Sample												7	7							
Town & Sentinel	LAW	GW	5/19/1999	Town Well	CHESTNUT ST 1A/2	124839	16749	124839	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	6/17/1999	Town Well	CHESTNUT ST 1A/2	127017	17264	127017	CHESTNUT STREET 1A	Sample												7	7							
Town & Sentinel	Town	GW	7/22/1999	Town Well	CHESTNUT ST 1A/2	129483	17866	129483	CHESTNUT STREET #1A	Sample												7	7							
Town & Sentinel	Town	GW	8/19/1999	Town Well	CHESTNUT ST 1A/2	131300	18320	131300	CHESTNUT ST. #1A	Sample												7	7							
Town & Sentinel	OLIN	GW	9/22/1999	Town Well	CHESTNUT ST 1A/2	133356	18857	133356	CHESTNUT ST. #1A	Sample												7	7							
Town & Sentinel	OLIN	GW	10/20/1999	Town Well	CHESTNUT ST 1A/2	135189	19350	135189	CHESTNUT STREET #1A	Sample												7	7							
Town & Sentinel	LAW	GW	11/3/1999	Town Well	CHESTNUT ST 1A/2	135988	19546	135988	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	3/22/2000	Town Well	CHESTNUT ST 1A/2	144171	21583	144171	CHESTNUT 1A	Sample												7	9							
Town & Sentinel	OLIN	GW	3/22/2000	Town Well	CHESTNUT ST 1A/2	144174	21583	144174	DUPLICATE	Duplicate												7	9							
Town & Sentinel	Town	GW	4/19/2000	Town Well	CHESTNUT ST 1A/2	146227	22037	146227	CHESTNUT 1A	Sample												7	9							
Town & Sentinel	LAW	GW	5/4/2000	Town Well	CHESTNUT ST 1A/2	147290	22271	147290	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	LAW	GW	5/4/2000	Town Well	CHESTNUT ST 1A/2	147295	22271	147295	TOWN DUP	Duplicate												7	7							
Town & Sentinel	OLIN	GW	6/21/2000	Town Well	CHESTNUT ST 1A/2	150451	23069	150451	CHESTNUT ST. 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2000	Town Well	CHESTNUT ST 1A/2	152537	23519	152537	CHESTNUT ST 1A	Sample												7	7							
Town & Sentinel	Town	GW	8/16/2000	Town Well	CHESTNUT ST 1A/2	154635	24044	154635	CHESTNUT ST 1A	Sample												7	9							
Town & Sentinel	OLIN	GW	9/28/2000	Town Well	CHESTNUT ST 1A/2	157652	24800	157652	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	9/28/2000	Town Well	CHESTNUT ST 1A/2	157684	24800	157684	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	10/18/2000	Town Well	CHESTNUT ST 1A/2	159282	25161	159282	CHESTNUT ST 1A	Sample												7	7							
Town & Sentinel	LAW	GW	11/7/2000	Town Well	CHESTNUT ST 1A/2	160888	25505	160888	CHESTNUT ST #1A/2	Sample												7	7							
Town & Sentinel	OLIN	GW	12/20/2000	Town Well	CHESTNUT ST 1A/2	164543	26271	164543	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	1/17/2001	Town Well	CHESTNUT ST 1A/2	166520	26660	166520	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	LAW	GW	2/13/2001	Town Well	CHESTNUT ST 1A/2	167906	26978	167906	CHESTNUT ST. 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	3/21/2001	Town Well	CHESTNUT ST 1A/2	170290	27514	170290	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	4/25/2001	Town Well	CHESTNUT ST 1A/2	172811	28051	172811	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	LAW	GW	5/16/2001	Town Well	CHESTNUT ST 1A/2	174430	28412	174430	CHESTNUT ST 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2001	Town Well	CHESTNUT ST 1A/2	179093	29474	179093	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	LAW	GW	8/21/2001	Town Well	CHESTNUT ST 1A/2	181712	30019	181712	CHESTNUT ST 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	9/19/2001	Town Well	CHESTNUT ST 1A/2	183542	30433	183542	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	OLIN	GW	9/19/2001	Town Well	CHESTNUT ST 1A/2	183546	30433	183546	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	10/17/2001	Town Well	CHESTNUT ST 1A/2	185703	30880	185703	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	LAW	GW	11/6/2001	Town Well	CHESTNUT ST 1A/2	187200	31197	187200	CHESTNUT ST 1A/2	Sample	SAMPLE ID SWITCHED WITH CHESTNUT ST NO 1 - LABSAMPID 187201											7	7							
Town & Sentinel	OLIN	GW	12/19/2001	Town Well	CHESTNUT ST 1A/2	189730	31832	189730	CHESTNUT 1A	Sample												7	7							
Town & Sentinel	LAW	GW	2/27/2002	Town Well	CHESTNUT ST 1A/2	193566	32697	193566	CHESTNUT ST NO 1A	Sample												7	7							
Town & Sentinel	LAW	GW	5/24/2002	Town Well	CHESTNUT ST 1A/2	200505-007	200505	200505-007	Chestnut St. N. 1A/2	Sample												7	7							
Town & Sentinel	OLIN	GW	6/19/2002	Town Well	CHESTNUT ST 1A/2	200652-004	200652	200652-004	Chestnut Street 1A	Sample												7	7							
Town Well	OLIN	GW	7/17/2002	Town Well	CHESTNUT ST 1A/2	201092-002	201092	201092-002	Chestnut St. 1A	Sample												7	7							
Town & Sentinel	Harding ESE	GW	8/21/2002	Town Well	CHESTNUT ST 1A/2	201567-002	201567	201567-002	Chestnut Street No. 1A/2	Sample												7	7							
Town Well	OLIN	GW	9/18/2002	Town Well	CHESTNUT ST 1A/2	202010-002	202010	202010-002	Chestnut St. 1A	Sample												7	7							
Town Well		GW	10/22/2002	Town Well	CHESTNUT ST 1A/2	202687-002	202687	202687-002	Chestnut St.1A	Sample												7	7							
Town Well		GW	12/19/2002	Town Well	CHESTNUT ST 1A/2	203877-002	203877	203877-002	Chestnut St. 1A	Sample												7	7							
Town & Sentinel	MACTEC	GW	2/7/2003	Town Well	CHESTNUT ST 1A/2	204681-004	204681	204681-004	Chestnut St. No.1 (A/2)	Sample												7	7							
Distribution System	MACTEC	DW	2/26/2003	Town Well	CHESTNUT ST 1A/2	205446-017	205446	205446-017	Chestnut St #1A/2	Sample													3		3					
Distribution System	MACTEC	DW	2/26/2003	Town Well	CHESTNUT ST 1A/2	2302270247	106376	2302270247	Chestnut St. 1A/2	Sample					1															
Town Well	OLIN	GW	3/19/2003	Town Well	CHESTNUT ST 1A/2	205525-002	205525	205525-002	Chestnut St. 1A	Sample												7	7							
Town Well	OLIN	GW	4/16/2003	Town Well	CHESTNUT ST 1A/2	206126-002	206126	206126-002	Chestnut St. 1A	Sample												7	8							
		DW	4/10/1997	Town Well	CITY WATER	1461610			CITY WATER	Sample													1		1					
Town & Sentinel	OLIN	GW	9/28/2000	Town Well	SHAWSHEEN	157655	24800	157655	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	10/18/2000	Town Well	SHAWSHEEN	159283	25161	159283	SHAWSHEEN	Sample												7	7							
Town & Sentinel	LAW	GW	11/7/2000	Town Well	SHAWSHEEN	160889	25505	160889	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	12/20/2000	Town Well	SHAWSHEEN	164546	26271	164546	SHAWSHEEN AVE	Sample												7	7							
Town & Sentinel	OLIN	GW	1/17/2001	Town Well	SHAWSHEEN	166522	26660	166522	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	1/17/2001	Town Well	SHAWSHEEN	166526	26660	166526	DUP	Duplicate												7	7							

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

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Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Town & Sentinel	LAW	GW	2/13/2001	Town Well	SHAWSHEEN	167908	26978	167908	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	3/21/2001	Town Well	SHAWSHEEN	170293	27514	170293	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	4/25/2001	Town Well	SHAWSHEEN	172814	28051	172814	SHAWSHEEN	Sample												7	7							
Town & Sentinel	LAW	GW	5/16/2001	Town Well	SHAWSHEEN	174432	28412	174432	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	6/20/2001	Town Well	SHAWSHEEN	177010	28997	177010	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2001	Town Well	SHAWSHEEN	179096	29474	179096	SHAWSHEEN	Sample												7	7							
Town & Sentinel	LAW	GW	8/21/2001	Town Well	SHAWSHEEN	181714	30019	181714	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	9/19/2001	Town Well	SHAWSHEEN	183545	30433	183545	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	10/17/2001	Town Well	SHAWSHEEN	185706	30880	185706	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	10/17/2001	Town Well	SHAWSHEEN	185707	30880	185707	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	11/6/2001	Town Well	SHAWSHEEN	187208	31197	187208	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	12/19/2001	Town Well	SHAWSHEEN	189733	31832	189733	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	1/16/2002	Town Well	SHAWSHEEN	191036	32147	191036	SHAWSHEEN	Sample												7	7							
Town & Sentinel	LAW	GW	2/27/2002	Town Well	SHAWSHEEN	193574	32697	193574	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	3/20/2002	Town Well	SHAWSHEEN	195022	33059	195022	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	4/17/2002	Town Well	SHAWSHEEN	196225	33386	196225	SHAWSHEEN	Sample												7	7							
Town & Sentinel	OLIN	GW	6/19/2002	Town Well	SHAWSHEEN	200652-008	200652	200652-008	Shawsheen	Sample												7	7							
Town & Sentinel	OLIN	GW	6/19/2002	Town Well	SHAWSHEEN	200652-003	200652	200652-003	Duplicate	Duplicate												7	7							
Town Well	OLIN	GW	7/17/2002	Town Well	SHAWSHEEN	201092-007	201092	201092-007	Shawsheen	Sample												7	7							
Town & Sentinel	Harding ESE	GW	8/21/2002	Town Well	SHAWSHEEN	201567-007	201567	201567-007	Shawsheen	Sample												7	7							
Town Well	OLIN	GW	9/18/2002	Town Well	SHAWSHEEN	202010-007	202010	202010-007	Shawsheen	Sample												7	7							
Town Well		GW	10/22/2002	Town Well	SHAWSHEEN	202687-007	202687	202687-007	Shawsheen	Sample												7	7							
Town & Sentinel		GW	11/13/2002	Town Well	SHAWSHEEN	203111-007	203111	203111-007	Shawsheen	Sample												7	7							
Town Well		GW	12/19/2002	Town Well	SHAWSHEEN	203877-007	203877	203877-007	Shawsheen	Sample												7	7							
Town Well	MACTEC	GW	1/15/2003	Town Well	SHAWSHEEN	204362-007	204362	204362-007	Shawsheen	Sample												7	7							
Town Well	MACTEC	GW	1/15/2003	Town Well	SHAWSHEEN	204362-006	204362	204362-006	Town Dup	Duplicate												7	7							
Town & Sentinel	MACTEC	GW	2/7/2003	Town Well	SHAWSHEEN	204681-005	204681	204681-005	Shawsheen	Sample												7	7							
Distribution System	MACTEC	GW	2/26/2003	Town Well	SHAWSHEEN	205446-026	205446	205446-026	Shawsheen	Sample															3					
Town Well	OLIN	GW	3/19/2003	Town Well	SHAWSHEEN	205525-007	205525	205525-007	Shawsheen	Sample												7	7							
Town Well	OLIN	GW	4/16/2003	Town Well	SHAWSHEEN	206126-007	206126	206126-007	Shawsheen	Sample												7	8							
		GW	4/11/1986	Town Well	TOWN PARK	1000431			TOWN PARK	Sample											7		6							
		GW	3/24/1987	Town Well	TOWN PARK	1000432			TOWN PARK	Sample											7		6	1						
		GW	3/25/1988	Town Well	TOWN PARK	1000433			TOWN PARK	Sample											7		6	2						
		GW	2/13/1989	Town Well	TOWN PARK	1000434			TOWN PARK	Sample											8		7	1						
		GW	5/30/1990	Town Well	TOWN PARK	1000435			TOWN PARK	Sample											7		7	2						
Town & Sentinel		GW	2/22/1992	Town Well	TOWN PARK	1000436	92053	92053005	TOWN PARK	Sample											1		3							
		GW	9/3/1992	Town Well	TOWN PARK	1460003			TOWN PARK	Sample		13			5						9		6							
Town & Sentinel		GW	10/20/1993	Town Well	TOWN PARK	1000438	WJ-1283	WJ-1283-1	TOWN PARK	Sample											1		3							
Town & Sentinel		GW	2/15/1994	Town Well	TOWN PARK	1000439	WK-0170	WK-0170-4	TOWN PARK	Sample	RES-5										4		6							
Town & Sentinel		GW	5/10/1994	Town Well	TOWN PARK	1000440	WK-0584/WK-0594	WK-0594-5	TOWN PARK	Sample											4		6							
Town & Sentinel		GW	8/24/1994	Town Well	TOWN PARK	1460704	WK-1160/WK-1164	WK-1164-5	TOWN PARK	Sample											4		6							
Town & Sentinel		GW	11/15/1994	Town Well	TOWN PARK	1460709	WK-1673/WK-1674	WK-1674-2	TOWN PARK	Sample											4		6							
Town & Sentinel	LAW	GW	12/5/1994	Town Well	TOWN PARK	1460967	151	940010489	TOWN PARK	Sample											4		3							
Town & Sentinel		GW	2/8/1995	Town Well	TOWN PARK	1460714	WL-0225/WL-0230	WL-0225-5	TOWN PARK	Sample											4		6							
Town & Sentinel		GW	5/31/1995	Town Well	TOWN PARK	1460430	WL-0848/WL-0850	WL-0848-2	TOWN PARK	Sample											4		6							
Town & Sentinel		GW	9/27/1995	Town Well	TOWN PARK	1460486	WL-1491/WL-1492	WL-1492-2	TOWN PARK	Sample											4		6							
Town & Sentinel		GW	12/13/1995	Town Well	TOWN PARK	1460960	WL-2122/WL-2116	WL-2122-2	TOWN PARK	Sample											4		6							
Town & Sentinel		GW	3/27/1996	Town Well	TOWN PARK	1460732	WM-0570	WM-0570	TOWN PARK	Sample											4		6							
		GW	6/19/1996	Town Well	TOWN PARK	1460975	O107-006	O107-006-05	TOWNPARK	Sample											4		5							
Town & Sentinel		GW	8/1/1996	Town Well	TOWN PARK	1461087	961462A	961462A-11	TOWN PARK	Sample	FILTERED 1461106											4	5							
Town & Sentinel		GW	8/1/1996	Town Well	TOWN PARK	1461106	961462A	961462A-11	TOWN PARK	Sample											1			2	1					
Town & Sentinel		GW	8/27/1996	Town Well	TOWN PARK	1461056	961654A	961654A-02	TOWN PARK	Sample	FILTERED											4	7	2	1					
Town & Sentinel		GW	9/24/1996	Town Well	TOWN PARK	1461116	961908A	961908A-02	TOWN PARK	Sample	FILTERED											4	6	3	1					
Town & Sentinel		GW	10/24/1996	Town Well	TOWN PARK	1461213	962201A	962201A-01	TOWN PARK	Sample	FILTERED											6	7	3	1					
Town & Sentinel		GW	1/23/1997	Town Well	TOWN PARK	1461538	970096A	970096A-01	TOWN PARK	Sample	FILTERED											6	7	3	1					
Town & Sentinel		GW	2/25/1997	Town Well	TOWN PARK	H000027	F970395A	F970395A-01	TOWN PARK	Sample												7	7	1						
		GW	5/20/1997	Town Well	TOWN PARK	1461672				Sample												6	9	1	1					
		GW	6/24/1997	Town Well	TOWN PARK	1461699				Sample												6	9	1	1					
		GW	9/9/1997	Town Well	TOWN PARK	2000019				Sample											6		6							
	LAW	GW	10/21/1997	Town Well	TOWN PARK	2000041				Sample											6		6							
	LAW	GW	11/10/1997	Town Well	TOWN PARK	2000073				Sample												6	6							
		GW	12/3/1997	Town Well	TOWN PARK	2000083				Sample												6	6							
Town & Sentinel	LAW	GW	1/6/1998	Town Well	TOWN PARK	2000097	O107-119	O107-119-01	Town Park 1	Sample											6		6							
Town & Sentinel	LAW	GW	2/11/1998	Town Well	TOWN PARK	2000239	O107-130	O107-130-01	Town Park 1	Sample												6	7							
Town & Sentinel	LAW	GW	3/10/1998	Town Well	TOWN PARK	2000261	O107-138	O107-138-18	Town Park	Sample												7	7							
Town & Sentinel	LAW	GW	3/10/1998	Town Well	TOWN PARK	2000251	O107-138	O107-138-08	Town Well Duplicate	Duplicate												7	7							
Town & Sentinel	LAW	GW	4/14/1998	Town Well	TOWN PARK	2000240	O107-145	O107-145-01	Town Park	Sample												7	7							
Town & Sentinel	LAW	GW	6/9/1998	Town Well	TOWN PARK	2000278	O107-168	O107-168-02	Town Park	Sample												7	6							
Town & Sentinel	LAW	GW	7/8/1998	Town Well	TOWN PARK	2000333	O107-177	O107-177-01	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	8/12/1998	Town Well	TOWN PARK	108643	O107-196	108643	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	9/9/1998	Town Well	TOWN PARK	2000385				Sample												7	7							
Town & Sentinel	LAW	GW	10/14/1998	Town Well	TOWN PARK	111945	O107-235	111945	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	10/14/1998	Town Well	TOWN PARK	111950	O107-235	111950	TOWN WELL DUPLICATE	Duplicate												7	7							

Table 2.1-14
Summary of Town Well and Butters Row Treatment Plant Groundwater Samples

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampl	Matrix	Date Sampled	Area	Location	Sample Number	Report Number	Lab Sample Number	COC Sample	Sample Type	Comments	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Open/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Coliform	Field	Field - pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
Town & Sentinel	LAW	GW	11/10/1998	Town Well	TOWN PARK	113391	13871	113391	TOWN PARK	Sample												7	6							
Town & Sentinel	LAW	GW	12/9/1998	Town Well	TOWN PARK	115133	14406	115133	TOWN PARK	Sample												7	6							
Town & Sentinel	Town	GW	1/27/1999	Town Well	TOWN PARK	117264	15010	117264	TOWN PARK	Sample												7	7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	TOWN PARK	118814	15367	118814	Town Park	Sample													7							
Town & Sentinel	Town	GW	2/17/1999	Town Well	TOWN PARK	118815	15367	118815	Town Park	Sample												7								
Town & Sentinel	OLIN	GW	3/17/1999	Town Well	TOWN PARK	120204	15741	120204	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	3/17/1999	Town Well	TOWN PARK	120207	15741	120207	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	4/28/1999	Town Well	TOWN PARK	123188	16372	123188	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	6/17/1999	Town Well	TOWN PARK	127015	17264	127015	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	6/17/1999	Town Well	TOWN PARK	127018	17264	127018	DUPLICATE	Duplicate												7	7							
Town & Sentinel	Town	GW	7/22/1999	Town Well	TOWN PARK	129481	17866	129481	TOWN PARK	Sample												7	7							
Town & Sentinel	Town	GW	8/19/1999	Town Well	TOWN PARK	131298	18320	131298	TOWN PARK	Sample												7	7							
Town & Sentinel	Town	GW	8/19/1999	Town Well	TOWN PARK	131301	18320	131301	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	9/22/1999	Town Well	TOWN PARK	133354	18857	133354	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	10/20/1999	Town Well	TOWN PARK	135187	19350	135187	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	11/3/1999	Town Well	TOWN PARK	135985	19546	135985	TOWN PARK	Sample												7	7							
Town Well	Town	GW	12/22/1999	Town Well	TOWN PARK	139110	20307	139110	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	1/26/2000	Town Well	TOWN PARK	140965	20776	140965	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	2/9/2000	Town Well	TOWN PARK	141655	20959	141655	TOWN PARK #1	Sample												7	7							
Town & Sentinel	Town	GW	4/19/2000	Town Well	TOWN PARK	146230	22037	146230	TOWN PARK	Sample												7	9							
Town & Sentinel	LAW	GW	5/4/2000	Town Well	TOWN PARK	147287	22271	147287	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	6/21/2000	Town Well	TOWN PARK	150449	23069	150449	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2000	Town Well	TOWN PARK	152535	23519	152535	TOWN PARK	Sample												7	7							
Town & Sentinel	Town	GW	8/16/2000	Town Well	TOWN PARK	154633	24044	154633	TOWN PARK	Sample												7	9							
Town & Sentinel	Town	GW	8/16/2000	Town Well	TOWN PARK	154636	24044	154636	DUPLICATE	Duplicate												7	9							
Town & Sentinel	OLIN	GW	9/28/2000	Town Well	TOWN PARK	157654	24800	157654	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	10/18/2000	Town Well	TOWN PARK	159280	25161	159280	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	11/7/2000	Town Well	TOWN PARK	160881	25505	160881	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	11/7/2000	Town Well	TOWN PARK	160890	25505	160890	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	12/20/2000	Town Well	TOWN PARK	164545	26271	164545	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	1/17/2001	Town Well	TOWN PARK	166521	26660	166521	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	2/13/2001	Town Well	TOWN PARK	167903	26978	167903	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	3/21/2001	Town Well	TOWN PARK	170292	27514	170292	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	3/21/2001	Town Well	TOWN PARK	170294	27514	170294	DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	4/25/2001	Town Well	TOWN PARK	172813	28051	172813	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	6/20/2001	Town Well	TOWN PARK	177009	28997	177009	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2001	Town Well	TOWN PARK	179095	29474	179095	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	7/19/2001	Town Well	TOWN PARK	179097	29474	179097	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	8/21/2001	Town Well	TOWN PARK	181711	30019	181711	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	8/21/2001	Town Well	TOWN PARK	181719	30019	181719	BLIND DUPLICATE 1	Duplicate												7	7							
Town & Sentinel	OLIN	GW	9/19/2001	Town Well	TOWN PARK	183544	30433	183544	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	10/17/2001	Town Well	TOWN PARK	185705	30880	185705	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	11/6/2001	Town Well	TOWN PARK	187204	31197	187204	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	11/6/2001	Town Well	TOWN PARK	187205	31197	187205	TOWN WELL DUPLICATE	Duplicate												7	7							
Town & Sentinel	OLIN	GW	12/19/2001	Town Well	TOWN PARK	189732	31832	189732	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	1/16/2002	Town Well	TOWN PARK	191035	32147	191035	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	2/27/2002	Town Well	TOWN PARK	193570	32697	193570	TOWN PARK	Sample												7	7							
Town & Sentinel	LAW	GW	2/27/2002	Town Well	TOWN PARK	193571	32697	193571	BLIND DUPLICATE 2	Duplicate												7	7							
Town & Sentinel	OLIN	GW	3/20/2002	Town Well	TOWN PARK	195021	33059	195021	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	4/17/2002	Town Well	TOWN PARK	196224	33386	196224	TOWN PARK	Sample												7	7							
Town & Sentinel	OLIN	GW	4/17/2002	Town Well	TOWN PARK	196226	33386	196226	DUPLICATE	Duplicate												7	7							
Town & Sentinel	LAW	GW	5/24/2002	Town Well	TOWN PARK	200505-001	200505	200505-001	Town Park	Sample												7	7							
Town & Sentinel	LAW	GW	5/24/2002	Town Well	TOWN PARK	200505-004	200505	200505-004	Blind Duplicate 2	Duplicate												7	7							
Town & Sentinel	OLIN	GW	6/19/2002	Town Well	TOWN PARK	200652-007	200652	200652-007	Town Park	Sample												7	7							
Town Well	OLIN	GW	7/17/2002	Town Well	TOWN PARK	201092-005	201092	201092-005	Town Park	Sample												7	7							
Town & Sentinel	Harding ESE	GW	8/21/2002	Town Well	TOWN PARK	201567-005	201567	201567-005	Town Park	Sample												7	7							
Town & Sentinel	Harding ESE	GW	8/21/2002	Town Well	TOWN PARK	201567-021	201567	201567-021	Town Park Duplicate	Duplicate												7	7							
Town Well	Harding ESE	GW	10/22/2002	Town Well	TOWN PARK	202687-005	202687	202687-005	Town Park	Sample												7	7							
Town Well	Harding ESE	GW	10/22/2002	Town Well	TOWN PARK	202687-006	202687	202687-006	Duplicate	Duplicate												7	7							
Town & Sentinel	Harding ESE	GW	11/13/2002	Town Well	TOWN PARK	203111-005	203111	203111-005	Town Park	Sample												7	7							
Town & Sentinel	Harding ESE	GW	11/13/2002	Town Well	TOWN PARK	203111-006	203111	203111-006	Town Dup	Duplicate												7	7							
Town Well	Harding ESE	GW	12/19/2002	Town Well	TOWN PARK	203877-005	203877	203877-005	Town Park	Sample												7	7							
Town Well	Harding ESE	GW	12/19/2002	Town Well	TOWN PARK	203877-006	203877	203877-006	Town Dup	Duplicate												7	7							
Town Well	MACTEC	GW	1/15/2003	Town Well	TOWN PARK	204362-005	204362	204362-005	Town Park	Sample												7	7							
Town & Sentinel	MACTEC	GW	2/7/2003	Town Well	TOWN PARK	204681-006	204681	204681-006	Town Park	Sample												7	7							
Town & Sentinel	MACTEC	GW	2/7/2003	Town Well	TOWN PARK	204681-007	204681	204681-007	Duplicate	Duplicate												7	7							
Distribution System	MACTEC	GW	2/26/2003	Town Well	TOWN PARK	205446-016	205446	205446-016	Town Park	Sample													3		3					
Distribution System	MACTEC	GW	2/26/2003	Town Well	TOWN PARK	2302270246	106376	2302270246	Town Park	Sample					1															
Town Well	OLIN	GW	3/19/2003	Town Well	TOWN PARK	205525-005	205525	205525-005	Town Park	Sample												7	7							
Town Well	OLIN	GW	4/16/2003	Town Well	TOWN PARK	206126-005	206126	206126-005	Town Park	Sample												7	8							
Town Well	OLIN	GW	4/16/2003	Town Well	TOWN PARK	206126-006	206126	206126-006	Town Dup	Duplicate												7	8							

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Table 2.1-15
Summary of Biological Tissue Samples Collected To Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Event	Company Sampled By	Matrix	RI Status	Date Sampled	Area	Location	Chain of Custody Sample ID	Sample Depth	Sample Type	Comments	Inorganics/Physical	Metals,Total	NDMA	Pesticide/PCB	Semivolatiles
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF005STDXX		Sample		1	23		28	
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF008STDXX		Sample		1	23		28	
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF007STDXX		Sample		1	23	1	28	60
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF004WDXXX		Sample		1	23		28	
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF006STDXX		Sample		1	23	1	28	60
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF003WDXXX		Sample		1	23	1	28	60
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF002WDXXX		Sample		1	23		28	
1997 ERC	ABB	TI		10-Oct-96		ECO-CRAYFISH	CF001WDXXX		Sample		1	23	1	28	60
1997 ERC	ABB	TI		10-Oct-96		ECO-FROG	FR003STDXX		Sample		1	23		21	
1997 ERC	ABB	TI		10-Oct-96		ECO-FROG	FR002PNDXX		Sample		1	23		21	
1997 ERC	ABB	TI		10-Oct-96		ECO-FROG	FR001PNDXX		Sample		1	23	1	28	60
1997 ERC	ABB	TI		10-Oct-96		SMALLMAMMAL	SM008WMDXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		10-Oct-96		SMALLMAMMAL	SM012PNDXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		10-Oct-96		SMALLMAMMAL	SM005STDXX		Sample		1	23		21	
1997 ERC	ABB	TI		10-Oct-96		SMALLMAMMAL	SM004WDOXX		Sample		1	23		21	
1997 ERC	ABB	TI		10-Oct-96		SMALLMAMMAL	SM003WDOXX		Sample		1	23		21	
1997 ERC	ABB	TI		10-Oct-96		SMALLMAMMAL	SM001WDOXX		Sample		1	23		21	
1997 ERC	ABB	TI		10-Oct-96		SMALLMAMMAL	SM002WDXXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		11-Oct-96		ECO-CRAYFISH	CF009REFXX		Sample		1			28	
1997 ERC	ABB	TI		11-Oct-96		ECO-FROG	FR007WDXXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		11-Oct-96		ECO-FROG	FR006PNDXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		11-Oct-96		ECO-FROG	FR005PNDXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		11-Oct-96		ECO-FROG	FR004WDXXX		Sample		1	23		28	
1997 ERC	ABB	TI		11-Oct-96		ECO-PLANT	PL003WMDXX		Sample			23		28	
1997 ERC	ABB	TI		11-Oct-96		ECO-PLANT	PL002WDXXX		Sample			23		28	
1997 ERC	ABB	TI		11-Oct-96		ECO-PLANT	PL001WDXXX		Sample			23		28	
1997 ERC	ABB	TI		11-Oct-96		ECO-PLANT	PL004WMDXX		Sample			23		28	
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM015TERXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM014TERXX		Sample		1	23		21	
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM013TERXX		Sample		1	23		21	
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM011STDXX		Sample		1	23		21	
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM009WMDXX		Sample		1	23		21	
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM007STDXX		Sample		1	23		21	
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM006STDXX		Sample		1	23	1	21	60
1997 ERC	ABB	TI		11-Oct-96		SMALLMAMMAL	SM010WMDXX		Sample		1	23		21	
1997 ERC	ABB	TI		19-Mar-97	West Ditch Wetland	BS013	BS013WDXX		Sample			23		21	66
1997 ERC	ABB	TI		19-Mar-97	South Ditch	BS015	BS015SDXX		Sample			23		21	66
1997 ERC	ABB	TI		19-Mar-97	South Ditch	BS018	BS018PNDX		Sample			23		21	66
1997 ERC	ABB	TI		19-Mar-97	South Ditch	SSREF-021	BS021WMDX		Sample			23		21	66
Ditch	MACTEC	TI		04-Nov-05	Maple Meadow Brook	BS021-02	BS021EWREF-02		Sample		2	23		22	64
Ditch	MACTEC	TI		04-Nov-05	Maple Meadow Brook	BS021-03	BS021EWREF-03		Sample		2	23		22	64
Ditch	MACTEC	TI		04-Nov-05	Maple Meadow Brook	BS021-04	BS021EWREF-04		Sample		2	23		22	64
Ditch	MACTEC	TI		04-Nov-05	Lower South Ditch	BS040	BS040EWLSD		Sample		2	23		22	64
Ditch	MACTEC	TI		04-Nov-05	Lower South Ditch	BS040	BS040EWLSD DUP		Duplicate		1				
Ditch	MACTEC	TI		04-Nov-05	Lower South Ditch	BS043	BS043EWLSD		Sample		2	23		22	64
Ditch	MACTEC	TI		04-Nov-05	Lower South Ditch	BS045	BS045EWLSD		Sample		2	23		22	64
Ditch	MACTEC	TI		04-Nov-05	Plant B	REFERENCE	BASELINEWLSD		Sample		2	23		22	64

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Table 2.4-1
Summary of Primary Sampling Tasks and Analytical Methods

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Investigation	Time Period	Parameter	Method	Notes
Comprehensive Site Assessment (CSA)	Oct 90 - March 93	VOCs	EPA 524.2	Olin Level I
		Trimethylpentenes	EPA SW 8240	Olin Level I
		TCL VOCs	EPA SW 8240	Olin Level I
		TCL SVOCs	EPA SW 8270	Olin Level I
		SVOCs	CFR 625	Olin Level I
		Pesticides/PCBs	CFR 608	Olin Level I
		TCL Pesticide/PCB	EPA SW 8080	Olin Level I
		Pesticides	SM 509A	Olin Level I
		Herbicides	SM 509B	Olin Level I
		EDB and DBCP	EPA 504	Olin Level I
		TAL Metals	EPA SW 6000/7000	Olin Level I
		Metals	EPA 200 Series	Olin Level I
		Priority Pollutant Metals	EPA SW 6000/7000	Olin Level I
		Mercury	EPA 245.1	Olin Level I
		Mercury	EPA SW 7470/7471	Olin Level I
		Hexavalent Chromium	EPA SW 7195	Olin Level I
		Hexavalent Chromium	SM 312B	Olin Level I
		Cyanide	EPA 335.2	Olin Level I
		Cyanide	EPA SW 9010	Olin Level I
		Ammonia	EPA 350.1	Olin Level I
		Chloride	EPA 325.2	Olin Level I
		Chloride	EPA SW 9251	Olin Level I
		Fecal Coliform	SM 909C	Olin Level I
		ignitability	EPA SW 1010	Olin Level I
		Nitrate	EPA 353.3	Olin Level I
		Nitrate/nitrite	EPA 353.2	Olin Level I
		Nitrite	EPA 354.1	Olin Level I
		pH	EPA 150.1	Olin Level I
		Specific Gravity	ASTM D-1429	Olin Level I
		Sulfate	EPA 375.4	Olin Level I
		Sulfate	EPA SW 9038	Olin Level I
		Total Coliform	SM 909A	Olin Level I
		Total Dissolved Solids	EPA 160.1	Olin Level I
		Total Kjeldahl Nitrogen	EPA 351.2	Olin Level I
		Total Organic Carbon	SM 505	Olin Level I
		Viscosity	ASTM D445	Olin Level I
Supplemental Phase II Activities - Soil	1995 - 1996	TCL VOCs	EPA SW 8240	Full Validation
		TCL SVOCs	CLP SOW	Full Validation
		TCL Pesticides	EPA SW 8081	Full Validation
		TAL Metals	CLP SOW	Full Validation
		Chromium only	CLP SOW	Full Validation
		Ammonia	mod EPA 350.2	Full Validation
		Sulfate	mod EPA 375.4	Full Validation
Supplemental Phase II Activities -	1995 - 1996	TCL VOCs	EPA SW 8240	Full Validation
Groundwater/Surface Water		TCL SVOCs	EPA SW 8270	Full Validation
		TCL Pesticides	EPA SW 8080	Full Validation
		Select Metals	EPA 200.7	Full Validation
		Arsenic	EPA 206.2	Full Validation

Table 2.4-1
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Investigation	Time Period	Parameter	Method	Notes
		Lead	EPA 239.2	Full Validation
		Hexavalent Chromium	EPA SW 7195	Full Validation
		Alkalinity	SW 310.1	Full Validation
		Bicarbonate/Carbonate	SM 2320B	Full Validation
		Anions (Br, Cl, SO4)	EPA 300	Full Validation
		Nitrate/nitrite	EPA 353.2	Full Validation
		Dissolved Organic Carbon (DOC)	EPA 415.1	Full Validation
		phosphorus	EPA 365.4	Full Validation
		ortho-phosphate	EPA 365.3	Full Validation
		Total Dissolved Solids	EPA 160.1	Full Validation
		Sulfide	EPA SW 9030	Full Validation
		Ammonia	EPA 350.2	Full Validation
LAW Programs	1996 - 2000	VOCs	EPA 524.2	Olin Level I
		TCL VOCs	EPA SW 8260	Olin Level I
		TCL SVOCs	EPA SW 8270C	Olin Level I
		Organophosphorous Pesticides	EPA SW 8000B	Olin Level I
		TCL Pesticides/PCBs	EPA SW 8081A/8082	Olin Level I
		Herbicides	EPA SW 8151A	Olin Level I
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Olin Level I
		Extractable Petroleum Hydrocarbons (EP	MADEP	Olin Level I
		Volatile Petroleum Hydrocarbons (VPH)	MADEP	Olin Level I
		Total Petroleum Hydrocarbons (TPH)	EPA SW8015	Olin Level I
		Pesticides/Fenazaflor	EPA SW 8081A/3550	Olin Level I
		Total Petroleum Hydrocarbons (TPH)	EPA 8100	Olin Level I
		Dissolved Metals	EPA 200.7/6010	Olin Level I
		Total Metals	EPA 200.7/6010	Olin Level I
		Antimony (GFAA)	EPA 204.2/7041	Olin Level I
		Arsenic (GFAA)	EPA 206.2/7060	Olin Level I
		Lead (GFAA)	EPA 239.2/7421	Olin Level I
		Mercury (CVAA)	EPA 245.1/7471	Olin Level I
		Total Mercury	EPA SW 7471A	Olin Level I
		Selenium (GFAA)	EPA 270.2	Olin Level I
		Thallium (GFAA)	EPA 279.2/7841	Olin Level I
		Hexavalent Chromium	SM18 3500D	Olin Level I
		Hexavalent Chromium	EPA SW 7196A	Olin Level I
		Total Cyanide	LAC 204001A	Olin Level I
		Sulfate	EPA 375.4	Olin Level I
		Chemical Oxidation Demand (Titrimetric	EPA 410.2	Olin Level I
		Oil and Grease	EPA 413.1	Olin Level I
		TOC	EPA 415.1	Olin Level I
		Odor, Threshold Odor (Consistent Series)	EPA 140.1	Olin Level I
		pH	EPA 150.1	Olin Level I
		Total Dissolved Solids	EPA 160.1	Olin Level I
		Total Suspended Solids	EPA 160.2	Olin Level I
		Turbidity	EPA 180.1	Olin Level I
		Ammonia	LAC 10107061A	Olin Level I
		Determination of Nitrate Nitrogen	LAC 107041A	Olin Level I
		Determination of Ammonia Nitrogen	LAC 107062D	Olin Level I
		Determination of Residual Chlorine	LAC 117071A	Olin Level I

Table 2.4-1
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		Alkalinity	SM 2320B	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		o-phosphate	SM 4500PE	Olin Level I
		Total phosphate	SM 4500PE	Olin Level I
		Determination of Color	SM18 2120B	Olin Level I
		Specific Gravity	SM18 2710F	Olin Level I
		Determination of Chloride	SM18 4500CL	Olin Level I
		Determination of Sulfides	SM18 4500E	Olin Level I
		Potentiometric Measurement of Fluoride	SM18 4500F	Olin Level I
		Determination of Nitrite Nitrogen	SM18 4500NO2B	Olin Level I
		Total Solids	EPA 160.3	Olin Level I
Comprehensive Sampling Round -	Oct 2000	SVOCs	EPA SW 8270C	Full Validation
Groundwater		Pesticides	EPA SW 8081	Full Validation
		Herbicides	EPA SW 8151A	Full Validation
		PAH Low Concentration	EPA SW 8310	Full Validation
		TAL Metals	EPA 200.7	Full Validation
		Sb, As, Pb, Se by GFAA	EPA 200 series	Full Validation
		Mercury	EPA 245.1	Full Validation
		Volatile Petroleum Hydrocarbons (VPH)	MADEP	Full Validation
		Extractable Petroleum Hydrocarbons (EP	MADEP	Full Validation
		Kempore and Opex	EPA SW 8000B	Full Validation
Remediation Activities - Soil and Sedim	2000 -2001	VOCs	SW846 8260B	TBD
GEI		SVOCs	SW846 8270C	TBD
		Pesticide/PCB	EPA 8081A/8082	TBD
		Pesticides	EPA 8081A	TBD
		Metals	EPA SW 6010/7000	TBD
		Mercury	EPA SW 7471	TBD
		Arsenic	EPA 206.2/7060	TBD
		Lead	EPA 239.2/7421	TBD
		EPH	MADEP EPH	TBD
		VPH	MADEP VPH	TBD
		pH	mod EPA 150.1	TBD
		Fluoride	mod SM4500F/Lachat	TBD
		Conductivity	mod SM18 2510B	TBD
		Hazardous Characteristics	SW846	TBD
Potential Chemicals of Concern	July 2002	n-heptane	EPA SW 8260	Olin Level I
Groundwater		4-nitroanaline	EPA SW 8270B	Olin Level I
		Aniline and Diphenylamine	EPA SW 8270B	Olin Level I
		Nonylphenol	EPA SW 8270B	Olin Level I
		phenylcyanide	EPA SW 8270B	Olin Level I
		Alcohols	EPA SW 8015B	Olin Level I
		DRO	EPA SW 8015B	Olin Level I
		Glycols	EPA SW 8015B	Olin Level I
		Naptha	EPA SW 8015B	Olin Level I
		n-butyl acetate	EPA SW 8015B	Olin Level I
		acrylamide	EPA SW 8316	Olin Level I
		Formaldehyde and Benzaldehyde	EPA SW 8315	Olin Level I

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Investigation	Time Period	Parameter	Method	Notes
		Mn and Na	EPA 200.7	Olin Level I
		Total Cyanide	LAC 204001A	Olin Level I
		Ammonia	LAC 107061A	Olin Level I
		Sulfate	EPA 300	Olin Level I
		Total Phosphorus	SM 4500PE	Olin Level I
NDMA Groundwater Investigations	2002 - Present	N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
		N-nitrosodimethylamine (NDMA)	EPA 625	Full Validation
NDMA in Soil (multiple sample location	2003 - Present	N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Full Validation
Lower South Ditch - Sediment/Soil	Jun-03	N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Full Validation
		Metals	EPA SW 6010B	Full Validation
	August 2003	Metals (Al, Cr, Fe)	EPA SW 6010B	Olin Level I
		Total Organic Carbon (TOC)	Lloyd Kahn	Olin Level I
	May-05	Metals (Al, Cr, Fe)	EPA SW 6010B	Olin Level I
	Aug-05	TCL SVOCs	EPA SW 8270C	Full Validation
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Full Validation
		Pesticides	EPA SW 8081A	Full Validation
		Metals	EPA SW 6010B/7471	Full Validation
		Cyanide (total and amenable)	EPA SW 9014	Full Validation
		Hexavalent Chromium	EPA SW 3060A/7196	Full Validation
		TOC	EPA SW mod 9060	Full Validation
		Ammonia	LAC 107061A	Full Validation
	Sept-05	Chromium	EPA SW 6010B	Olin Level I
		Hexavalent Chromium	EPA SW 3060A/7196	Olin Level I
South Ditch Surface Water	Aug-05 and Nov-0	Metals (Al, Cr, and Na)	EPA SW 6010B	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		Ammonia	LAC 107061A	Olin Level I
		Conductivity	SM 2510B	Olin Level I
East Ditch (Surface Water/Sediment)	Jun-03	TCL VOCs	EPA SW 8260B	Full Validation
		TCL SVOCs	EPA SW 8270C	Full Validation
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Full Validation
		Polychlorinated biphenyls (PCBs)	EPA SW 8082A	Full Validation
		Pesticides	EPA SW 8081A	Full Validation
		Herbicides	EPA SW 8151A	Full Validation
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
		N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Full Validation
		Opex and Kempore	HPLC	Full Validation
		Metals	EPA SW 6010B	Full Validation
		Mercury	EPA SW 7470A/7471	Full Validation
		As, Pb, Se, Tl by GFAA	EPA SW 7000	Full Validation
		Hexavalent Chromium	EPA SW 7196	Full Validation
		Hexavalent Chromium	EPA SW 3060A/7196	Full Validation

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Investigation	Time Period	Parameter	Method	Notes
		Cyanide (total and amenable)	EPA SW 9014	Full Validation
		Ammonia	LAC 107061A	Full Validation
		Alkalinity	SM 2320B	Full Validation
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Full Validation
		Sulfide	EPA SW 9030B	Full Validation
		o-phosphate	SM 4500PE	Full Validation
		Total phosphate	SM 4500PE	Full Validation
		Conductivity	SM 2510B	Full Validation
		Turbidity	EPA 180.1	Full Validation
East Ditch Surface Water	Sept 03	TCL VOCs	EPA SW 8260B	Olin Level I
		TCL SVOCs	EPA SW 8270C	Olin Level I
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Olin Level I
		Polychlorinated biphenyls (PCBs)	EPA SW 8082A	Olin Level I
		Pesticides	EPA SW 8081A	Olin Level I
		Herbicides	EPA SW 8151A	Olin Level I
		Metals	EPA SW 6010B	Olin Level I
		Mercury	EPA SW 7470A	Olin Level I
		As, Pb, Se, Tl by GFAA	EPA SW 7000	Olin Level I
		Hexavalent Chromium	EPA SW 7196	Olin Level I
		Cyanide (total and amenable)	EPA SW 9014	Olin Level I
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
		Opex and Kempore	HPLC	Full Validation
		Ammonia	LAC 107061A	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		Sulfide	EPA SW 9030B	Olin Level I
		o-phosphate	SM 4500PE	Olin Level I
		Total phosphate	SM 4500PE	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		Turbidity	EPA 180.1	Olin Level I
East Ditch (Surface Water/Sediment)	April 04	TCL VOCs	EPA SW 8260B	Olin Level I
		TCL SVOCs	EPA SW 8270C	Olin Level I
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Olin Level I
		Polychlorinated biphenyls (PCBs)	EPA SW 8082A	Olin Level I
		Pesticides	EPA SW 8081A	Olin Level I
		Herbicides	EPA SW 8151A	Olin Level I
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
		N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Full Validation
		Opex and Kempore	HPLC	Full Validation
		Hydrazines	mod EPA 300	Olin Level I
		Formaldehyde	EPA SW 8315	Olin Level I
		Metals	EPA SW 6010B	Olin Level I
		Mercury	EPA SW 7470A/7471	Olin Level I
		As, Pb, Se, Tl by GFAA	EPA SW 7000	Olin Level I
		Hexavalent Chromium	EPA SW 7196	Olin Level I
		Hexavalent Chromium	EPA SW 3060A/7196	Olin Level I
		Cyanide (total and amenable)	EPA SW 9014	Olin Level I
		Ammonia	LAC 107061A	Olin Level I

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Investigation	Time Period	Parameter	Method	Notes
		Alkalinity	SM 2320B	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		Sulfide	EPA SW 9030B	Olin Level I
		o-phosphate	SM 4500PE	Olin Level I
		Total phosphate	SM 4500PE	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		Turbidity	EPA 180.1	Olin Level I
		Total Kjeldahl Nitrogen (TKN)	EPA 351	Olin Level I
East Ditch (Surface Water)	Oct 04 and Feb 05	TCL VOCs	EPA SW 8260B	Olin Level I
		TCL SVOCs	EPA SW 8270C	Olin Level I
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Olin Level I
		Polychlorinated biphenyls (PCBs)	EPA SW 8082A	Olin Level I
		Pesticides	EPA SW 8081A	Olin Level I
		Herbicides	EPA SW 8151A	Olin Level I
		N-nitrosodimethylamine (NDMA)	EPA 1625	Olin Level I
		Hydrazines	mod EPA 300	Olin Level I
		Formaldehyde	EPA SW 8315	Olin Level I
		Metals	EPA SW 6010B	Olin Level I
		Mercury	EPA SW 7470A	Olin Level I
		As, Pb, Se, Tl by GFAA	EPA SW 7000	Olin Level I
		Hexavalent Chromium	EPA SW 7196	Olin Level I
		Cyanide (total and amenable)	EPA SW 9014	Olin Level I
		Opex and Kempore	HPLC	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		Sulfide	EPA SW 9030B	Olin Level I
		o-phosphate	SM 4500PE	Olin Level I
		Total phosphate	SM 4500PE	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		Turbidity	EPA 180.1	Olin Level I
		Total Kjeldahl Nitrogen	LAC 10-1070602	Olin Level I
Off-Property West Ditch (OPWD)	Jun-03	TCL VOCs	EPA SW 8260B	Full Validation
Sediment/Soil		TCL SVOCs	EPA SW 8270C	Full Validation
		Metals	EPA SW 6010B	Full Validation
		N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Full Validation
		pH	EPA SW 9045C	Full Validation
		Ammonia	LAC 107061A	Full Validation
Lake Poly Soils	Dec 03	N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Olin Level I
		Hydrazines	mod EPA 300	Olin Level I
		Formaldehyde	EPA SW 8315A	Olin Level I
Lake Poly Water	Dec 03	N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
		Hydrazines	mod EPA 300	Olin Level I
		Formaldehyde	EPA SW 8315A	Olin Level I
Lake Poly Soils	Jun-04	Ammonia	mod LAC 10-107061A	Olin Level I

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Investigation	Time Period	Parameter	Method	Notes
		Chromium	EPA SW 6010B	Olin Level I
	July 04	Volatile organic compounds (VOCs)	EPA SW 8260B	Olin Level I
		Semivolatile organic compounds (SVOCs	EPA SW 8270C	Olin Level I
		Metals	EPA SW 6010B	Olin Level I
		Mercury	EPA SW 7471A	Olin Level I
		Diesel Range Organics (DRO)	EPA SW 8015A	Olin Level I
		Pesticides by Method	EPA SW 8081A	Olin Level I
		Polychlorinated Biphenyls (PCBs)	EPA SW 8082A	Olin Level I
		pH	EPA SW 9045C	Olin Level I
		Conductivity	mod SM 2510B	Olin Level I
		Hazardous characteristics	EPA SW	Olin Level I
		TCLP - chromium	EPA SW 1311/6010B	Olin Level I
Plant B Soil Investigations	Jul-04	Volatile Petroleum Hydrocarbons (VPH)	MADEP	Olin Level I
		Trimethylpentenes	EPA SW 8260B	Olin Level I
Plant B Groundwater Investigations	Jul-04	Volatile Petroleum Hydrocarbons (VPH)	MADEP	Olin Level I
		Trimethylpentenes	EPA SW 8260B	Olin Level I
Pilot Wetland	2004 - 2005	Chromium and iron	EPA SW 6010B	Olin Level I
		ferrous iron	?	Olin Level I
		TOC	EPA 415.1	Olin Level I
		ammonia	mod LAC 10-107061A	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
North Pond Groundwater	Nov 2003	Volatile organic compounds (VOCs)	EPA SW 8260B	Olin Level I
		Semivolatile organic compounds (SVOCs	EPA SW 8270C	Olin Level I
		Dissolved Metals	EPA SW 6010B	Olin Level I
		Chloride, sulfate	mod EPA 300	Olin Level I
		Ammonia	mod LAC 10-107061A	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		pH	EPA 150.1	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
North Pond Soils/Sediment	Nov 2003	Volatile organic compounds (VOCs)	EPA SW 8260B	Olin Level I
		Semivolatile organic compounds (SVOCs	EPA SW 8270C	Olin Level I
		N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Olin Level I
		Pesticides	EPA SW 8081A	Olin Level I
		Herbicides	EPA SW 8151A	Olin Level I
		Metals	EPA SW 6010B	Olin Level I
		Mercury	EPA SW 7471A	Olin Level I
		Hexavalent Chromium	EPA SW 6030A/7196	Olin Level I
		Total Cyanide	EPA SW 9014	Olin Level I
		Chloride, sulfate	mod EPA 300	Olin Level I
		Ammonia	mod LAC 10-107061A	Olin Level I
North Pond Sediment	September 2004	Volatile organic compounds (VOCs)	EPA SW 8260B	Olin Level I
		Semivolatile organic compounds (SVOCs	EPA SW 8270C	Olin Level I
		N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Olin Level I

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Investigation	Time Period	Parameter	Method	Notes
		Pesticides	EPA SW 8081A	Olin Level I
		Herbicides	EPA SW 8151A	Olin Level I
		Metals	EPA SW 6010B	Olin Level I
		Mercury	EPA SW 7471A	Olin Level I
		Hexavalent Chromium	EPA SW 6030A/7196	Olin Level I
		Total Cyanide	EPA SW 9014	Olin Level I
		Chloride, sulfate	mod EPA 300	Olin Level I
		Ammonia	mod LAC 10-107061A	Olin Level I
		Opex and Kempore	HPLC	Olin Level I
Biocell Sand	May-05	Semivolatile organic compounds (SVOCs	EPA SW 8270C	Olin Level I
		N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Olin Level I
		Diesel Range Organics (DRO)	EPA SW 8015B	Olin Level I
		Hydrazines	mod EPA 300	Olin Level I
Groundwater Monitoring - Town and Se	Pre-2000 - 2005	Alkalinity	SM 2320B	Olin Level I
		pH	EPA 150.1	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Sulfate	EPA 300	Olin Level I
		Dissolved Ca, Cr, Fe, Mg, Mn, K, Na	EPA 200.7	Olin Level I
		Formaldehyde	EPA SW 8315	Full Validation
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
	Nov 05 *	VOCs	EPA SW 8260B	Olin Level I
	Subset of Wells	SVOCs	EPA SW 8270C	Olin Level I
		Volatile Petroleum Hydrocarbons (VPH)	MADEP	Olin Level I
		Extractable Petroleum Hydrocarbons (EP	MADEP	Olin Level I
		Hydrazines	mod EPA 300	Olin Level I
		Formaldehyde	EPA SW 8315A	Olin Level I
Groundwater Monitoring - PCMP	2001 - 2005	pH	EPA 150.1	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Sulfate	EPA 300	Olin Level I
		Dissolved Fe and Mn	EPA 200.7	Olin Level I
		Al and Cr	EPA 200.7	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
Groundwater Monitoring - Plant B	1997 - 2005	Select VOCs	EPA SW 8260B	Olin Level I
		Select SVOCs	EPA SW 8270C	Olin Level I
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Olin Level I
		pH	EPA 150.1	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Oil and Grease	EPA 413.1 or CFR 16	Olin Level I
		Total Phenols	EPA 420.2	Olin Level I
		Iron	EPA 200.7	Olin Level I
		Chlorine	SM 4500 CL F	Olin Level I
		Volatile Petroleum Hydrocarbons (VPH)	MADEP	Olin Level I

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Investigation	Time Period	Parameter	Method	Notes
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
Supplemental Phase II Soils	Mar-04	N-nitrosodimethylamine (NDMA)	mod EPA SW 8270C	Full Validation
		Hydrazines	mod EPA 300	Full Validation
		Formaldehyde	EPA SW 8315A	Full Validation
Supplemental Phase II Groundwater Wel	Mar-04	N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
		Hydrazines	mod EPA 300	Full Validation
		Formaldehyde	EPA SW 8315A	Full Validation
Additional DAPL and Diffuse Groundwa	Mar-04	Sodium	EPA SW 6010B	Olin Level I
		Chloride, Sulfate, Nitrate, Nitrite	EPA 300	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Hydrazines	mod EPA 300	Olin Level I
	May-05	Formaldehyde	EPA SW 8315A	Olin Level I
Surface Water Monitoring - OPWD	July 22, 2003	dissolved and total metals (Cd, Cu, Pb, Zı	EPA SW 6010B	Olin Level I
		Chloride, Sulfate, Nitrate, Nitrite	EPA 300	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		pH	EPA 150.1	Olin Level I
		Pesticides	EPA SW 8081A	Olin Level I
		Herbicides	EPA SW 8151A	Olin Level I
Surface Water Monitoring - OPWD	2002 -2003	TOC	EPA 415.1	Olin Level I
		Ferrous iron	SM 3500	Olin Level I
		Ferric iron	EPA SW 6010B	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Chloride, Sulfate, Nitrate, Nitrite	EPA 300	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		metals	EPA SW 6010B	Olin Level I
		heptachlor epoxide	EPA SW 8081A	Olin Level I
		di-n-octyl phthalate	EPA SW 8270C	Olin Level I
Surface Water Monitoring - PCMP	2002 - 2005	Dissolved Chromium and Aluminum	EPA SW 6010B	Olin Level I
		Chloride, Sulfate, Nitrate, Nitrite	EPA 300	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Conductivity	SM 2510B	Olin Level I
Surface Water - MMB	Nov 03	Formaldehyde	EPA SW 8315A	Olin Level I
		Dissolved Metals	EPA SW 6010B	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		Tl by GFAA	EPA SW 7841	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		pH	EPA 150.1	Olin Level I
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
Surface Water Monitoring - MMB	2004 - 2006	Dissolved metals	EPA SW 6010B	Olin Level I
		Metals	EPA SW 6010B/6020	Olin Level I
		Arsenic by GFAA	EPA SW 7061A	Olin Level I

Table 2.4-1
Summary of Primary Sampling Tasks and Analytical Methods

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Investigation	Time Period	Parameter	Method	Notes
		Tl and Se by GFAA	EPA SW 7841/7740	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
Surface Water Monitoring - South Ditch	Jun-05	metals	EPA SW 6010B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		Conductivity	SM 2510B	Olin Level I
Plant B Air Sampling	Sept 2005	VOCs	TO-14	Olin Level I
		SVOCs	TO-13	Olin Level I
		Air-Phase Petroleum Hydrocarbons	MADEP	Olin Level I
Private Well - Cook Ave Well	Feb-05	Volatile organic compounds (VOCs)	EPA SW 8260B	Olin Level I
		SVOCs	EPA SW 8270C	Olin Level I
		Metals	EPA SW 6010B/6020	Olin Level I
		Volatile Petroleum Hydrocarbons (VPH)	MADEP	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		TOC	EPA 415.1	Olin Level I
Site Boundary	Aug-05	Select VOCs	EPA SW 8260B	Olin Level I
		Select SVOCs	EPA SW 8270C	Olin Level I
		Dissolved Metals	EPA SW 6010B/6020	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Sulfate	EPA 300	Olin Level I
		Conductivity	SM 2510B	Olin Level I
MP-5 Groundwater	Oct-05	VOCs	EPA SW 8260B	Olin Level I
		SVOCs	EPA SW 8270C	Olin Level I
		Dissolved and Total Metals	EPA SW 6010B	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		TOC	EPA 415.1	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		TDS	EPA 160.1	Olin Level I
		Specific Gravity	ASTM	Olin Level I
		Volatile Petroleum Hydrocarbons (VPH)	MADEP	Olin Level I
		Extractable Petroleum Hydrocarbons (EP	MADEP	Olin Level I
		Hydrazines	mod EPA 300	Olin Level I
		Formaldehyde	EPA SW 8315A	Olin Level I
		Opex and Kempore	HPLC	Full Validation
GW -88 Groundwater	Nov 05	Opex and Kempore	HPLC	Full Validation

Table 2.4-1
Summary of Primary Sampling Tasks and Analytical Methods

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Investigation	Time Period	Parameter	Method	Notes
GW-57 Groundwater	May-06	VOCs	EPA SW 8260B	Olin Level I
MP-1 Groundwater	March 03	TAL Metals	EPA SW 6010B	Olin Level I
		Hex Chromium	EPA SW 7196	Olin Level I
		pH		Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Ammonia	LAC 10-107061A	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		TOC	EPA 415.1	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		TDS	EPA 160.1	Olin Level I
MP-2 Groundwater	2003	Formaldehyde	EPA SW 8315A	Olin Level I
MP-1, MP-2, MP-3, MP-4	Sept 03	Formaldehyde	EPA SW 8315A	Olin Level I
Floc Investigations	2003	Dissolved Metals (Cr, Fe, Mn	EPA 200.7	Olin Level I
		Hexavalent Chromium	EPA SW 7196A	Olin Level I
		Total Suspended Solids (TSS)	EPA 160.2	Olin Level I
Biota	1996-1997	SVOCs	mod 1625	TBD
		Pesticides	mod OLM01	TBD
		Metals	mod ILM03	TBD
Butters Row Wells	Nov 03	VOCs w-TICs	EPA SW 8260B	Full Validation
		SVOCs w-TICs	EPA SW 8270C	Full Validation
		Volatile Petroleum Hydrocarbons (VPH)	MADEP	Full Validation
		Polyaromatic hydrocarbons (PAH)	EPA SW 8310	Full Validation
		Opex and Kempore	HPLC	Full Validation
		N-nitrosodimethylamine (NDMA)	EPA 1625	Full Validation
		Dissolved Metals	EPA SW 6010B	Full Validation
		As, Pb, Se, Tl by GFAA	EPA SW 7000	Full Validation
		Formaldehyde	EPA SW 8315	Full Validation
		Ammonia	LAC 10-107061A	Olin Level I
		Alkalinity	SM 2320B	Olin Level I
		Chloride, Nitrate, Nitrite, Sulfate	EPA 300	Olin Level I
		Conductivity	SM 2510B	Olin Level I
		TOC	EPA 415.1	Olin Level I
		pH	EPA 150.1	Olin Level I
Notes:				Prepared/Date: CSR 07/21/07
TBD = To be determined. Retrieval of data records in process.				Checked/Date: PHT 07/27/07

Table 2.4-2
Summary of MCP Analytical Methods

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter	Method
VOCs	8260B
VOC-aromatics	8021A
SVOCs	8270C
Pesticides	8081A
PCBs	8082
Herbicides	8151A
Nitroaromatics	8330
Metals	6010B/6020A/7000
Mercury	7470/7471
Hexavalent Chromium	7196A
Cyanide	9014
Volatile Petroleum Hydrocarbons	VPH MADEP
Extactable Petroleum Hydrocarbons	EPH MADEP
Air Phase Petroleum Hydrocarbons	APH MADEP

Prepared/Date: CSR 07/21/07
Checked/Date: PHT 07/27/07

Table 2.5-1
Summary of MCP QC Limits for Surrogates and Spikes Analytical Data Quality Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

PARAMETER	QC TEST	ANALYTE	WATER (%R)	SOIL (%R)
Volatiles	**Surrogate**	All Surrogates	70 - 130	70 - 130
	LCS	All Target Compounds	70 - 130	70 - 130
	MS/MSD	All Target Compounds	70 - 130	70 - 130
Semivolatiles	**Surrogate**	Acid Compounds	15 -110	30 - 130
		Base-Neutral Compounds	30 - 130	30 - 130
	LCS	Base-Neutral Compounds	40-140	40-140
		Acid Compounds	30-130	30-130
	MS/MSD	Base-Neutral Compounds	40-140	40-140
		Acid Compounds	30-130	30-130
Polychlorinated Biphenyls (PCBs)	**Surrogate**	Decachlorobiphenyl	30 - 150	30 - 150
		Tetrachloro-m-xylene	30 - 150	30 - 150
	LCS	All Target Compounds	40 - 140	40 - 140
	MS/MSD	All Target Compounds	40 - 140	40 - 140
Pestcides	**Surrogate**	Decachlorobiphenyl	30 - 150	30 - 150
		Tetrachloro-m-xylene	30 - 150	30 - 150
	LCS	All Target Compounds	40 - 140	40 - 140
	MS/MSD	All Target Compounds	30 - 150	30 - 150
Herbicides	**Surrogate**	All Surrogates	30 -15 0	30 -15 0
	LCS	All Target Compounds	40 - 140	40 - 140
	MS/MSD	All Target Compounds	30 -150	30 -150
Inorganics	**LCS**	All Target Compounds	80 - 120	80 - 120
	MS/MSD	All Target Compounds	75 -125	75 - 125
Volatile Petroleum Hydrocarbons (VPH)	**Surrogate**	All Surrogates	70 -130	70 -130
	LCS	All Target Compounds	70 -130	70 -130
	MS/MSD	All Target Compounds	70 -130	70 -130
Extractable Petroleum Hydrocarbons (EPH)	**Surrogate**	All Surrogates	40 -140	40 -140
	Fractionation Surr.	2-bromonaphthalene	40 -140	40 -140
	LCS	All Target Compounds	40 -140	40 -140
	MS/MSD	All Target Compounds	40 -140	40 -140

LCS = Laboratory Control Sample
MS/MSD = Matrix spike/ Matrix Spike Duplicate
%R = Percent Recovery
QC = Quality Control

Prepared/Date: CSR 07/21/07
Checked/Date: PHT 07/27/07

Table 2.5-2
Summary of MCP QC Limits for Precision
Analytical Data Quality Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

PARAMETER	QC TEST	RPD Water	RPD Soil
Volatiles	**Field Duplicates**	30	50
	MS/MSD	30	30
Semivolatiles	**Field Duplicates**	30	50
	MS/MSD	20	30
Polychlorinated Biphenyls (PCBs)	**Field Duplicates**	30	50
	MS/MSD	50	50
Pesticides	**Field Duplicates**	30	50
	MS/MSD	30	30
Herbicides	**Field Duplicates**	30	50
	MS/MSD	30	30
Inorganics	**Lab Duplicates**	20	35
	Field Duplicates	30	50
	MS/MSD	20	35
Volatile Petroleum Hydrocarbons (VPH)	**Field Duplicates**	30	50
	MS/MSD	50	50
Extractable Petroleum Hydrocarbons (EPH)	**Field Duplicates**	30	50
	MS/MSD	50	50

LCS = Laboratory Control Sample
MS/MSD = Matrix spike/ Matrix Spike Duplicate
QC = Quality Control
RPD = Relative Percent Difference

Prepared/Date: CSR 07/21/07
Checked/Date: PHT 07/27/07

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	08-Jul-91	Containment Area	AREA-1	36				65				21	7		23		4	1			
SS	09-Jul-91	Central Pond	AREA-8	36				65				21	7		23		4	1			
SS	09-Jul-91	Containment Area	AREA-2	36				65				21	7		23		4	1			
SS	30-Jul-91	South Ditch	SWMU-30	36				65				21	7		23		4	1			
SS	30-Jul-91	Buried Debris Area	SWMU-27	36				65				21	7		23		4	1			
SS	30-Jul-91	Buried Debris Area	SWMU-27													2		1			
SS	22-Apr-93	Buried Debris Area	SWMU-27												2		1				
SS	15-Dec-96	Containment Area	AREA-1					65				21			23		2	1			
SS	15-Dec-96	Containment Area	AREA-1-1	36																	
SS	15-Dec-96	Containment Area	AREA-1-2	36																	
SS	15-Dec-96	Containment Area	AREA-1-4	36														1			
SS	15-Dec-96	Containment Area	AREA-1-5	36														1			
SS	15-Dec-96	Containment Wall	AREA-1-3	36														1			
SS	15-Dec-96	Drum Area A	DRMA-COMP-A					65				21			23		2				
SS	15-Dec-96	Drum Area A	DRMA-COMP-B					65				21			23		2				
SS	15-Dec-96	Drum Area A	GA1-DRMA	36																	
SS	15-Dec-96	Drum Area A	GA2-DRMA	36																	
SS	15-Dec-96	Drum Area A	GA3-DRMA	36																	
SS	15-Dec-96	Drum Area A	GA4-DRMA	36																	
SS	15-Dec-96	Drum Area A	GB1-DRMA	36																	

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	15-Dec-96	Drum Area A	GB2-DRMA	36																	
SS	15-Dec-96	Drum Area A	GB3-DRMA	36																	
SS	15-Dec-96	Drum Area A	GB4-DRMA	36																	
SS	15-Dec-96	Drum Area B	DRMB-COMP					65				21			23		2				
SS	15-Dec-96	Drum Area B	G1-DRMB	36																	
SS	15-Dec-96	Drum Area B	G2-DRMB	36																	
SS	15-Dec-96	Drum Area B	G3-DRMB	36																	
SS	15-Dec-96	Drum Area B	G4-DRMB	36																	
SS	15-Dec-96	Lake Poly	LAKE POLY-1	36				65				21			23		2				
SS	16-Dec-96	Central Pond	A8CW-1	36				65				21			1		2				
SS	16-Dec-96	Central Pond	AREA-8-4	36				65				21			1		2				
SS	16-Dec-96	Central Pond	CPDA-6	36				65				21			1		2				
SS	16-Dec-96	Central Pond	CPDA-7	36				65				21			1		2				
SS	16-Dec-96	Central Pond	CPDA-9	36				65				21			23		2				
SS	16-Dec-96	Central Pond	CPDA-9	36				65				21			1		2				
SS	16-Dec-96	Containment Area	CPDA-3	36				65				21			1		2				
SS	16-Dec-96	Containment Area	CPDA-4	36				65				21			1		2				
SS	16-Dec-96	Detention Pond	AREA-8-1	36				65				21			23		2				
SS	21-Jan-97	Containment Area	BS017					65				21			23						
SS	21-Jan-97	On-Property West Ditch	BS014					65				21			23						

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	21-Jan-97	West Ditch Wetland	BS013					65				21			23						
SS	21-Jan-97	West Ditch Wetland	BS013												23						
SS	23-Nov-98	Buried Debris Area	SWMU-27-102	64				67							23		4				
SS	23-Nov-98	Buried Debris Area	SWMU-27-103	64				67							23		4				
SS	24-Nov-98	Lake Poly	LP-102												2		4				
SS	24-Nov-98	Lake Poly	LP-104												2		4				
SS	30-Nov-98	Buried Debris Area	SWMU-27-102	62																	
SS	30-Nov-98	Buried Debris Area	SWMU-27-103	62																	
SS	30-Nov-98	Lake Poly	LP-101												2		1				
SS	30-Nov-98	Lake Poly	LP-104												2		1				
SS	04-Nov-99	Containment Area	WD-2									1					1				
SS	04-Nov-99	On-Property West Ditch	WD-1									1					1				
SS	24-Jan-00	Containment Area	RSO-14	37				66													
SS	24-Jan-00	Containment Area	RSO-14												22		1				
SS	25-Jan-00	Plant B	RSO-06	37				66													
SS	25-Jan-00	Plant B	RSO-06												22		1				
SS	10-Aug-00	Drum Area B	DB-C14	64																	
SS	10-Aug-00	Drum Area B	DB-C14					67				22			3		1				
SS	11-Aug-00	Biocell	BP-1					67				22			6		1				
SS	11-Aug-00	Biocell	BP-2					67				22			6		1				

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	11-Aug-00	Biocell	BP-3					67				22			6		1				
SS	11-Aug-00	Biocell	BP-4					67				22			6		1				
SS	02-Oct-00	Central Pond	CP-C10					67							1		1				
SS	02-Oct-00	Central Pond	CP-C9					67							1		1				
SS	03-Oct-00	South Ditch	SD-C2B					67							1		1				
SS	05-Oct-00	Central Pond	CP-C25	64				67				19			8		1				
SS	11-Oct-00	South Ditch	SD-C3B					67							1		1				
SS	11-Oct-00	South Ditch	SD-C4					67							1		1				
SS	12-Oct-00	South Ditch	SD-C22B					67							1		1				
SS	12-Oct-00	South Ditch	SD-C23B					67				19			8		1				
SS	12-Oct-00	South Ditch	SD-C23B	64													1				
SS	12-Oct-00	South Ditch	SD-C23B					67				19			8		1				
SS	12-Oct-00	South Ditch	SD-C23B	64													1				
SS	27-Oct-00	Buried Debris Area	BD-C33	64				67				19			8		1				
SS	02-Nov-00	South Ditch	SD-C25B					67				19			8		1				
SS	02-Nov-00	South Ditch	SD-C25B	64													1				
SS	02-Nov-00	South Ditch	SD-C26B					67							1		1				
SS	02-Nov-00	South Ditch	SD-C27B					67							1		1				
SS	02-Nov-00	South Ditch	SD-C28B					67							1		1				
SS	02-Nov-00	South Ditch	SD-C31B					67				19			8		1				

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	02-Nov-00	South Ditch	SD-C31B	64												1					
SS	02-Nov-00	South Ditch	SD-C32B					67							1	1					
SS	02-Nov-00	South Ditch	SD-C33B					67				19			8	1					
SS	02-Nov-00	South Ditch	SD-C33B					67				19			8	1					
SS	02-Nov-00	South Ditch	SD-C33B	64												1					
SS	02-Nov-00	South Ditch	SD-C33B	64												1					
SS	03-Nov-00	South Ditch	SD-C34B					67							1	1					
SS	03-Nov-00	South Ditch	SD-C35B					67							1	1					
SS	03-Nov-00	South Ditch	SD-C36B					67							1	1					
SS	03-Nov-00	South Ditch	SD-C37B					67				19			8	1					
SS	03-Nov-00	South Ditch	SD-C37B	64												1					
SS	03-Nov-00	South Ditch	SD-C38B					67							1	1					
SS	03-Nov-00	South Ditch	SD-C38B					67							1	1					
SS	03-Nov-00	South Ditch	SD-C39B					67				19			8	1					
SS	03-Nov-00	South Ditch	SD-C39B	64												1					
SS	03-Nov-00	South Ditch	SD-C41B					67							1	1					
SS	15-May-01	South Ditch	SD-C54N					67							1	1					
SS	09-Jul-01	Lake Poly	LPB11												1	1					
SS	09-Jul-01	Lake Poly	LPB13												1	1					
SS	10-Jul-01	Lake Poly	LPB12												1	1					

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	10-Jul-01	Lake Poly	LPB12					67				19			3		2				22
SS	10-Jul-01	Lake Poly	LPB12	64																12	
SS	10-Jul-01	Lake Poly	LPB15												1		1				
SS	10-Jul-01	Lake Poly	LPB15					67				19			3		2				22
SS	10-Jul-01	Lake Poly	LPB15	64																12	
SS	10-Jul-01	Lake Poly	LPB15													1					
SS	10-Jul-01	Lake Poly	LPB16												1		1				
SS	10-Jul-01	Lake Poly	LPB16					67				19			3		2				22
SS	10-Jul-01	Lake Poly	LPB16	64																12	
SS	10-Jul-01	Lake Poly	LPB16					67									1				
SS	12-Jul-01	Lake Poly	LPB29												1		1				
SS	12-Jul-01	Lake Poly	LPB30												1		1				
SS	18-Sep-01	Central Pond	CP-TP14										7		8		1				22
S	18-Jan-95	Lake Poly	LPB-1	35				64							23		3	1			
S	18-Jan-95	Lake Poly	LPB-1	36				64							22		3	1			
S	24-Nov-98	Lake Poly	LP-104												2		4				
S	30-Nov-98	Lake Poly	LP-104												2		1				
S	25-Jan-00	Plant B	RSO-06	37				66													
S	25-Jan-00	Plant B	RSO-06												22		1				
S	02-Oct-00	Central Pond	CP-C11					67							1		1				

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	02-Oct-00	Central Pond	CP-C14					67							1		1				
S	02-Oct-00	Central Pond	CP-C15					67							1		1				
S	02-Oct-00	Central Pond	CP-C18					67							1		1				
S	02-Oct-00	Central Pond	CP-C19					67							1		1				
S	02-Oct-00	Central Pond	CP-C22					67							1		1				
S	05-Oct-00	Central Pond	CP-C27					67							1		1				
S	05-Oct-00	Central Pond	CP-C31	64				67				19			8		1				
S	05-Oct-00	Central Pond	CP-C32					67							1		1				
S	05-Oct-00	Central Pond	CP-C38					67							1		1				
S	11-Oct-00	Buried Debris Area	BD-C8	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C23	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C24	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C28	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C29	64				67				19			8		1				
S	17-Nov-00	Lake Poly	LAKE POLY 1-E	64				66				19			3		1				
S	17-Nov-00	Lake Poly	LAKE POLY 1-N	64				67				19			3		1				
S	17-Nov-00	Lake Poly	LAKE POLY 1-S	64				67				19			3		1				
S	17-Nov-00	Lake Poly	LAKE POLY 1-W	64				67				19			3		1				
S	09-May-01	Central Pond	CP-C79					66							1		1				
S	09-Jul-01	Lake Poly	LPB11												1		2				

Table 4.1-1
Soil Samples No Longer Representative of Site Conditions (Excavation) - By Date

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	10-Jul-01	Lake Poly	LPB12											1		2					
S	10-Jul-01	Lake Poly	LPB12					67				19	7		7		7				22
S	10-Jul-01	Lake Poly	LPB12	64																12	
S	10-Jul-01	Lake Poly	LPB12													1					
S	12-Jul-01	Lake Poly	LPB29											1		2					
S	12-Jul-01	Lake Poly	LPB29												1						
S	12-Jul-01	Lake Poly	LPB30											1		2					
S	28-Aug-03	Central Pond	CP-EX2											8		1					22
S	09-Jun-04	Lake Poly	LP-C01											1		2					

SS = Surface Soil
S = Subsurface Soil

Prepared/Date: MJM 8/6/07
Checked/Date: MH 8/6/07

Table 4.1-2
Summary of Background Soil Conditions

Draft Focused Remedlial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

	1997 Smith Report Site-Specific Background			MADEP Background	
Parameter Name	Minimum	Maximum	Median	1995	2002
Semivolatile Organics (mg/Kg)					
Benzo(b)fluoranthene	0.058	0.062	0.06		2
Fluoranthene	0.047	0.066	0.057		4
Phenanthrene	0.043	0.043	0.043		3
Pyrene	0.047	0.065	0.056		4
Inorganics and Metals (mg/Kg)					
Aluminum, Total	6100	7900	7000	13000	10000
Antimony, Total				1.4	1
Arsenic, Total	6.2	7.1	6.7	17	20
Barium, Total	11	22	17	45	50
Beryllium, Total				0.4	0.4
Cadmium, Total				2	2
Calcium, Total	125	2000	620		
Chromium, Total	14	16	15	29	30
Cobalt, Total	2.4	3.7	3.1	4.4	4
Copper, Total	5.1	6.4	5.8	38	40
Hexavalent Chromium, Total					30
Iron, Total	9200	12000	11000	17000	20000
Lead, Total	11	11	10.5	99	100
Magnesium, Total	2400	3000	2700	4900	5000
Manganese, Total	100	150	125	300	300
Mercury, Total				0.3	0.3
Nickel, Total	5.5	6.5	6	17	20
Potassium, Total	120	1400	260		
Selenium, Total				0.5	0.5
Silver, Total				0.6	0.6
Sodium, Total	22.5	130	29		
Thallium, Total				0.6	0.6
Vanadium, Total	12	16	14	29	30
Zinc, Total	16	21	19	116	100
Nitrogen, Ammonia	17	37	26		
Sulfate as SO4	30	30	< 40		

MADEP, 1995. Guidance for Disposal Site Risk Characterization, In Support of the Massachusetts Contingency Plan, Interim Final Policy WSC/ORS-95-141, July.

MADEP, 2002. Technical Update, Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil, May.

Prepared/Date: MJM 08/08/07
Checked/Date: KJC 08/08/07

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	09-Jul-91		AREA-10	AREA 10	36				65				21	7		23		4	1			
SS	09-Jul-91		AREA-10	AREA 10	36				65				21	7		23		4	1			
SS	09-Jul-91		AREA-3	AREA 03	36				65				21	7		23		4	1			
SS	09-Jul-91		AREA-4	AREA 04	36				65				21	7		23		4	1			
SS	09-Jul-91		AREA-5	AREA 05	36				65				21	7		23		4	1			
SS	09-Jul-91		AREA-6	AREA 06	36				65				21	7		23		4	1			
SS	09-Jul-91		AREA-7	AREA 07	36				65				21	7		23		4	1			
SS	09-Jul-91		AREA-9	AREA 09	36				65				21	7		23		4	1			
SS	30-Jul-91		SWMU-33	SWMU-33	36				65				21	7		23		4	1			
SS	07-May-93		SWMU-25	SWMU-25	36				65				21			23		3	1			
SS	15-Dec-96		SWMU-26	SWMU26 COMP					65				21			1		2				
SS	15-Dec-96		SWMU-26-1	SWMU26-1	36																	
SS	15-Dec-96		SWMU-26-2	SWMU26-2	36																	
SS	15-Dec-96		SWMU-26-3	SWMU26-3	36														1			
SS	15-Dec-96		SWMU-26-4	SWMU26-4	36																	
SS	15-Dec-96	Lake Poly	LAKE POLY-2	LAKE POLY-2	36				65				21			23		2				
SS	15-Dec-96	Lake Poly	LAKE POLY-2	LAKE POLY-2	36				65				21			23		2				
SS	15-Dec-96	Lake Poly	LAKE POLY-3	LAKE POLY-3	36				65				21			23		2				
SS	15-Dec-96	Property	AREA-1-6	AREA 1-6	36														1			
SS	16-Dec-96		AREA-8-2	AREA8-2	36				65				21			1		2				
SS	16-Dec-96		AREA-8-3	AREA8-3	36				65				21			1		2				
SS	16-Dec-96		CPDA-5	CPDA-5	36				65				21			1		2				
SS	16-Dec-96	Central Pond	CPDA-8	CPDA-8	36				65				21			23		2				
SS	16-Dec-96	Containment Area	CPDA-1	CPDA-1	36				65				21			1		2				
SS	16-Dec-96	Containment Area	CPDA-2	CPDA-2	36				65				21			1		2				
SS	16-Dec-96	Property	A8CW-2	A8CW-2	36				65				21			1		2				
SS	16-Dec-96	Property	A8CW-3	A8CW-3	36				65				21			1		2				
SS	16-Dec-96	Property	A8CW-4	A8CW-4	36				65				21			23		2				
SS	16-Dec-96	Property	A9CW-(COMP)	A9CW-(COMP)					65				21			23		2				
SS	16-Dec-96	Property	A9CW-1	A9CW-1	36																	
SS	16-Dec-96	Property	A9CW-2	A9CW-2	36																	
SS	16-Dec-96	Property	A9CW-3	A9CW-3	36																	
SS	16-Dec-96	Property	A9CW-4	A9CW-4	36																	
SS	21-Jan-97	South Ditch	BS015	BS015SDX					65				21			23						
SS	21-Jan-97	South Ditch	BS016	BS016SMD					65				21			23						
SS	21-Jan-97	South Ditch	BS018	BS018PND					65				21			23						
SS	21-Jan-97	South Ditch	BS019	BS019WMD					65				21			23						
SS	21-Jan-97	South Ditch	BS020	BS020WMD					65				21			23						

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	16-Apr-98	Warehouse	E1.45	E1, 45, 1.5												23		3				
SS	23-Nov-98		SWMU-27-101	SS101XX27X	64				67							23		4				
SS	23-Nov-98		SWMU-27-101	SS101XX27D	64				67							23		4				
SS	23-Nov-98		SWMU-33-101	SS101XX33X	64				67							23		4				
SS	23-Nov-98		SWMU-33-102	SS102XX33X	64				67							23		4				
SS	23-Nov-98		SWMU-33-103	SS103XX33X	64				67							23		4				
SS	24-Nov-98	Lake Poly	LP-102	SS102XXLPX												2		4				
SS	24-Nov-98	Lake Poly	LP-103	SS103XXLPX												2		4				
SS	24-Nov-98	Lake Poly	LP-103	SS103XXLPX												2		4				
SS	24-Nov-98	Lake Poly	LP-103	SS103XXLPD												2		4				
SS	24-Nov-98	Lake Poly	LP-105	SS105XXLPX												2		4				
SS	30-Nov-98		SWMU-27-101	SS101XX27X	62																	
SS	30-Nov-98		SWMU-33-101	SS101XX33X	62																	
SS	30-Nov-98		SWMU-33-102	SS102XX33X	62																	
SS	30-Nov-98		SWMU-33-103	SS103XX33X	62																	
SS	30-Nov-98	Lake Poly	LP-102	102A												2		1				
SS	04-Nov-99		CP-1	CP 1 (Central Pond 1)									1					1				
SS	04-Nov-99		CP-2	CP 2 (Central Pond 2)									1					1				
SS	04-Nov-99		NW-WAREHOUSE	NW Warehouse									1					1				
SS	04-Nov-99		SE-WAREHOUSE	SE Warehouse									1					1				
SS	04-Nov-99	Lake Poly	LP-1	LP 1 (Lake Poly 1)									1					1				
SS	04-Nov-99	Lake Poly	LP-2	LP 2 (Lake Poly 2)									1					1				
SS	04-Nov-99	Lake Poly	LP-2	Duplicate									1					1				
SS	24-Jan-00		RSO-09	RSO-09-S1 (0-3)	37				66													
SS	24-Jan-00		RSO-09	RSO-09-S1 (0-3 FT)												22		1				
SS	24-Jan-00		RSO-10	RSO-10-S1 (0-3)	37				66													
SS	24-Jan-00		RSO-10	RSO-10-S1 (0-3 FT)												22		1				
SS	24-Jan-00		RSO-11	RSO-11-S1 (0-3)	37				66													
SS	24-Jan-00		RSO-11	RSO-11-S1 (0-3 FT)												22		1				
SS	24-Jan-00		RSO-12	RSO-12-S1 (0-3)	37				66													
SS	24-Jan-00		RSO-12	RSO-12-S1 (0-3 FT)												22		1				
SS	24-Jan-00		RSO-13	RSO-13-S1 (0-3)	37				66													
SS	24-Jan-00		RSO-13	RSO-13-S1 (0-3 FT)												22		1				
SS	24-Jan-00	Containment Area	RSO-15	RSO-15-S1 (0-3)	37				66													
SS	24-Jan-00	Containment Area	RSO-15	RSO-15-S1 (0-3 FT)												22		1				
SS	25-Jan-00		RSO-01	RSO-01-S1 (0-3)	37				66													
SS	25-Jan-00		RSO-01	RSO-01-S1 (0-3 FT)												22		1				
SS	25-Jan-00		RSO-02	RSO-02-S1 (0-3)	37				66													

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	25-Jan-00		RSO-02	RSO-02-S1 (0-3 FT)												22		1					
SS	25-Jan-00		RSO-03	RSO-03-S1 (0-3)	37				66														
SS	25-Jan-00		RSO-03	RSO-03-S1 (0-3 FT)												22		1					
SS	25-Jan-00		RSO-04	RSO-04-S1 (0-3)	37				66														
SS	25-Jan-00		RSO-04	RSO-04-S1 (0-3 FT)												22		1					
SS	25-Jan-00		RSO-05	RSO-05-S1 (0-3)	37				66														
SS	25-Jan-00		RSO-05	RSO-05-S1 (0-3 FT)												22		1					
SS	25-Jan-00		RSO-07	RSO-07-S1 (0-3)	37				66														
SS	25-Jan-00		RSO-07	RSO-07-S1 (0-3 FT)												22		1					
SS	25-Jan-00		RSO-08	RSO-08-S1 (0-3)	37				66														
SS	25-Jan-00		RSO-08	RSO-08-S1 (0-3 FT)												22		1					
SS	26-Jan-00		RSO-16	RSO-16 (0-3)	37				66														
SS	26-Jan-00		RSO-16	RSO-16 (0-3)												23		1					
SS	26-Jan-00		RSO-17	RSO-17 (0-3)					66														
SS	26-Jan-00		RSO-17	RSO-17 (0-3)RE	37																		
SS	26-Jan-00		RSO-17	RSO-17 (0-3)												23		1					
SS	26-Jan-00		RSO-18	RSO-18 (0-3)					66														
SS	26-Jan-00		RSO-18	RSO-18 (0-3)RE	37																		
SS	26-Jan-00		RSO-18	RSO-18 (0-3)												23		1					
SS	10-Aug-00	Drum Area B	DB-C1	DB-C1	64																		
SS	10-Aug-00	Drum Area B	DB-C1	DB-C1					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C10	DB-C10	64																		
SS	10-Aug-00	Drum Area B	DB-C10	DB-C10					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C13	DB-C13	64																		
SS	10-Aug-00	Drum Area B	DB-C13	DB-C13					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C15	DB-C15	64																		
SS	10-Aug-00	Drum Area B	DB-C15	DB-C15					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C2	DB-C2	64																		
SS	10-Aug-00	Drum Area B	DB-C2	DB-C2					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C3	DB-C3	64																		
SS	10-Aug-00	Drum Area B	DB-C3	DB-C3					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C5	DB-C5	64																		
SS	10-Aug-00	Drum Area B	DB-C5	DB-C5					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C6	DB-C6	64																		
SS	10-Aug-00	Drum Area B	DB-C6	DB-C6					67				22			3		1					
SS	10-Aug-00	Drum Area B	DB-C9	DB-C9	64																		
SS	10-Aug-00	Drum Area B	DB-C9	DB-C9					67				22			3		1					
SS	18-Sep-00	Drum Area A	DA-C10	1120-DA-C10	64				67				19			3		1					

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	18-Sep-00	Drum Area A	DA-C11	1120-DA-C11	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C15	1120-DA-C15	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C16	1120-DA-C16	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C19	1120-DA-C19	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C2	1120-DA-C2	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C20	1120-DA-C20	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C3	1120-DA-C3	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C4	1120-DA-C4	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C5	1120-DA-C5	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C6	1120-DA-C6	64				67				19			3		1				
SS	18-Sep-00	Drum Area A	DA-C9	1120-DA-C9	64				67				19			3		1				
SS	29-Sep-00	Drum Area A	DA-C26	1120-DA-C26	64				67				19			3		2				
SS	29-Sep-00	Drum Area A	DA-C27	1120-DA-C27	64				67				19			3		2				
SS	03-Oct-00	South Ditch	SD-C1	1140-SD-C1					67							1		1				
SS	03-Oct-00	South Ditch	SD-C1B	1140-SD-C1B					67							1		1				
SS	03-Oct-00	South Ditch	SD-C2	1140-SD-C2					67							1		1				
SS	05-Oct-00	Central Pond	CP-C26	1140-CP-C26					67							1		1				
SS	05-Oct-00	Central Pond	CP-C30	1140-CP-C30					67							1		1				
SS	10-Oct-00	Buried Debris Area	BD-C3	1120-BD-C3	64				67				19			8		1				
SS	10-Oct-00	Buried Debris Area	BD-C6	1120-BD-C6	64				67				19			8		1				
SS	11-Oct-00	South Ditch	SD-C10	1140-SD-C10	64				67				19			8		1				
SS	11-Oct-00	South Ditch	SD-C13	1140-SD-C13					67							1		1				
SS	11-Oct-00	South Ditch	SD-C14	1140-SD-C14					67							1		1				
SS	11-Oct-00	South Ditch	SD-C15	1140-SD-C15	64				67				19			8		1				
SS	11-Oct-00	South Ditch	SD-C6	1140-SD-C6	64				67				19			8		1				
SS	11-Oct-00	South Ditch	SD-C7	1140-SD-C7					67							1		1				
SS	11-Oct-00	South Ditch	SD-C9	1140-SD-C9					67							1		1				
SS	12-Oct-00	South Ditch	SD-C16B	1140-SD-C16B					67							1		1				
SS	12-Oct-00	South Ditch	SD-C17B	1140-SD-C17B					67				19			8		1				
SS	12-Oct-00	South Ditch	SD-C17B	1140-SD-C17B	64													1				
SS	12-Oct-00	South Ditch	SD-C18B	1140-SD-C18B					67							1		1				
SS	12-Oct-00	South Ditch	SD-C19	1140-SD-C19					67							1		1				
SS	12-Oct-00	South Ditch	SD-C19B	1140-SD-C19B					67				19			8		1				
SS	12-Oct-00	South Ditch	SD-C19B	1140-SD-C19B	64													1				
SS	12-Oct-00	South Ditch	SD-C20B	1140-SD-C20B					67							1		1				
SS	12-Oct-00	South Ditch	SD-C21B	1140-SD-C21B					67				19			8		1				
SS	12-Oct-00	South Ditch	SD-C21B	1140-SD-C21B	64													1				
SS	13-Oct-00	Containment Area	OSFILL-450	1130-OSFILL-450	64				67					7		8		1				5

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	13-Oct-00	Containment Area	OSFILL-550	1130-OSFILL-550	64				67					7		8		1				5
SS	18-Oct-00	South Ditch	SD-C24B	1140-SD-C24B					67							1		1				
SS	18-Oct-00	South Ditch	SD-C24B	1140-SD-C24B-D					67							1		1				
SS	27-Oct-00	Buried Debris Area	BD-C21	1120-BD-C21	64				67				19			8		1				
SS	27-Oct-00	Buried Debris Area	BD-C22	1120-BD-C22	64				67				19			8		1				
SS	27-Oct-00	Buried Debris Area	BD-C26	1120-BD-C26	64				67				19			8		1				
SS	27-Oct-00	Buried Debris Area	BD-C31	1120-BD-C31	64				67				19			8		1				
SS	27-Oct-00	Buried Debris Area	BD-C35	1120-BD-C35	64				67				19			8		1				
SS	02-Nov-00	South Ditch	SD-C29B	1140-SD-C29B					67				19			8		1				
SS	02-Nov-00	South Ditch	SD-C29B	1140-SD-C29B	64													1				
SS	02-Nov-00	South Ditch	SD-C30B	1140-SD-C30B					67							1		1				
SS	02-Nov-00	South Ditch	SD-C31	1140-SD-C31					67							1		1				
SS	02-Nov-00	South Ditch	SD-C33	1140-SD-C33					67							1		1				
SS	03-Nov-00	South Ditch	SD-C34	1140-SD-C34					67							1		1				
SS	03-Nov-00	South Ditch	SD-C35	1140-SD-C35	64				67				19			8		1				
SS	03-Nov-00	South Ditch	SD-C36	1140-SD-C36					67							1		1				
SS	03-Nov-00	South Ditch	SD-C37	1140-SD-C37					67							1		1				
SS	03-Nov-00	South Ditch	SD-C38	1140-SD-C38					67							1		1				
SS	03-Nov-00	South Ditch	SD-C40B	1140-SD-C40B					67							1		1				
SS	03-Nov-00	South Ditch	SD-C42	1140-SD-C42					67							1		1				
SS	03-Nov-00	South Ditch	SD-C42B	1140-SD-C42B					67				19			8		1				
SS	03-Nov-00	South Ditch	SD-C42B	1140-SD-C42B	64													1				
SS	03-Nov-00	South Ditch	SD-C43B	1140-SD-C43B					67				19			8		1				
SS	03-Nov-00	South Ditch	SD-C43B	1140-SD-C43B	64													1				
SS	09-Nov-00	C-RAM Hotspot	A8CW-1-E	1160-A8CW-1-E					67				19			3		1				
SS	09-Nov-00	C-RAM Hotspot	A8CW-1-N	1160-A8CW-1-N					67				19			3		1				
SS	09-Nov-00	C-RAM Hotspot	A8CW-1-S	1160-A8CW-1-S					67				19			3		1				
SS	09-Nov-00	C-RAM Hotspot	A8CW-1-W	1160-A8CW-1-W					67				19			3		1				
SS	15-Nov-00	Containment Area	OSFILL-1120	1130-OSFILL-1120	64				67					7		8		1				5
SS	15-Nov-00	Containment Area	OSFILL-1170	1130-OSFILL-1170	64				67					7		8		1				5
SS	15-Nov-00	Containment Area	OSFILL-1220	1130-OSFILL-1220	64				67					7		8		1				5
SS	15-Nov-00	Containment Area	OSFILL-1220	1130-OSFILL-1220 D	64				67					7		8		1				5
SS	15-Nov-00	Containment Area	OSFILL-400	1130-OSFILL-400	64				67					7		8		1				5
SS	15-Nov-00	Containment Area	OSFILL-460	1130-OSFILL-460	64				67					7		8		1				5
SS	15-Nov-00	Containment Area	OSFILL-530	1130-OSFILL-530	64				67					7		8		1				5
SS	15-Nov-00	Containment Area	OSFILL-600	1130-OSFILL-600	64				67					7		8		1				5
SS	09-May-01	Central Pond	CP-C78	1140-CP-C78					66							1		1				
SS	09-May-01	Central Pond	CP-C83	1140-CP-C83					66							1		1				

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	10-May-01	Central Pond	CP-C84	1140-CP-C84	64				67							7		1					
SS	10-May-01	Central Pond	CP-C85	1140-CP-C85					67							1		1					
SS	10-May-01	Central Pond	CP-C89	1140-CP-C89					67							1		1					
SS	10-May-01	Central Pond	CP-C90	1140-CP-C90	64											7		1					
SS	14-May-01	South Ditch	SD-C44N	1140-SD-C44N					67							1		1					
SS	14-May-01	South Ditch	SD-C45S	1140-SD-C45S					67							1		1					
SS	14-May-01	South Ditch	SD-C46N	1140-SD-C46N												1		1					
SS	14-May-01	South Ditch	SD-C46S	1140-SD-C46S												1		1					
SS	14-May-01	South Ditch	SD-C48N	1140-SD-C48N												1		1					
SS	14-May-01	South Ditch	SD-C48S	1140-SD-C48S												1		1					
SS	14-May-01	South Ditch	SD-C49N	1140-SD-C49N												1		1					
SS	14-May-01	South Ditch	SD-C49S	1140-SD-C49S												1		1					
SS	14-May-01	South Ditch	SD-C50N	1140-SD-C50N												1		1					
SS	14-May-01	South Ditch	SD-C50S	1140-SD-C50S												1		1					
SS	14-May-01	South Ditch	SD-C51N	1140-SD-C51N												1		1					
SS	14-May-01	South Ditch	SD-C51S	1140-SD-C51S												1		1					
SS	14-May-01	South Ditch	SD-C52N	1140-SD-C52N	64											1		1					
SS	14-May-01	South Ditch	SD-C52S	1140-SD-C52S	64											1		1					
SS	15-May-01	South Ditch	SD-C53N	1140-SD-C53N												1		1					
SS	15-May-01	South Ditch	SD-C53S	1140-SD-C53S												1		1					
SS	15-May-01	South Ditch	SD-C54S	1140-SD-C54S					67							1		1					
SS	16-May-01	On-Property West Ditch Wetland	WDW-C34	1140-WDW-C34												1		1					
SS	18-May-01	South Ditch	SD-C55	1140-SD-C55												1		1					
SS	19-May-01	Buried Debris Area	BD-C51	1140-BD-C51					67									1					
SS	19-May-01	Buried Debris Area	BD-C51	1140-BD-C51	64																		
SS	19-May-01	Buried Debris Area	BD-C51	1140-BD-C51												1							
SS	09-Jul-01	Lake Poly	LPB17	1160-LPB17-S1												1		1					
SS	09-Jul-01	Lake Poly	LPB19	1160-LPB19-S1												1		1					
SS	09-Jul-01	Lake Poly	LPB3	1160-LPB3-S1												1		1					
SS	09-Jul-01	Lake Poly	LPB9	1160-LPB9-S1												1		1					
SS	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S1												1		1					
SS	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S1					67				19			3		2					22
SS	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S1	64																12		
SS	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S1													1						
SS	10-Jul-01	Lake Poly	LPB18	1160-LPB18-S1												1		1					
SS	10-Jul-01	Lake Poly	LPB4	1160-LPB4-S1												1		1					
SS	10-Jul-01	Lake Poly	LPB4	1160-LPB4-S2												1		1					
SS	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S1												1		1					

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S1					67				19			3		2				22
SS	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S1	64																12	
SS	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S1													1					
SS	10-Jul-01	Lake Poly	LPB6	1160-LPB6-S1												1		1				
SS	10-Jul-01	Lake Poly	LPB6	1160-LPB6-S2												1		1				
SS	10-Jul-01	Lake Poly	LPB6	1160-LPB6-S2													1					
SS	10-Jul-01	Lake Poly	LPB7	1160-LPB7-S1												1		1				
SS	10-Jul-01	Lake Poly	LPB7	1160-LPB7-S1					67				19			3		2				22
SS	10-Jul-01	Lake Poly	LPB7	1160-LPB7-S1	64																12	
SS	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S1												1		1				
SS	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S1					67				19			3		2				22
SS	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S1	64																12	
SS	11-Jul-01	Lake Poly	LPB1	1160-LPB1-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S1									19			3		2				22
SS	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S1	64																12	
SS	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S1 RX (178762)					67									1				
SS	11-Jul-01	Lake Poly	LPB2	1160-LPB2-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB22	1160-LPB22-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB23	1160-LPB23-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB24	1160-LPB24-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB25	1160-LPB25-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB26	1160-LPB26-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB27	1160-LPB27-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB28	1160-LPB 28-S1												1		1				
SS	11-Jul-01	Lake Poly	LPB28	1160-LPB28-S1					67				19			3		2				22
SS	11-Jul-01	Lake Poly	LPB28	1160-LPB28-S1	64																12	
SS	12-Jul-01	Lake Poly	LPB31	1160-LPB 31-S1												1		1				
SS	12-Jul-01	Lake Poly	LPB32	1160-LPB 32-S1												1		1				
SS	12-Jul-01	Lake Poly	LPB33	1160-LPB 33-S1												1		1				
SS	12-Jul-01	Lake Poly	LPB34	1160-LPB 34-S1												1		1				
SS	17-Sep-01	South Ditch	SDF-1	1010-SED-SDF-1S	64													1				
SS	17-Sep-01	South Ditch	SDF-1	1010-SED-SDF-1S					67							9		4				22
SS	17-Sep-01	South Ditch	SDF-2	1010-SED-SDF-2S	64													1				
SS	17-Sep-01	South Ditch	SDF-2	1010-SED-SDF-2S					67							9		4				22
SS	17-Sep-01	South Ditch	SDF-3	1010-SED-SDF-3S	64													1				
SS	17-Sep-01	South Ditch	SDF-3	1010-SED-DUPE1	64													1				
SS	17-Sep-01	South Ditch	SDF-3	1010-SED-SDF-3S					67							9		3				22

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	17-Sep-01	South Ditch	SDF-3	1010-SED-DUPE1					67							9		3				22
SS	17-Sep-01	South Ditch	SDF-4	1010-SED-SDF-4S	64													1				
SS	17-Sep-01	South Ditch	SDF-4	1010-SED-SDF-4S					67							9		3				22
SS	17-Sep-01	South Ditch	SDF-5	1010-SED-SDF-5S	64													1				
SS	17-Sep-01	South Ditch	SDF-5	1010-SED-SDF-5S					67							9		3				22
SS	17-Sep-01	South Ditch	SDF-6	1010-SED-SDF-6S	64													1				
SS	17-Sep-01	South Ditch	SDF-6	1010-SED-SDF-6S					67							9		3				22
SS	18-Sep-01	Central Pond	CP-TP15	1010-CP-TP15									7			8		1				22
SS	18-Sep-01	Central Pond	CP-TP19	1010-CP-TP19									7			8		1				22
SS	18-Sep-01	Central Pond	CP-TP8	1010-CP-TP8									7			8		1				22
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-06-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-C12-01	68				65		1							1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-12-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-18-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-C36-01	68				65		1							1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SO-N-24-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-06-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-C12-01	68				65		1							1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-12-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-18-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-C36-01	68				65		1							1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SO-S-24-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-06-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C12-01	68													1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C12-01					65		1							1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-12-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-18-01												22		3				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C36-01	68													1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-C36-01					65		1							1				
SS	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SO-WS-24-01												22		3				
SS	10-Dec-03	Lake Poly	LPB-40	LPB-40-OVR			2	3			1							1				
SS	10-Dec-03	Lake Poly	LPB-41	LPB-41-OVR			2	3			1							1				
SS	10-Dec-03	Lake Poly	LPB-41	LPB-41-VI			2	3			1							1				
SS	10-Dec-03	Lake Poly	LPB-42	LPB-42-OVR			2	3			1							1				
SS	10-Dec-03	Lake Poly	LPB-43	LPB-43-OVR			2	3			1							1				
SS	08-Mar-04		PLD-3	PLD3-0-4			2	3			1							1				
SS	08-Mar-04	51 Eames Street	GW-306	PLD1A-0-4 (GW-306)			2	3			1							1				
SS	08-Mar-04	51 Eames Street	GW-307	PLD2A-0-4 (GW-307)			2	3			1							1				

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	22-Aug-05	Lower South Ditch	BS040	BS040LSD RE					68			16	19			24		5					
SS	22-Aug-05	Lower South Ditch	BS040	BS040LSD					68									1					
SS	22-Aug-05	Lower South Ditch	BS041	BS041LSD					68			16	19			24		5					
SS	22-Aug-05	Lower South Ditch	BS041	BS041LSD-DUP					68			16	19			24		5					
SS	22-Aug-05	Lower South Ditch	BS041	BS041LSDRE					68									1					
SS	22-Aug-05	Lower South Ditch	BS041	BS041LSD-DUPRE					68									1					
SS	22-Aug-05	Lower South Ditch	BS042	BS042LSD					68			16	19			24		5					
SS	22-Aug-05	Lower South Ditch	BS042	BS042LSDRE					68									1					
SS	22-Aug-05	Lower South Ditch	BS043	BS043LSD RE					68			16	19			24		5					
SS	22-Aug-05	Lower South Ditch	BS043	BS043LSD					68									1					
SS	23-Aug-05	Lower South Ditch	BS044	BS044LSD					68			16	19			24		5					
SS	23-Aug-05	Lower South Ditch	BS044	BS044LSD RE					68									1					
SS	23-Aug-05	Lower South Ditch	BS045	BS045LSD					68			16	19			24		5					
SS	23-Aug-05	Lower South Ditch	BS045	BS045LSD RE					68									1					
SS	20-Sep-05	Lower South Ditch	SOLSD17	SOLSD-17-0-6												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD17	SOLSD-17-6-12												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD18	SOLSD-18-0-6												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD18	SOLSD-18-6-12												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD18	SOLSD-18-12-18												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD19	SOLSD-19-0-6												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD19	SOLSD-19-6-12												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD20	SOLSD-20-0-6												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD20	SOLSD-20-6-12												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD21	SOLSD-21-0-6												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD22	SOLSD-22-0-6												1		1					
SS	20-Sep-05	Lower South Ditch	SOLSD23	SOLSD-23-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD01	SOLSD-1-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD02	SOLSD-2-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD03	SOLSD-3-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD04	SOLSD-4-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD05	SOLSD-5-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD06	SOLSD-6-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD06	SOLSD-6-6-12												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD06	SOLSD-6-12-18												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD07	SOLSD-7-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD07	SOLSD-7-6-12												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD08	SOLSD-8-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD09	SOLSD-9-0-6												1		1					

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SS	21-Sep-05	Lower South Ditch	SOLSD10	SOLSD-10-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD11	SOLSD-11-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD11	SOLSD-11-6-12												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD11	SOLSD-11-6-12-D												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD11	SOLSD-11-12-18												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD12	SOLSD-12-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD12	SOLSD-12-0-6-D												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD13	SOLSD-13-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD13	SOLSD-13-6-12												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD13	SOLSD-13-12-18												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD14	SOLSD-14-0-6												2		1					
SS	21-Sep-05	Lower South Ditch	SOLSD14	SOLSD-14-6-12												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD15	SOLSD-15-0-6												1		1					
SS	21-Sep-05	Lower South Ditch	SOLSD16	SOLSD-16-0-6												1		1					
S	05-Jun-91	Containment Area	BH1	BH01	36				65				20	7		23		5	1				
S	05-Jun-91	Containment Area	BH2	BH02	36				65				20	7		23		5	1				
S	05-Jun-91	Containment Area	BH3	BH03	36				65				20	7		23		5	1				
S	05-Jun-91	Containment Area	BH4	BH04	36				65				20	7		23		5	1				
S	06-Jun-91	Containment Area	BH5	BH05	36				65				20	7		23		4	1				
S	06-Jun-91	Containment Area	BH6	BH06	36				65				20	7		23		4	1				
S	06-Jun-91	Containment Area	BH7	BH07	36				65				20	7		23		5	1				
S	07-Jun-91	Containment Area	BH10	BH10	36				65				20	7		23		4	1				
S	07-Jun-91	Containment Area	BH8	BH08	36				65				20	7		23		4	1				
S	07-Jun-91	Containment Area	BH9	BH09	36				65				20	7		23		4	1				
S	07-Jun-91	Warehouse	BH11	BH11	36				65				20	7		23		4	1				
S	07-Jun-91	Warehouse	BH11	BH11	36				65				20	7		23		4	1				
S	10-Jun-91	Lake Poly	BH12	BH12	36				65				20	7		23		4	1				
S	10-Jun-91	Lake Poly	BH14	BH14	36				65				20	7		23		4	1				
S	10-Jun-91	Lake Poly	BH16	BH16	36				65				20	7		23		4	1				
S	10-Jun-91	Lake Poly	BH17	BH17	36				65				20	7		23		4	1				
S	10-Jun-91	Lake Poly	BH18	BH18	36				65				20	7		23		4	1				
S	10-Jun-91	Property	BH23	BH23	36				65				20	7		23		4	1				
S	10-Jun-91	Property	BH24	BH24	36													4	1				
S	10-Jun-91	Property	BH25	BH25	36													4	1				
S	10-Jun-91	Warehouse	BH13	BH13	36				65				20	7		23		4	1				
S	10-Jun-91	Warehouse	BH15	BH15	36				65				20	7		23		4	1				
S	10-Jun-91	Warehouse	BH20	BH20	36				65				20	7		23		4	1				
S	10-Jun-91	Warehouse	BH21	BH21	36				65				20	7		23		4	1				

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	10-Jun-91	Warehouse	BH22	BH22	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH27	BH27	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH28	BH28	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH28	BH28	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH29	BH29	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH30	BH30	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH32	BH32	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH32	BH32	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH33	BH33	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH34	BH34	36				65				20	7		23		4	1			
S	11-Jun-91	Plant B	BH35	BH35	36				65				20	7		23		4	1			
S	11-Jun-91	Property	BH19	BH19	36				65				20	7		23		4	1			
S	11-Jun-91	Property	BH26	BH26	36				65				20	7		23		4	1			
S	11-Jun-91	Property	BH31	BH31	36				65				20	7		23		4	1			
S	02-Oct-91		TP-1	TP-1-SN1	34				65				21	7		23		4	1			
S	07-Oct-91		TP-19	TP-19-SN6	34				65				21	7		23		4	1			
S	08-Oct-91		TP-21	TP-21-SN8	34				65				21	7		23		4				
S	06-Feb-92	Property	BH36	BH36	36				65				20	7		23		4	1			
S	06-Feb-92	Property	BH37	BH37	36				65				20	7		23		4	1			
S	06-Feb-92	Property	BH38	BH38	36				65				20	7		23		4	1			
S	06-Feb-92	Property	BH39	BH39	36				65				20	7		23		4	1			
S	06-Feb-92	Property	BH40	BH40	36				65				20	7		23		4	1			
S	18-Jan-95	Lake Poly	LPB-2	LPB-2(7-8)	36				64							23		3	1			
S	18-Jan-95	Lake Poly	LPB-2	LPB-2(8-9)	36				64							23		3	1			
S	14-Apr-98	Warehouse	TE2.10	TE2.10.11-12	56				67				19			15		3				
S	15-Apr-98	Warehouse	W1.35	W1.35, 6-7	56				67				19			15		3				
S	15-Apr-98	Warehouse	W1.35	W1.35, 7.5-8.5	56				67				19			15		3				
S	16-Apr-98	Warehouse	E1.40	E1, 40, 3-4												23		3				
S	17-Apr-98	Warehouse	E1.50	E1.5, 6-7	57				66				19			15		3				
S	17-Apr-98	Warehouse	E1.50	E1.5, 8-8.5	56				67				19			15		3				
S	20-Apr-98	Warehouse	E1.75	E1.75, 6-7	56				67				19			15		3				
S	20-Apr-98	Warehouse	E1.75	E1.75,8.5-9.5	57				66				19			15		3				
S	20-Apr-98	Warehouse	E2.70	E2.70, 9.2	56				67				19			15		3				
S	20-Apr-98	Warehouse	E2.70	E2.70, 10	56				67				19			15		3				
S	21-Apr-98	Warehouse	E2.22	E2.22, 7-8	56				67				19			15		3				
S	12-Aug-98	Warehouse	B-1A	B-1, 8'-10'												4		6	4			
S	12-Aug-98	Warehouse	B-1A	B-1, 16'-17.3'												4		6	4			
S	13-Aug-98	Warehouse	B-2A	B-2, 16'-18'												4		6	4			

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	13-Aug-98	Warehouse	B-2A	B-2, 22'-24'												4		6	4			
S	14-Aug-98	Warehouse	B-1B	B-1B, 19.0'-19.6'												4		6	4			
S	14-Aug-98	Warehouse	B-3A	B-3, 12'-14'												4		6	4			
S	14-Aug-98	Warehouse	B-3A	B-3, 18'-20'												4		6	4			
S	03-Nov-98		SBGR	SBGR												23		1				
S	24-Nov-98	Lake Poly	LP-101	SB101XXLPX												2		4				
S	24-Nov-98	Lake Poly	LP-102	SB102XXLPX												2		4				
S	24-Nov-98	Lake Poly	LP-103	SB103XXLPX												2		4				
S	24-Nov-98	Lake Poly	LP-105	SB105XXLPX												2		4				
S	30-Nov-98	Lake Poly	LP-101	101B												2		1				
S	30-Nov-98	Lake Poly	LP-102	102B												2		1				
S	24-Jan-00		RSO-09	RSO-09-S2 (3-6)	37				66													
S	24-Jan-00		RSO-09	RSO-09-S2 (3-6 FT)												22		1				
S	24-Jan-00		RSO-10	RSO-10-S2 (3-6)	37				66													
S	24-Jan-00		RSO-10	RSO-10-S2 (3-6 FT)												22		1				
S	24-Jan-00		RSO-11	RSO-11-S2 (3-6)	37				66													
S	24-Jan-00		RSO-11	RSO-11-S2 (3-6 FT)												22		1				
S	24-Jan-00		RSO-12	RSO-12-S2 (3-6)	37				66													
S	24-Jan-00		RSO-12	RSO-12-S2 (3-6 FT)												22		1				
S	24-Jan-00		RSO-13	RSO-13-S2 (3-5.5 FT)												22		1				
S	24-Jan-00		RSO-13	RSO-13-S2 (3-6)	37				66													
S	24-Jan-00	Containment Area	CPDA-1-A	CPD-1-A (0-3 FT)												22		1				
S	24-Jan-00	Warehouse	BH20-A	BH20-A (3-6 FT)												22		1				
S	25-Jan-00		RSO-01	RSO-01-S2 (3-6)	37				66													
S	25-Jan-00		RSO-01	RSO-01-S2 (3-6 FT)												22		1				
S	25-Jan-00		RSO-02	RSO-02-S2 (3-6)	37				66													
S	25-Jan-00		RSO-02	RSO-02-S2 (3-6 FT)												22		1				
S	25-Jan-00		RSO-03	RSO-03-S2 (3-6)	37				66													
S	25-Jan-00		RSO-03	RSO-03-S2 (3-6 FT)												22		1				
S	25-Jan-00		RSO-04	RSO-04-S2 (3-6)	37				66													
S	25-Jan-00		RSO-04	RSO-04-S2 (3-6 FT)												22		1				
S	25-Jan-00		RSO-05	RSO-05-S2 (3-6)	37				66													
S	25-Jan-00		RSO-05	RSO-05-S2 (3-6 FT)												22		1				
S	25-Jan-00		RSO-07	RSO-07-S2 (3-6)	37				66													
S	25-Jan-00		RSO-07	RSO-07-S2 (3-6 FT)												22		1				
S	25-Jan-00		RSO-08	RSO-08-S2 (3-6)	37				66													
S	25-Jan-00		RSO-08	RSO-08-S2 (3-6 FT)												22		1				
S	10-Aug-00	Drum Area B	DB-C11	DB-C11	64																	

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	10-Aug-00	Drum Area B	DB-C11	DB-C11					66				22			3		1				
S	10-Aug-00	Drum Area B	DB-C12	DB-C12	64																	
S	10-Aug-00	Drum Area B	DB-C12	DB-C12					67				22			3		1				
S	10-Aug-00	Drum Area B	DB-C16	DB-C16	64																	
S	10-Aug-00	Drum Area B	DB-C16	DB-C16					67				22			3		1				
S	10-Aug-00	Drum Area B	DB-C4	DB-C4	64																	
S	10-Aug-00	Drum Area B	DB-C4	DB-C4					67				22			3		1				
S	10-Aug-00	Drum Area B	DB-C7	DB-C7	64																	
S	10-Aug-00	Drum Area B	DB-C7	DB-C7					67				22			3		1				
S	10-Aug-00	Drum Area B	DB-C8	DB-C8	64																	
S	10-Aug-00	Drum Area B	DB-C8	DB-C8					67				22			3		1				
S	18-Sep-00	Drum Area A	DA-C12	1120-DA-C12	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C13	1120-DA-C13	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C14	1120-DA-C14	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C17	1120-DA-C17	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C18	1120-DA-C18	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C21	1120-DA-C21	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C22	1120-DA-C22	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C23	1120-DA-C23	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C24	1120-DA-C24	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C7	1120-DA-C7	64				67				19			3		1				
S	18-Sep-00	Drum Area A	DA-C8	1120-DA-C8	64				67				19			3		1				
S	19-Sep-00	On-Property West Ditch	WD-C1	1140-WD-C1					67							1		1				
S	19-Sep-00	On-Property West Ditch	WD-C10	1140-WD-C10					67							1		1				
S	19-Sep-00	On-Property West Ditch	WD-C11	1140-WD-C11	64				67							8		1				
S	19-Sep-00	On-Property West Ditch	WD-C11	1140-WD-C11 (156878)									19									
S	19-Sep-00	On-Property West Ditch	WD-C2	1140-WD-C2					67							1		1				
S	19-Sep-00	On-Property West Ditch	WD-C3	1140-WD-C3					67							1		1				
S	19-Sep-00	On-Property West Ditch	WD-C4	1140-WD-C4	64				67							8		1				
S	19-Sep-00	On-Property West Ditch	WD-C4	1140-WD-C4 (156876)									19									
S	19-Sep-00	On-Property West Ditch	WD-C5	1140-WD-C5					67							1		1				
S	19-Sep-00	On-Property West Ditch	WD-C6	1140-WD-C6					67							1		1				
S	19-Sep-00	On-Property West Ditch	WD-C7	1140-WD-C7					67							1		1				
S	19-Sep-00	On-Property West Ditch	WD-C8	1140-WD-C8	64				67							8		1				
S	19-Sep-00	On-Property West Ditch	WD-C8	1140-WD-C8 (156877)									19									
S	19-Sep-00	On-Property West Ditch	WD-C9	1140-WD-C9					67							1		1				
S	21-Sep-00		WD-C1B	1140-WD-C1B					67							1		1				
S	21-Sep-00	On-Property West Ditch	WD-C10B	1140-WD-C10B					67							1		1				

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	21-Sep-00	On-Property West Ditch	WD-C11B	1140-WD-C11B					67							8		1					
S	21-Sep-00	On-Property West Ditch	WD-C11B	1140-WD-C11B	64													1					
S	21-Sep-00	On-Property West Ditch	WD-C11B	1140-WD-C11B (157182)									19										
S	21-Sep-00	On-Property West Ditch	WD-C2B	1140-WD-C2B					67							1		1					
S	21-Sep-00	On-Property West Ditch	WD-C3B	1140-WD-C3B					67							1		1					
S	21-Sep-00	On-Property West Ditch	WD-C4B	1140-WD-C4B					67							8		1					
S	21-Sep-00	On-Property West Ditch	WD-C4B	1140-WD-C4B	64													1					
S	21-Sep-00	On-Property West Ditch	WD-C4B	1140-WD-C4B (157180)									19										
S	21-Sep-00	On-Property West Ditch	WD-C5B	1140-WD-C5B					67							1		1					
S	21-Sep-00	On-Property West Ditch	WD-C6B	1140-WD-C6B					67							1		1					
S	21-Sep-00	On-Property West Ditch	WD-C7B	1140-WD-C7B					67							1		1					
S	21-Sep-00	On-Property West Ditch	WD-C8B	1140-WD-C8B					67							8		1					
S	21-Sep-00	On-Property West Ditch	WD-C8B	1140-WD-C8B	64													1					
S	21-Sep-00	On-Property West Ditch	WD-C8B	1140-WD-C8B (157181)									19										
S	21-Sep-00	On-Property West Ditch	WD-C9B	1140-WD-C9B					67							1		1					
S	29-Sep-00	Drum Area A	DA-C25	1120-DA-C25	64				67				19			3		2					
S	29-Sep-00	Drum Area A	DA-C28	1120-DA-C28	64				67				19			3		2					
S	29-Sep-00	Drum Area A	DA-C29	1120-DA-C29	64				67				19			3		2					
S	29-Sep-00	Drum Area A	DA-C29	1120-DA-C29-D	64				67									2					
S	29-Sep-00	Drum Area A	DA-C30	1120-DA-C30	64				67				19			3		2					
S	29-Sep-00	Drum Area A	DA-C31	1120-DA-C31	64				67				19			3		2					
S	29-Sep-00	Drum Area A	DA-C32	1120-DA-C32	64				67				19			3		2					
S	29-Sep-00	Drum Area A	DA-C33	1120-DA-C33	64				67				19			3		2					
S	29-Sep-00	Drum Area A	DA-C34	1120-DA-C34	64				67				19			3		2					
S	02-Oct-00	Central Pond	CP-C12	1140-CP-C12					67							1		1					
S	02-Oct-00	Central Pond	CP-C13	1140-CP-C13-D	64				67				19			8		1					
S	02-Oct-00	Central Pond	CP-C13	1140-CP-C13	64				67				19			8		1					
S	02-Oct-00	Central Pond	CP-C16	1140-CP-C16	64				67				19			8		1					
S	02-Oct-00	Central Pond	CP-C17	1140-CP-C17					67							1		1					
S	02-Oct-00	Central Pond	CP-C20	1140-CP-C20					67							1		1					
S	02-Oct-00	Central Pond	CP-C21	1140-CP-C21	64				67				19			8		1					
S	02-Oct-00	Central Pond	CP-C24	1140-CP-C24					67							1		1					
S	04-Oct-00	On-Property West Ditch	WD-C12	1140-WD-C12					67							1		1					
S	04-Oct-00	On-Property West Ditch	WD-C12B	1140-WD-C12B					67							1		1					
S	04-Oct-00	On-Property West Ditch	WD-C13	1140-WD-C13					67							1		1					
S	04-Oct-00	On-Property West Ditch	WD-C13B	1140-WD-C13B					67							1		1					
S	04-Oct-00	On-Property West Ditch	WD-C14	1140-WD-C14					67							1		1					
S	04-Oct-00	On-Property West Ditch	WD-C14B	1140-WD-C14B					67							1		1					

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Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	04-Oct-00	On-Property West Ditch	WD-C15	1140-WD-C15					67				19			8		1					
S	04-Oct-00	On-Property West Ditch	WD-C15B	1140-WD-C15B					67				19			8		1					
S	04-Oct-00	On-Property West Ditch	WD-C15B	1140-WD-C15B	64													1					
S	05-Oct-00	Central Pond	CP-C28	1140-CP-C28	64				67				19			8		1					
S	05-Oct-00	Central Pond	CP-C29	1140-CP-C29					67							1		1					
S	05-Oct-00	Central Pond	CP-C33	1140-CP-C33					67							1		1					
S	05-Oct-00	Central Pond	CP-C34	1140-CP-C34					67							1		1					
S	05-Oct-00	Central Pond	CP-C35	1140-CP-C35	64				67				19			8		1					
S	05-Oct-00	Central Pond	CP-C36	1140-CP-C36					67							1		1					
S	05-Oct-00	Central Pond	CP-C37	1140-CP-C37					67							1		1					
S	05-Oct-00	Central Pond	CP-C39	1140-CP-C39	64				67				19			8		1					
S	05-Oct-00	Central Pond	CP-C40	1140-CP-C40					67							1		1					
S	05-Oct-00	Central Pond	CP-C41	1140-CP-C41					67							1		1					
S	05-Oct-00	Central Pond	CP-C42	1140-CP-C42					67							1		1					
S	05-Oct-00	Central Pond	CP-C43	1140-CP-C43					67							1		1					
S	05-Oct-00	Central Pond	CP-C44	1140-CP-C44					67							1		1					
S	05-Oct-00	Central Pond	CP-C45	1140-CP-C45					67							1		1					
S	05-Oct-00	Central Pond	CP-C46	1140-CP-C46					67							1		1					
S	05-Oct-00	Central Pond	CP-C47	1140-CP-C47	64				67				19			8		1					
S	05-Oct-00	Central Pond	CP-C48	1140-CP-C48					67							1		1					
S	05-Oct-00	Central Pond	CP-C49	1140-CP-C49	64				67				19			8		1					
S	05-Oct-00	Central Pond	CP-C50	1140-CP-C50					67							1		1					
S	05-Oct-00	Central Pond	CP-C51	1140-CP-C51					67							1		1					
S	07-Oct-00	Drum Area A	DA-C35	1120-DA-C35	64				67				19			3		2					
S	09-Oct-00	Central Pond	CP-C52	1140-CP-C52					67							1		1					
S	09-Oct-00	Central Pond	CP-C53	1140-CP-C53					67							1		1					
S	10-Oct-00	Buried Debris Area	BD-C1	1120-BD-C1	64				67				19			8		1					
S	10-Oct-00	Buried Debris Area	BD-C2	1120-BD-C2	64				67				19			8		1					
S	10-Oct-00	Buried Debris Area	BD-C4	1120-BD-C4	64				67				19			8		1					
S	10-Oct-00	Buried Debris Area	BD-C5	1120-BD-C5	64				67				19			8		1					
S	10-Oct-00	Central Pond	CP-C54	1140-CP-C54					67							1		1					
S	10-Oct-00	Central Pond	CP-C55	1140-CP-C55					67							1		1					
S	10-Oct-00	Central Pond	CP-C56	1140-CP-C56	64				67				19			8		1					
S	10-Oct-00	Central Pond	CP-C57	1140-CP-C57					67							1		1					
S	10-Oct-00	Central Pond	CP-C58	1140-CP-C58					67							1		1					
S	10-Oct-00		AS-1	AS-1-8-10	37													1			12	22
S	10-Oct-00		AS-1	AS-1 12-13	37				67									1			12	22
S	11-Oct-00	Buried Debris Area	BD-C11	1120-BD-C11	64				67				19			8		1					

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	11-Oct-00	Buried Debris Area	BD-C12	1120-BD-C12	64				67				19			8		1					
S	11-Oct-00	Buried Debris Area	BD-C14	1120-BD-C14	64				67				19			8		1					
S	11-Oct-00	Buried Debris Area	BD-C14	1120-BD-C14-D	64				67				19			8		1					
S	11-Oct-00	Buried Debris Area	BD-C15	1120-BD-C15	64				67				19			8		1					
S	11-Oct-00	Buried Debris Area	BD-C9	1120-BD-C9	64				67				19			8		1					
S	11-Oct-00	South Ditch	SD-C11	1140-SD-C11					67							1		1					
S	11-Oct-00	South Ditch	SD-C12	1140-SD-C12					67							1		1					
S	11-Oct-00	South Ditch	SD-C3	1140-SD-C3					67							1		1					
S	11-Oct-00	South Ditch	SD-C5	1140-SD-C5					67							1		1					
S	11-Oct-00	South Ditch	SD-C8	1140-SD-C8	64				67				19			8		1					
S	11-Oct-00	South Ditch	SD-C8	1140-SD-C8-D	64				67				19			8		1					
S	11-Oct-00		AS-3	AS-3 8-10	37													1			12	22
S	11-Oct-00		AS-3	AS-3 10-12	37				67									1			12	22
S	12-Oct-00	Buried Debris Area	BD-C10	1120-BD-C10					67				19			8		1					
S	12-Oct-00	Buried Debris Area	BD-C10	1120-BD-C10	64													1					
S	12-Oct-00	Buried Debris Area	BD-C13	1120-BD-C13					67				19			8		1					
S	12-Oct-00	Buried Debris Area	BD-C13	1120-BD-C13	64													1					
S	12-Oct-00	Buried Debris Area	BD-C7	1120-BD-C7					67				19			8		1					
S	12-Oct-00	Buried Debris Area	BD-C7	1120-BD-C7	64													1					
S	12-Oct-00	South Ditch	SD-C16	1140-SD-C16					67							1		1					
S	12-Oct-00	South Ditch	SD-C17	1140-SD-C17					67							1		1					
S	12-Oct-00	South Ditch	SD-C18	1140-SD-C18					67							1		1					
S	12-Oct-00	South Ditch	SD-C20	1140-SD-C20					67							1		1					
S	12-Oct-00	South Ditch	SD-C21	1140-SD-C21					67							1		1					
S	12-Oct-00	South Ditch	SD-C22	1140-SD-C22					67							1		1					
S	12-Oct-00	South Ditch	SD-C23	1140-SD-C23					67							1		1					
S	12-Oct-00		AS-2	AS-2-15														1					22
S	12-Oct-00		AS-7	AS-7-8-10	37													1			12	22
S	12-Oct-00		AS-7	AS-7-10-12	37				67									1			12	22
S	13-Oct-00	On-Property West Ditch	WD-C16	1140-WD-C16	64				67				19			8		1					
S	13-Oct-00		AS-5	AS-5-10	37													1			12	22
S	16-Oct-00		AS-4	AS-4-8	37													1			12	22
S	16-Oct-00		AS-8	AS-8-15														1					22
S	17-Oct-00		AS-9	AS-9 S-2 7	37													1			12	22
S	17-Oct-00		AS-9	AS-9 S-2D 7	37													1			12	22
S	17-Oct-00	Plant B	SVE-6B	SVE-6B S2 8	37													1			12	22
S	17-Oct-00	Plant B	SVE-6B	SVE-6B S2DUP 8	37													1			12	22
S	17-Oct-00	Plant B	SVE-6B	SVE-6B S3 10	37													1			12	22

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Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Olin Chemical Superfund Site
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Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	18-Oct-00	South Ditch	SD-C24	1140-SD-C24					67							1		1				
S	20-Oct-00	Central Pond	CP-C59	1140-CP-C59					67							1		1				
S	20-Oct-00	Central Pond	CP-C60	1140-CP-C60	64				67				19			8		1				
S	20-Oct-00	Central Pond	CP-C61	1140-CP-C61					67							1		1				
S	20-Oct-00	Central Pond	CP-C62	1140-CP-C62					67							1		1				
S	20-Oct-00	Central Pond	CP-C64	1140-CP-C64					67							1		1				
S	20-Oct-00	Central Pond	CP-C65	1140-CP-C65	64				67				19			8		1				
S	20-Oct-00	Central Pond	CP-C66	1140-CP-C66					67							1		1				
S	20-Oct-00	Central Pond	CP-C67	1140-CP-C67					67							1		1				
S	20-Oct-00	Central Pond	CP-C68	1140-CP-C68					67							1		1				
S	20-Oct-00	Central Pond	CP-C69	1140-CP-C69	64				67				19			8		1				
S	20-Oct-00	Central Pond	CP-C70	1140-CP-C70					67							1		1				
S	25-Oct-00		B-10	B-10 S-2	37													2			12	22
S	25-Oct-00	Plant B	SVE-11	SVE-11 S2 7-9	37													1			12	22
S	27-Oct-00	Buried Debris Area	BD-C18	1120-BD-C18	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C19	1120-BD-C19	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C20	1120-BD-C20	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C25	1120-BD-C25	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C30	1120-BD-C30	64				67				19			8		1				
S	27-Oct-00	Buried Debris Area	BD-C34	1120-BD-C34	64				67				19			8		1				
S	01-Nov-00		B-10	TP-1, 6-9`	37				67									1			12	22
S	01-Nov-00		B-10	TP-1 5-1 9.5	37				67									1			12	22
S	01-Nov-00		B-10	TP-1 S-1DUP 9.5	37				67									1			12	22
S	02-Nov-00	Central Pond	CP-C71	1140-CP-C71												1		1				
S	02-Nov-00	Central Pond	CP-C72	1140-CP-C72												1		1				
S	02-Nov-00	Central Pond	CP-C73	1140-CP-C73												1		1				
S	02-Nov-00	Central Pond	CP-C74	1140-CP-C74												1		1				
S	02-Nov-00	South Ditch	SD-C25	1140-SD-C25					67							1		1				
S	02-Nov-00	South Ditch	SD-C26	1140-SD-C26					67							1		1				
S	02-Nov-00	South Ditch	SD-C27	1140-SD-C27	64				67				19			8		1				
S	02-Nov-00	South Ditch	SD-C28	1140-SD-C28					67							1		1				
S	02-Nov-00	South Ditch	SD-C28	1140-SD-C28-D					67							1		1				
S	02-Nov-00	South Ditch	SD-C29	1140-SD-C29					67							1		1				
S	02-Nov-00	South Ditch	SD-C30	1140-SD-C30					67							1		1				
S	02-Nov-00	South Ditch	SD-C32	1140-SD-C32					67							1		1				
S	03-Nov-00	South Ditch	SD-C39	1140-SD-C39					67							1		1				
S	03-Nov-00	South Ditch	SD-C40	1140-SD-C40					67							1		1				
S	03-Nov-00	South Ditch	SD-C41	1140-SD-C41					67							1		1				

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	03-Nov-00	South Ditch	SD-C43	1140-SD-C43					67						1		1					
S	09-Nov-00	C-RAM Hotspot	A8CW-1-B	1160-A8CW-1-B					67				19			3		1				
S	09-Nov-00	C-RAM Hotspot	RSO-06-B	1160-RS0-06-B	1				66				19			3		1				
S	09-Nov-00	C-RAM Hotspot	RSO-06-E	1160-RS0-06-E					67				19			3		1				
S	09-Nov-00	C-RAM Hotspot	RSO-06-N	1160-RS0-06-N					67				19			3		1				
S	09-Nov-00	C-RAM Hotspot	RSO-06-S	1160-RS0-06-S					67				19			3		1				
S	09-Nov-00	C-RAM Hotspot	RSO-06-W	1160-RS0-06-W					67				19			3		1				
S	14-Nov-00	Plant B	SVE-12	SVE 12-6-8	37				67									2				22
S	14-Nov-00	Plant B	SVE-13	SVE 13-9	37				67									2				22
S	15-Nov-00	Plant B	SVE-14	SVE 14-8-9	37				67									2			12	22
S	15-Nov-00	Plant B	SVE-15	SVE 15-9-9.5	37				67									2			12	22
S	15-Nov-00	Plant B	SVE-16	SVE 16-8	37				67									2			12	22
S	17-Nov-00	Lake Poly	LAKE POLY 1-B	1160-LAKE POLY 1-B	64				67				19			3		1				
S	18-Nov-00	Central Pond	CP-C75	1140-CP-C75												1		1				
S	18-Nov-00	Central Pond	CP-C76	1140-CP-C76												1		1				
S	01-Dec-00	Central Pond	CP-C77	1160-CP-C77												1		1				
S	16-Feb-01		SV-460	SV-460 MS/MSD	63				67									2				
S	08-May-01	Lake Poly	LAKEPOLY1-01	1160-LAKEPOLY1-01	64													1				
S	08-May-01	Lake Poly	LAKEPOLY1-01	1160-LAKEPOLY1-01					66							3		2				
S	08-May-01	Lake Poly	LAKEPOLY1-02	1160-LAKEPOLY1-02	64													1				
S	08-May-01	Lake Poly	LAKEPOLY1-02	1160-LAKEPOLY1-02					66							3		2				
S	09-May-01	Central Pond	CP-C80	1140-CP-C80	64				66							7		1				
S	09-May-01	Central Pond	CP-C81	1140-CP-C81					66							1		1				
S	09-May-01	Central Pond	CP-C82	1140-CP-C82					66							1		1				
S	10-May-01	Central Pond	CP-C86	1140-CP-C86					67							1		1				
S	10-May-01	Central Pond	CP-C87	1140-CP-C87	64				67							7		1				
S	10-May-01	Central Pond	CP-C88	1140-CP-C88					67							1		1				
S	10-May-01	Central Pond	CP-C91	1140-CP-C91					67							1		1				
S	10-May-01	Central Pond	CP-C92	1140-CP-C92					67							1		1				
S	14-May-01	South Ditch	SD-C44S	1140-SD-C44S					67							1		1				
S	14-May-01	South Ditch	SD-C45N	1140-SD-C45N					67							1		1				
S	14-May-01	South Ditch	SD-C47N	1140-SD-C47N					67							1		1				
S	14-May-01	South Ditch	SD-C47S	1140-SD-C47S					67							1		1				
S	16-May-01	On-Property West Ditch Wetland	WDW-C33	1140-WDW-C33												1		1				
S	17-May-01	Central Pond	CP-C79B	1140-CP-C79B												1		1				
S	19-May-01	Buried Debris Area	BD-C50	1140-BD-C50					67									1				
S	19-May-01	Buried Debris Area	BD-C50	1140-BD-C50	64																	
S	19-May-01	Buried Debris Area	BD-C50	1140-BD-C50												1						

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Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	19-May-01	Buried Debris Area	BD-C52	1140-BD-C52					67								1					
S	19-May-01	Buried Debris Area	BD-C52	1140-BD-C52	64																	
S	19-May-01	Buried Debris Area	BD-C52	1140-BD-C52											1							
S	19-May-01	Buried Debris Area	BD-C53	1140-BD-C53					67								1					
S	19-May-01	Buried Debris Area	BD-C53	1140-BD-C53	64																	
S	19-May-01	Buried Debris Area	BD-C53	1140-BD-C53											1							
S	19-May-01	Buried Debris Area	BD-C54	1140-BD-C54					67								1					
S	19-May-01	Buried Debris Area	BD-C54	1140-BD-C54	64																	
S	19-May-01	Buried Debris Area	BD-C54	1140-BD-C54											1							
S	19-May-01	Buried Debris Area	BD-C55	1140-BD-C55					67								1					
S	19-May-01	Buried Debris Area	BD-C55	1140-BD-C55D					67								1					
S	19-May-01	Buried Debris Area	BD-C55	1140-BD-C55	64																	
S	19-May-01	Buried Debris Area	BD-C55	1140-BD-C55											1							
S	19-May-01	Buried Debris Area	BD-C55	1140-BD-C55D	64																	
S	19-May-01	Buried Debris Area	BD-C55	1140-BD-C55D											1							
S	21-May-01	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35					67								1					
S	21-May-01	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35	64																	
S	21-May-01	On-Property West Ditch Wetland	WDW-C35	1140-WDW-C35											1							
S	09-Jul-01	Lake Poly	LPB11	1160-LPB11-S3											1		1					
S	09-Jul-01	Lake Poly	LPB13	1160-LPB13-S2											1		1					
S	09-Jul-01	Lake Poly	LPB13	1160-LPB13-S3											1		1					
S	09-Jul-01	Lake Poly	LPB17	1160-LPB17-S2											1		1					
S	09-Jul-01	Lake Poly	LPB19	1160-LPB19-S2											1		1					
S	09-Jul-01	Lake Poly	LPB19	1160-LPB19-S3											1		1					
S	09-Jul-01	Lake Poly	LPB3	1160-LPB3-S2											1		1					
S	09-Jul-01	Lake Poly	LPB3	1160-LPB3-S3											1		1					
S	09-Jul-01	Lake Poly	LPB9	1160-LPB9-S2											1		1					
S	09-Jul-01	Lake Poly	LPB9	1160-LPB9-S3											1		1					
S	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S2											1		2					
S	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S2					67				19	7		7		7					22
S	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S2	64																12	
S	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S2												1						
S	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S2-D					67				19			3		2					22
S	10-Jul-01	Lake Poly	LPB10	1160-LPB10-S3											1			1					
S	10-Jul-01	Lake Poly	LPB12	1160-LPB12-S3											1			1					
S	10-Jul-01	Lake Poly	LPB12	1160-LPB12-S3									19	7		7		7					22
S	10-Jul-01	Lake Poly	LPB12	1160-LPB12-S3	64																12	
S	10-Jul-01	Lake Poly	LPB12	1160-LPB12-S3												1						

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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S	10-Jul-01	Lake Poly	LPB15	1160-LPB15-S2											1		1					
S	10-Jul-01	Lake Poly	LPB15	1160-LPB15-S3											1		1					
S	10-Jul-01	Lake Poly	LPB15	1160-LPB15-S3					67				19	7		7		7					22
S	10-Jul-01	Lake Poly	LPB15	1160-LPB15-S3	64																	12	
S	10-Jul-01	Lake Poly	LPB15	1160-LPB15-S3												1							
S	10-Jul-01	Lake Poly	LPB16	1160-LPB16-S2											1		1						
S	10-Jul-01	Lake Poly	LPB16	1160-LPB16-S2					67				19	7		7		7					22
S	10-Jul-01	Lake Poly	LPB16	1160-LPB16-S2	64																	12	
S	10-Jul-01	Lake Poly	LPB16	1160-LPB16-S2												1							
S	10-Jul-01	Lake Poly	LPB18	1160-LPB18-S2											1		1						
S	10-Jul-01	Lake Poly	LPB18	1160-LPB18-S2												1							
S	10-Jul-01	Lake Poly	LPB18	1160-LPB18-S3											1		1						
S	10-Jul-01	Lake Poly	LPB4	1160-LPB4-S3											1		1						
S	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S2											1		1						
S	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S2					67				19	7		7		7					22
S	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S2	64																	12	
S	10-Jul-01	Lake Poly	LPB5	1160-LPB5-S2												1							
S	10-Jul-01	Lake Poly	LPB7	1160-LPB7-S2											1		1						
S	10-Jul-01	Lake Poly	LPB7	1160-LPB7-S2													2						
S	10-Jul-01	Lake Poly	LPB7	1160-LPB7-S2	64																	12	
S	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S2											1		2						
S	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S2					67				19	7		7		7					22
S	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S2	64																	12	
S	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S2												1							
S	10-Jul-01	Lake Poly	LPB8	1160-LPB8-S3											1		1						
S	11-Jul-01	Lake Poly	LPB1	1160-LPB1-S2											1		1						
S	11-Jul-01	Lake Poly	LPB12	1160-LPB12-S3 RX (178578)					67								1						
S	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S2											1		1						
S	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S2					67				19			3		2					22
S	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S2														2					
S	11-Jul-01	Lake Poly	LPB14	1160-LPB14-S2	64																	12	
S	11-Jul-01	Lake Poly	LPB2	1160-LPB2-S2											1		1						
S	11-Jul-01	Lake Poly	LPB22	1160-LPB22-S2											1		1						
S	11-Jul-01	Lake Poly	LPB23	1160-LPB23-S2											1		1						
S	11-Jul-01	Lake Poly	LPB24	1160-LPB24-S2											1		1						
S	11-Jul-01	Lake Poly	LPB24	1160-LPB24-S3											1		1						
S	11-Jul-01	Lake Poly	LPB25	1160-LPB25-S2											1		2						
S	11-Jul-01	Lake Poly	LPB25	1160-LPB25-S3											1		1						

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	11-Jul-01	Lake Poly	LPB26	1160-LPB26-S2											1		1					
S	11-Jul-01	Lake Poly	LPB26	1160-LPB26-S3											1		1					
S	11-Jul-01	Lake Poly	LPB27	1160-LPB27-S2											1		1					
S	11-Jul-01	Lake Poly	LPB27	1160-LPB27-S3											1		1					
S	11-Jul-01	Lake Poly	LPB28	1160-LPB 28-S2											1		1					
S	11-Jul-01	Lake Poly	LPB28	1160-LPB28-S2					67				19		3		2					22
S	11-Jul-01	Lake Poly	LPB28	1160-LPB28-S2													2					
S	11-Jul-01	Lake Poly	LPB28	1160-LPB28-S2	64																12	
S	11-Jul-01	Lake Poly	LPB28	1160-LPB 28-S3											1		1					
S	11-Jul-01	Lake Poly	LPB7	1160-LPB7-S2					67				19		3		2					22
S	12-Jul-01	Lake Poly	LPB29	1160-LPB 29-S3											1		1					
S	12-Jul-01	Lake Poly	LPB30	1160-LPB 30-S3											1		1					
S	12-Jul-01	Lake Poly	LPB31	1160-LPB 31-S2											1		1					
S	12-Jul-01	Lake Poly	LPB32	1160-LPB 32-S2											1		1					
S	12-Jul-01	Lake Poly	LPB33	1160-LPB 33-S2											1		1					
S	12-Jul-01	Lake Poly	LPB33	1160-LPB33-S2												1						
S	12-Jul-01	Lake Poly	LPB33	1160-LPB 33-S3											1		1					
S	12-Jul-01	Lake Poly	LPB34	1160-LPB 34-S2											1		1					
S	27-Aug-03	Central Pond	CP-EX1	1170-CPEX1-BOT											8		1					22
S	27-Aug-03	Central Pond	CP-EX2	1170-CPEX2-BOT											8		1					22
S	27-Aug-03	Central Pond	CP-EX3	1170-CPEX3-BOT											8		1					22
S	28-Aug-03	Central Pond	CP-EX1	1170-CPEX1-SIDE123											8		1					22
S	28-Aug-03	Central Pond	CP-EX1	1170-CPEX1-SIDE4											8		1					22
S	28-Aug-03	Central Pond	CP-EX2	1170-CPEX2-SIDE4											8		1					22
S	28-Aug-03	Central Pond	CP-EX3	1170-CPEX3-SIDE123											8		1					22
S	28-Aug-03	Central Pond	CP-EX3	1170-CPEX3-SIDE4											8		1					22
S	10-Oct-03	Central Pond	CP-EX2	1170-CPEX2-Side1													1					22
S	10-Oct-03	Central Pond	CP-EX2	1170-CPEX2-Side2													1					22
S	10-Oct-03	Central Pond	CP-EX2	1170-CPEX2-Side3													1					22
S	10-Dec-03	Lake Poly	LPB-40	LPB-40-VI			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-40	LPB-40-BLW			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-41	LPB-41-BLW			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-42	LPB-42-VI			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-42	LPB-42-BLW			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-43	LPB-43-VI			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-43	LPB-43-BLW			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-48	LPB-48-OVR			2	3			1						1					
S	10-Dec-03	Lake Poly	LPB-48	LPB-48-VI			2	3			1						1					

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	10-Dec-03	Lake Poly	LPB-48	LPB-48-BLW			2	3			1							1				
S	10-Dec-03	Lake Poly	LPB-50	LPB-50-OVR			2	3			1							1				
S	10-Dec-03	Lake Poly	LPB-50	LPB-50-VI			2	3			1							1				
S	10-Dec-03	Lake Poly	LPB-50	LPB-50-BLW			2	3			1							1				
S	29-Jan-04	51 Eames Street	ECS-1	ECS-1														1			12	
S	29-Jan-04	51 Eames Street	ECS-2	ECS-2														1			12	
S	29-Jan-04	51 Eames Street	ECS-3	ECS-3														1			12	
S	29-Jan-04	51 Eames Street	ECS-5a	ECS-5														1			12	
S	30-Jan-04	51 Eames Street	ECS-4	ECS-4														1			12	
S	30-Jan-04	51 Eames Street	ECS-6	ECS-6														1			12	
S	30-Jan-04	51 Eames Street	ECS-8	ECS-8														1			12	
S	30-Jan-04	51 Eames Street	ECS-C-1	ECS-C-1					74		1			9		8		6				21
S	30-Jan-04	51 Eames Street	ECS-C-2	ECS-C-2					72		1		2	9		8		6				21
S	08-Mar-04		PLD-1	PLD1-5-8			2	3			1							1				
S	08-Mar-04		PLD-2	PLD2-5-8			2	3			1							1				
S	08-Mar-04		PLD-3	PLD3-5-8			2	3			1							1				
S	09-Mar-04		WSS-2	WSS2-2-4			2	3			1							1				
S	09-Mar-04	51 Eames Street	GW-301	WSS1-2-4 (GW-301)			2	3			1							1				
S	09-Mar-04	51 Eames Street	GW-302	WSS3-2-4 (GW-302)			2	3			1							1				
S	10-Mar-04	51 Eames Street	GW-303	WSL1-6-10 (GW-303)			2				1							1				
S	10-Mar-04	51 Eames Street	GW-303	WSL1-6-10 DUP (GW-303)			2				1							1				
S	10-Mar-04	51 Eames Street	GW-304	WSL2-5-9 MS/MSD (GW-304)			2				1							1				
S	11-Mar-04	51 Eames Street	GW-305	WSL3-5-9 (GW-305)			2				1							1				
S	21-Apr-04	Biocell	BIOCELL	1140-BP-DS1				3	68		1							1		1		
S	21-Apr-04	Biocell	BIOCELL	1140-BP-DS2				3	68		1							1		1		
S	21-Apr-04	Biocell	BIOCELL	1140-BP-DS3				3	68		1							1		1		
S	21-Apr-04	Biocell	BIOCELL	1140-BP-DS4				3	68		1							1		1		
S	21-Apr-04	Biocell	BIOCELL	1140-BP-DS5				3	68		1							1		1		
S	09-Jun-04	Lake Poly	LP-BOT-A	LP-BOT-A												1		2				
S	09-Jun-04	Lake Poly	LP-BOT-B	LP-BOT-B												1		2				
S	09-Jun-04	Lake Poly	LP-BOT-C	LP-BOT-C												1		2				
S	09-Jun-04	Lake Poly	LP-C02	LP-C02												1		2				
S	09-Jun-04	Lake Poly	LP-C03	LP-C03												1		2				
S	09-Jun-04	Lake Poly	LP-C04	LP-C04												1		2				
S	09-Jun-04	Lake Poly	LP-C05	LP-C05												1		2				
S	09-Jun-04	Lake Poly	LP-C06	LP-C06												1		2				
S	09-Jun-04	Lake Poly	LP-C07	LP-C07												1		2				
S	09-Jun-04	Lake Poly	LP-C07	LP-C07D												1		2				

Table 4.1-3
Subsurface and Surface Soil Samples Representative of Current Conditions at OU1

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Wilmington, MA

Matrix	Date Sampled	Area	Location	Chain of Custody Sample ID	Volatiles	TCLP Volatiles	Acetaldehyde/Formaldehyde	Hydrazine/MMH/UDMH	Semivolatiles	TCLP Semi-volatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	TCLP Metals	Inorganics/Physical	Field	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
S	09-Jun-04	Lake Poly	LP-C08	LP-C08												1		2				
S	15-Jun-04	Lake Poly	LP-C09	LP-C09												1		2				
S	16-Jul-04	Plant B	SVEMW-9	SVESB-9-10-12	2													1			14	
S	16-Jul-04	Plant B	SVESB-1	SVESB1-8-10	2													1			14	
S	16-Jul-04	Plant B	SVESB-2	SVESB2-6-8	2													1			14	
S	16-Jul-04	Plant B	SVESB-3	SVESB-3-6-8	2													1			14	
S	16-Jul-04	Plant B	SVESB-4	SVESB4-4-6.5	2													1			14	
S	16-Jul-04	Plant B	SVESB-5	SVESB-5-6-8	2													1			14	
S	16-Jul-04	Plant B	SVESB-5	SVESB-5-8-11	2													1			14	
S	16-Jul-04	Plant B	SVESB-6	SVESB-6-8-10	2													1			14	
S	16-Jul-04	Plant B	SVESB-7	SVESB7-8-10	2													1			14	
S	16-Jul-04	Plant B	SVESB-8	SVESB-8-8-10	2													1			14	
S	19-May-05	Biocell	BIOCELL	1140-BP-DS1-02				3	68		1							2		1		
S	19-May-05	Biocell	BIOCELL	1140-BP-DS2-02				3	68		1							2		1		
S	19-May-05	Biocell	BIOCELL	1140-BP-DS3-02				3	68		1							2		1		
S	19-May-05	Biocell	BIOCELL	1140-BP-DS4-02				3	68		1							2		1		
S	19-May-05	Biocell	BIOCELL	1140-BP-DS5-02				3	68		1							2		1		

SS=Surface Soil
S = Subsurface Soil

Prepared/Date: MJM 08/06/07
Checked/Date: MH 08/06/07

Table 4.1-4
Summary of Analytical Data for
Surface Soil - OU1 Current Conditions

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										1997 Smith Report Background			MADEP Background		Region IX PRG (10/2004)			
Parameter Name	Frequency of Detection			Percent Detected	Range of Non Detect Concentrations			Range of Detected Concentrations		Average of All Samples	Min	Max	Median	1995	2002	Residential Soil (mg/kg)		Industrial Soil (mg/kg)	
Volatile Organics (mg/Kg)																			
1,1,1-Trichloroethane (TCA)	9	/	119	7.6%	0.005	:	1	0.003	- 0.087	6.32E-02						1.20E+03	sat	1.20E+03	sat
1,1-Dichloroethane	1	/	119	0.8%	0.005	:	1	0.001	- 0.001	6.19E-02						5.10E+02	nc	1.70E+03	nc
1,2,3-Trichlorobenzene	3	/	74	4.1%	0.009	:	1	0.15	- **0.24**	1.04E-01									
1,2,4-Trichlorobenzene	5	/	74	6.8%	0.009	:	1	0.071	- 1.2	1.34E-01						6.20E+01	nc	2.20E+02	nc
1,2,4-Trimethylbenzene	7	/	74	9.5%	0.009	:	1	0.025	- 4.6	2.60E-01						5.20E+01	nc	1.70E+02	nc
1,2-Dichloroethane	1	/	119	0.8%	0.005	:	1	0.001	- 0.001	6.19E-02						2.80E-01	ca*	6.00E-01	ca*
1,3,5-Trimethylbenzene	6	/	74	8.1%	0.009	:	1	0.085	- 2.9	2.04E-01						2.10E+01	nc	7.00E+01	nc
1,4-Dichlorobenzene	1	/	74	1.4%	0.009	:	1	0.054	- 0.054	9.80E-02						3.40E+00	ca	7.90E+00	ca
2,4,4-Trimethyl-1-pentene	5	/	105	4.8%	0.005	:	0.79	0.002	- **12**	1.79E-01									
2,4,4-Trimethyl-2-Pentene	3	/	105	2.9%	0.005	:	0.79	0.023	- **3.4**	8.79E-02									
2-Butanone (MEK)	1	/	119	0.8%	0.01	:	20	0.004	- 0.004	1.19E+00						2.20E+04	nc	1.10E+05	nc
Acetone	7	/	119	5.9%	0.006	:	20	0.011	- 0.056	1.19E+00						1.40E+04	nc	5.40E+04	nc
Benzene	1	/	119	0.8%	0.005	:	1	0.001	- 0.001	6.19E-02						6.40E-01	ca*	1.40E+00	ca*
Ethylbenzene	3	/	119	2.5%	0.005	:	1	0.069	- 0.16	6.41E-02						4.00E+02	sat	4.00E+02	sat
Formaldehyde	3	/	8	37.5%	0.11	:	0.13	0.14	- 0.25	1.05E-01						9.20E+03	nc	1.00E+05	nc
Hydrazine	1	/	8	12.5%	0.28	:	0.35	0.42	- 0.42	1.83E-01						1.60E-01	ca	5.70E-01	ca
Isopropyl Benzene	3	/	74	4.1%	0.009	:	1	0.39	- 0.65	1.17E-01						5.70E+02	nc	2.00E+03	nc
m,p-Xylene	4	/	74	5.4%	0.009	:	1	0.011	- 0.35	1.08E-01						2.70E+02	nc	4.20E+02	sat
Methylene Chloride	25	/	119	21.0%	0.004	:	2	0.002	- 0.88	1.42E-01						9.10E+00	ca	2.10E+01	ca
Naphthalene	2	/	68	2.9%	0.086	:	10	0.051	- 0.62	7.95E-01						5.60E+01	nc	1.90E+02	nc
n-Propyl Benzene	3	/	74	4.1%	0.009	:	1	0.34	- 0.59	1.17E-01						2.40E+02	sat	2.40E+02	sat
o-Xylene	4	/	74	5.4%	0.009	:	1	0.042	- 0.53	1.14E-01						2.70E+02	nc	4.20E+02	sat
p-Isopropyl Toluene	3	/	74	4.1%	0.009	:	1	0.12	- **0.37**	1.05E-01									
s-Butylbenzene	3	/	74	4.1%	0.009	:	1	0.14	- **0.21**	1.03E-01									
Styrene	4	/	119	3.4%	0.005	:	1	0.001	- 0.43	6.92E-02						1.70E+03	sat	1.70E+03	sat
Tetrachloroethene (PCE)	4	/	119	3.4%	0.005	:	1	0.001	- 0.015	6.19E-02						4.80E-01	ca*	1.30E+00	ca
Toluene	10	/	119	8.4%	0.005	:	1	0.0009	- 0.094	6.29E-02						5.20E+02	sat	5.20E+02	sat
Trichloroethene (TCE)	1	/	119	0.8%	0.005	:	1	0.007	- 0.007	6.19E-02						5.30E-02	ca	1.10E-01	ca
Xylenes, Total	1	/	45	2.2%	0.005	:	0.016	0.002	- 0.002	3.26E-03						2.70E+02	nc	4.20E+02	sat
Semivolatile Organics (mg/Kg)																			
1,2,4-Trichlorobenzene	2	/	144	1.4%	0.2651	:	110	0.27	- 0.9	1.89E+00						6.20E+01	nc	2.20E+02	nc
2-Methylnaphthalene	3	/	144	2.1%	0.2651	:	110	0.007	- 0.075	1.87E+00						5.60E+01	nc	1.90E+02	nc
2-Methylphenol (o-Cresol)	1	/	150	0.7%	0.2651	:	110	0.02	- 0.02	2.07E+00						3.10E+03	nc	3.10E+04	nc
Acenaphthylene	6	/	138	4.3%	0.2651	:	110	0.008	- 0.057	1.93E+00						2.30E+03	nc	2.90E+04	nc
Anthracene	7	/	138	5.1%	0.2651	:	110	0.005	- 0.069	1.92E+00						2.20E+04	nc	1.00E+05	max
Benzo(a)anthracene	13	/	138	9.4%	0.2651	:	110	0.008	- 0.36	1.92E+00						6.20E-01	ca	2.10E+00	ca
Benzo(a)pyrene	11	/	138	8.0%	0.2651	:	110	0.011	- **0.24**	1.93E+00						6.20E-02	ca	2.10E-01	ca
Benzo(b)fluoranthene	14	/	138	10.1%	0.2651	:	110	0.013	- 0.56	1.93E+00	0.058	0.062	0.06		2	6.20E-01	ca	2.10E+00	ca
Benzo(g,h,i)perylene	5	/	138	3.6%	0.2651	:	110	0.029	- 0.12	1.93E+00						2.30E+03	nc	2.90E+04	nc
Benzo(k)fluoranthene	12	/	138	8.7%	0.2651	:	110	0.012	- 0.17	1.92E+00						6.20E+00	ca	2.10E+01	ca
Benzoic Acid	16	/	148	10.8%	0.5302	:	530	0.07	- 2.1	1.04E+01						1.00E+05	max	1.00E+05	max
bis(2-EthylHexyl)phthalate	115	/	150	76.7%	0.2651	:	0.98	0.066	- **903**	2.73E+01						3.50E+01	ca*	1.20E+02	ca
Butylbenzylphthalate	4	/	150	2.7%	0.2651	:	110	0.029	- 0.13	2.07E+00						1.20E+04	nc	1.00E+05	max
Chrysene	14	/	138	10.1%	0.2651	:	110	0.015	- 0.64	1.93E+00						6.20E+01	ca	2.10E+02	ca
Dibenzo(a,h)anthracene	1	/	138	0.7%	0.2651	:	110	0.074	- 0.074	1.94E+00						6.20E-02	ca	2.10E-01	ca
Dibenzofuran	1	/	150	0.7%	0.2651	:	110	0.016	- 0.016	2.07E+00						1.50E+02	nc	1.60E+03	nc
Diethylphthalate	9	/	150	6.0%	0.021	:	110	0.013	- 0.085	2.04E+00						4.90E+04	nc	1.00E+05	max
Dimethylphthalate	1	/	150	0.7%	0.2651	:	110	0.064	- 0.064	2.07E+00						1.00E+05	max	1.00E+05	max
Di-n-butylphthalate	28	/	150	18.7%	0.04	:	55	0.009	- 70	2.07E+00						6.10E+03	nc	6.20E+04	nc
Di-n-octylphthalate	3	/	149	2.0%	0.2651	:	110	0.012	- 0.053	2.08E+00						2.40E+03	nc	2.50E+04	nc
Fluoranthene	17	/	138	12.3%	0.2651	:	110	0.011	- 0.94	1.91E+00	0.047	0.066	0.057		4	2.30E+03	nc	2.20E+04	nc
Fluorene	2	/	138	1.4%	0.2651	:	110	0.008	- 0.02	1.94E+00						2.70E+03	nc	2.60E+04	nc
Indeno (1,2,3-cd) pyrene	8	/	138	5.8%	0.2651	:	110	0.031	- 0.2	1.93E+00						6.20E-01	ca	2.10E+00	ca
Naphthalene	5	/	138	3.6%	0.2651	:	110	0.008	- 0.26	1.94E+00						5.60E+01	nc	1.90E+02	nc

Table 4.1-4
Summary of Analytical Data for
Surface Soil - OU1 Current Conditions

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

										1997 Smith Report Background			MADEP Background		Region IX PRG (10/2004)			
Parameter Name	Frequency of Detection	Percent Detected	Range of Non Detect Concentrations			Range of Detected Concentrations			Average of All Samples	Min	Max	Median	1995	2002	Residential Soil (mg/kg)		Industrial Soil (mg/kg)	
N-Nitrosodiphenylamine	20 / 150	13.3%	0.2651	:	110	0.059	-	28	2.04E+00						9.90E+01	ca*	3.50E+02	ca*
Phenanthrene	15 / 138	10.9%	0.2651	:	110	0.012	-	0.68	1.91E+00	0.043	0.043	0.043		3	2.30E+03	nc	2.90E+04	nc
Phenol	3 / 150	2.0%	0.2651	:	110	0.047	-	0.32	2.07E+00						1.80E+04	nc	1.00E+05	max
Pyrene	17 / 137	12.4%	0.2651	:	110	0.013	-	0.66	1.92E+00	0.047	0.065	0.056		4	2.30E+03	nc	2.90E+04	nc
Polyaromatic Hydrocarbons (mg/Kg)																		
Acenaphthylene	3 / 6	50.0%	0.97	:	1.2	0.65	-	3.9	1.41E+00						2.30E+03	nc	2.90E+04	nc
Anthracene	5 / 6	83.3%	0.05	:	0.05	0.045	-	0.073	5.13E-02						2.20E+04	nc	1.00E+05	max
Benzo(a)anthracene	6 / 6	100.0%		:		0.32	-	**2.3**	8.12E-01						6.20E-01	ca	2.10E+00	ca
Benzo(a)pyrene	6 / 6	100.0%		:		0.31	-	**0.71**	4.68E-01						6.20E-02	ca	2.10E-01	ca
Benzo(b)fluoranthene	6 / 6	100.0%		:		0.49	-	1.2	6.77E-01	0.058	0.062	0.06		2	6.20E-01	ca	2.10E+00	ca
Benzo(g,h,i)perylene	6 / 6	100.0%		:		0.36	-	0.79	5.10E-01						2.30E+03	nc	2.90E+04	nc
Benzo(k)fluoranthene	6 / 6	100.0%		:		0.23	-	0.34	2.70E-01						6.20E+00	ca	2.10E+01	ca
Chrysene	6 / 6	100.0%		:		0.54	-	0.97	6.83E-01						6.20E+01	ca	2.10E+02	ca
Dibenzo(a,h)anthracene	2 / 6	33.3%	0.3	:	0.49	0.066	-	0.14	1.59E-01						6.20E-02	ca	2.10E-01	ca
Fluoranthene	6 / 6	100.0%		:		1.2	-	2	1.52E+00	0.047	0.066	0.057		4	2.30E+03	nc	2.20E+04	nc
Indeno (1,2,3-cd) pyrene	5 / 6	83.3%	0.12	:	0.12	0.33	-	0.8	3.95E-01						6.20E-01	ca	2.10E+00	ca
Phenanthrene	6 / 6	100.0%		:		0.41	-	0.69	5.43E-01	0.043	0.043	0.043		3	2.30E+03	nc	2.90E+04	nc
Pyrene	6 / 6	100.0%		:		0.73	-	1.5	1.06E+00	0.047	0.065	0.056		4	2.30E+03	nc	2.90E+04	nc
Pesticides/PCBs (mg/Kg)																		
4,4'-DDD	9 / 83	10.8%	0.0033	:	0.21	0.00012	-	0.16	1.62E-02						2.40E+00	ca	1.00E+01	ca
4,4'-DDE	14 / 83	16.9%	0.0033	:	0.21	0.00053	-	0.049	1.45E-02						1.70E+00	ca	7.00E+00	ca
4,4'-DDT	24 / 83	28.9%	0.0033	:	0.21	0.0014	-	0.68	2.66E-02						1.70E+00	ca*	7.00E+00	ca*
Aldrin	4 / 83	4.8%	0.0017	:	0.21	9.8E-05	-	0.003	1.30E-02						2.90E-02	ca*	1.00E-01	ca
Alpha-BHC	3 / 83	3.6%	0.0017	:	0.21	0.0002	-	0.0058	1.29E-02						9.00E-02	ca	3.60E-01	ca
Alpha-Chlordane	5 / 36	13.9%	0.0017	:	0.24	0.00034	-	0.078	2.35E-02						1.60E+00	ca*	6.50E+00	ca*
Beta-BHC	3 / 83	3.6%	0.0017	:	0.33	0.00013	-	0.32	2.15E-02						3.20E-01	ca	1.30E+00	ca
Delta-BHC	2 / 83	2.4%	0.0017	:	0.21	0.0015	-	0.031	1.34E-02						9.00E-02	ca	3.60E-01	ca
Dieldrin	8 / 83	9.6%	0.0033	:	0.68	0.00055	-	0.0025	1.80E-02						3.00E-02	ca	1.10E-01	ca
Endosulfan I	4 / 83	4.8%	0.0017	:	0.21	0.0019	-	**0.034**	1.34E-02									
Endrin	2 / 83	2.4%	0.0033	:	0.21	0.0004	-	0.0072	1.41E-02						1.80E+01	nc	1.80E+02	nc
Endrin Ketone	1 / 42	2.4%	0.0033	:	0.065	0.0014	-	**0.0014**	1.03E-02									
Gamma-BHC (Lindane)	17 / 83	20.5%	0.0017	:	0.21	0.00011	-	1.6	6.00E-02						4.40E-01	ca*	1.70E+00	ca
Gamma-Chlordane	7 / 36	19.4%	0.0017	:	0.24	0.00028	-	0.042	2.44E-02						1.60E+00	ca*	6.50E+00	ca*
Heptachlor Epoxide	2 / 83	2.4%	0.0017	:	0.21	7.8E-05	-	0.00041	1.30E-02						5.30E-02	ca*	1.90E-01	ca*
Hexachlorobenzene	1 / 6	16.7%	0.024	:	0.044	0.029	-	0.029	1.97E-02						3.00E-01	ca	1.10E+00	ca
PCB-1016	1 / 20	5.0%	0.1	:	0.24	0.98	-	0.98	1.14E-01						3.90E+00	nc	2.10E+01	ca**
Inorganics (mg/Kg)																		
Aluminum, Total	65 / 65	100.0%		:		670	-	59000	7.27E+03	6100	7900	7000	13000	**10000**	7.60E+04	nc	1.00E+05	max
Antimony, Total	1 / 46	2.2%	0.97	:	20	79	-	79	4.70E+00				1.4	**1**	3.10E+01	nc	4.10E+02	nc
Arsenic, Total	52 / 76	68.4%	0.9	:	37	1.6	-	**40**	8.06E+00	6.2	7.1	6.7	17	**20**	3.90E-01	ca*	1.60E+00	ca
Barium, Total	63 / 64	98.4%	40	:	40	4.6	-	120	2.01E+01	11	22	17	45	**50**	5.40E+03	nc	6.70E+04	nc
Beryllium, Total	19 / 46	41.3%	0.1	:	1.5	0.1	-	4	4.83E-01				0.4	**0.4**	1.50E+02	nc	1.90E+03	ca**
Cadmium, Total	14 / 116	12.1%	0.1	:	4.8	0.14	-	7.3	4.93E-01				2	**2**	3.70E+01	nc	4.50E+02	nc
Calcium, Total	45 / 46	97.8%	1000	:	1000	77.4	-	**32000**	2.75E+03	125	**2000**	620						
Chromium, Total	229 / 232	98.7%	1	:	10	1.4	-	**62000**	1.24E+03	14	16	15	29	**30**	2.10E+02	ca	4.50E+02	ca
Cobalt, Total	42 / 46	91.3%	0.24	:	10	0.42	-	45	4.75E+00	2.4	3.7	3.1	4.4	**4**	9.00E+02	ca**	1.90E+03	ca*
Copper, Total	39 / 46	84.8%	5	:	20	1.1	-	79	1.44E+01	5.1	6.4	5.8	38	**40**	3.10E+03	nc	4.10E+04	nc
Hexavalent Chromium, Total	6 / 17	35.3%	1.1	:	110	0.41	-	28	1.78E+01					30	3.00E+01	ca**	6.40E+01	ca
Iron, Total	65 / 65	100.0%		:		81	-	100000	8.37E+03	9200	12000	11000	17000	**20000**	2.30E+04	nc	1.00E+05	max
Lead, Total	105 / 116	90.5%	1	:	24	1.3	-	210	2.05E+01	11	11	10.5	99	**100**	4.00E+02	nc	8.00E+02	nc
Magnesium, Total	45 / 46	97.8%	1000	:	1000	84	-	**4100**	1.10E+03	2400	3000	2700	4900	5000				
Manganese, Total	46 / 46	100.0%		:		3.7	-	970	8.85E+01	100	150	125	300	**300**	1.80E+03	nc	1.90E+04	nc
Mercury, Total	27 / 83	32.5%	0.04	:	0.2	0.01	-	**1.5**	1.23E-01				0.3	**0.3**				
Nickel, Total	44 / 46	95.7%	5	:	8	1.5	-	67	1.02E+01	5.5	6.5	6	17	**20**	1.60E+03	nc	2.00E+04	nc
Potassium, Total	40 / 46	87.0%	1000	:	2100	46.3	-	**2300**	4.96E+02	120	**1400**	260						

Table 4.1-4
Summary of Analytical Data for
Surface Soil - OU1 Current Conditions

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

												1997 Smith Report Background				MADEP Background		Region IX PRG (10/2004)			
Parameter Name	Frequency of Detection			Percent Detected	Range of Non Detect Concentrations			Range of Detected Concentrations			Average of All Samples	Min		Max		Median		1995	2002	Residential Soil (mg/kg)		Industrial Soil (mg/kg)	
Selenium, Total	4	/	80	5.0%	0.5	:	20	0.64	-	1.6	1.41E+00							0.5	**0.5**	3.90E+02	nc	5.10E+03	nc
Sodium, Total	32	/	46	69.6%	54	:	1100	12	-	**25600**	7.40E+02	22.5		**130**		29							
Thallium, Total	4	/	46	8.7%	0.5	:	5.4	0.63	-	2.2	8.52E-01							0.6	**0.6**	5.20E+00	nc	6.70E+01	nc
Vanadium, Total	44	/	46	95.7%	1	:	10	5.3	-	54	1.70E+01	12		16		14		29	**30**	7.80E+01	nc	1.00E+03	nc
Zinc, Total	40	/	46	87.0%	0.6	:	27	4.8	-	180	3.09E+01	16		21		19		116	**100**	2.30E+04	nc	1.00E+05	max
Amenable Cyanide	1	/	6	16.7%	2	:	4.1	3.8	-	3.8	1.78E+00									1.20E+03	nc	1.20E+04	nc
Chloride	8	/	14	57.1%	40	:	40	1.03	-	**560**	7.61E+01												
Cyanide	7	/	14	50.0%	2	:	2	3.7	-	9.7	3.84E+00									1.20E+03	nc	1.20E+04	nc
Nitrogen, Ammonia	38	/	39	97.4%	8	:	8	11	-	**1800**	2.14E+02	17		**37**		26							
pH **(pH units)**	11	/	11	100.0%		:		4.58	-	**6.36**	5.47E+00												
Sulfate as SO4	24	/	27	88.9%	40	:	110	4.2	-	**108000**	6.83E+03	30		**30**	<	40							
Total Organic Carbon (TOC)	3	/	3	100.0%		:		4600	-	**10900**	8.06E+03												
VPH (mg/Kg)																							
C5-C8 Aliphatics (FID)	1	/	6	16.7%	2	:	2.4	9.8	-	**9.8**	2.58E+00												
C5-C8 Aliphatics, Unadjusted	1	/	6	16.7%	2	:	2.4	9.8	-	**9.8**	2.58E+00												
C9-C10 Aromatics (PID)	1	/	6	16.7%	2	:	2.4	15	-	**15**	3.45E+00												
C9-C12 Aliphatics (FID)	1	/	6	16.7%	2	:	2.4	13	-	**13**	3.12E+00												
C9-C12 Aliphatics, Unadjusted	1	/	6	16.7%	2	:	2.4	28	-	**28**	5.62E+00												
VPH Concentration (Total)	1	/	6	16.7%	2	:	2.4	38	-	**38**	7.28E+00												
EPH (mg/Kg)																							
Benzo(a)pyrene	4	/	15	26.7%	0.4	:	2.6	1.2	-	**3.4**	8.67E-01									6.20E-02	ca	2.10E-01	ca
Benzo(g,h,i)perylene	3	/	15	20.0%	0.4	:	2.6	2.3	-	8.4	1.25E+00									2.30E+03	nc	2.90E+04	nc
C11-C22 Aromatics (FID)	17	/	24	70.8%	3.6	:	3.7	5.7	-	**7500**	4.25E+02												
C11-C22 Aromatics, Unadjusted	17	/	24	70.8%	3.6	:	3.7	5.7	-	**7500**	4.26E+02												
C19-C36 Aliphatics (PID)	15	/	24	62.5%	3.6	:	3.8	5.9	-	**4900**	3.27E+02												
C9-C18 Aliphatics (FID)	8	/	24	33.3%	3.4	:	3.8	6.7	-	**780**	5.14E+01												
EPH Concentration (Total)	17	/	24	70.8%	3.6	:	3.7	5.7	-	**13000**	7.91E+02												
Fluoranthene	1	/	15	6.7%	0.4	:	2.2	2.6	-	2.6	5.13E-01	0.047		0.066		0.057			4	2.30E+03	nc	2.20E+04	nc
Indeno (1,2,3-cd) pyrene	1	/	15	6.7%	0.4	:	2.2	13	-	**13**	1.21E+00									6.20E-01	ca	2.10E+00	ca

mg/Kg = milligrams per kilogram
MADEP = Massachusetts Department of Environmnetal Protection
PRG = Preliminary Remediation Goal
nc = non-cancer basis
ca = carcinogenic basis
1997 Smiith Report = 1997 Phase II Comprehensive Site Assessment

BOLD	in column indicating upper end of range of concentrations, maximum concentration is greater than Industrial Soil PRG or there is no PRG avaialable
BOLD	in column indicating a background concentration, maximum concentration is greater than that background concentration

Prepared/Date: KJC 8/7/07
Checked/Date: MJM 8/8/07

Table 4.1-5
Comparison of Total Chromium and Hexavalent Chromium Concentrations in Soil

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Sample Category	Date Sampled	Sample ID	Location	Matrix	Sample Depth	Chromium, Total (mg/Kg)	Hexavalent Chromium, Total (mg/Kg)
Excavated	22-Apr-93	SWMU-27	SWMU-27	SS	0-0.5 ft bgs	280	**17**
OU1	24-Nov-98	SB101XXLPX	LP-101	S	6-8 ft bgs	1270	**14.5**
OU1	24-Nov-98	SB102XXLPX	LP-102	S	6-8 ft bgs	322	**2.78**
Excavated	24-Nov-98	SS101XXLPX	LP-102	SS	0-2 ft bgs	41	**0.43**
OU1	24-Nov-98	SS102XXLPX	LP-102	SS	0-2 ft bgs	101	**1.22**
OU1	24-Nov-98	SB103XXLPX	LP-103	S	6-8 ft bgs	407	**1.76**
OU1	24-Nov-98	SS103XXLPX	LP-103	SS	0-2 ft bgs	13.5	**0.41**
Excavated	24-Nov-98	SB104XXLPX	LP-104	S	6-8 ft bgs	2610	**16.2**
Excavated	24-Nov-98	SS104XXLPX	LP-104	SS	0-2 ft bgs	27.6	**0.59**
OU1	24-Nov-98	SB105XXLPX	LP-105	S	6-8 ft bgs	9.4	**0.47**
OU1	24-Nov-98	SS105XXLPX	LP-105	SS	0-2 ft bgs	29.8	**0.42**
OU1	30-Nov-98	101B	LP-101	S	6-8 ft bgs	2130	**19.9**
Excavated	30-Nov-98	101A	LP-101	SS	0-2 ft bgs	1440	**11.1**
OU1	30-Nov-98	102B	LP-102	S	6-8 ft bgs	624	**12.7**
OU1	30-Nov-98	102A	LP-102	SS	0-2 ft bgs	117	**2.29**
Excavated	30-Nov-98	104B	LP-104	S	6-8 ft bgs	524	**5.36**
Excavated	30-Nov-98	104A	LP-104	SS	0-2 ft bgs	33.3	**0.88**
OU1	17-Sep-01	1010-SED-SDF-1S	SDF-1	SS	0-0.5 ft bgs	21000	**28**
OU1	17-Sep-01	1010-SED-SDF-2S	SDF-2	SS	0-0.5 ft bgs	12000	**26**
OU1	17-Sep-01	1010-SED-SDF-3S	SDF-3	SS	0-0.5 ft bgs	310	< 1.1
OU1	17-Sep-01	1010-SED-SDF-4S	SDF-4	SS	0-0.5 ft bgs	1700	< 1.7
OU1	17-Sep-01	1010-SED-SDF-5S	SDF-5	SS	0-0.5 ft bgs	300	< 1.7
OU1	17-Sep-01	1010-SED-SDF-6S	SDF-6	SS	0-0.5 ft bgs	400	< 2.5
North Pond	20-Nov-03	NPSB1-SED1	NPSB1	S	6-7.5 ft bgs	17.5	< 0.66
North Pond	20-Nov-03	NPSB1-Fill1	NPSB1	SS	0-2 ft bgs	18.8	< 0.54
North Pond	20-Nov-03	NPSB2-Fill1	NPSB2	S	2-3 ft bgs	50.6	< 0.57
North Pond	20-Nov-03	NPSB3-Fill1	NPSB3	S	2-4 ft bgs	53.8	< 0.54
North Pond	20-Nov-03	NPSB3-SED1	NPSB3	S	9.4-10.4 ft bgs	15.5	< 0.6
North Pond	08-Sep-04	NPSB4-Sed	NPSB4	S	5-7 ft bgs	32	< 4.9
North Pond	08-Sep-04	NPSB4-Soil	NPSB4	S	10-11.5 ft bgs	29	< 4.9
North Pond	08-Sep-04	NPSB4-Fill	NPSB4	SS	0-2 ft bgs	50	< 5.6
MMB Wetland	22-Aug-05	BS021REF-02 ( )	BS021-02	SS	0-0.5 ft bgs	11	< 86
MMB Wetland	22-Aug-05	BS021REF-03 ( )	BS021-03	SS	0-0.5 ft bgs	27	< 86
MMB Wetland	22-Aug-05	BS021REF-04 ( )	BS021-04	SS	0-0.5 ft bgs	34	< 27
OU1	22-Aug-05	BS040LSD RE	BS040	SS	0-0.5 ft bgs	5000	< 30
OU1	22-Aug-05	BS041LSD	BS041	SS	0-0.5 ft bgs	1600	< 49
OU1	22-Aug-05	BS042LSD	BS042	SS	0-0.5 ft bgs	82	< 54
OU1	22-Aug-05	BS043LSD RE	BS043	SS	0-0.5 ft bgs	240	< 80
OU1	23-Aug-05	BS044LSD	BS044	SS	0-0.5 ft bgs	580	< 63
OU1	23-Aug-05	BS045LSD	BS045	SS	0-0.5 ft bgs	1500	< 95
OU1	21-Sep-05	SOLSD-14-0-6	SOLSD14	SS	0-0.5 ft bgs	7200	< 110

Prepared/Date: MJM 08/17/07
Checked/Date: MH 09/25/07

mg/Kg = milligrams per kilogram

Table 4.1-6
Summary of Subsurface Soil Analytical Data For Current Conditions - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

									1997 Smith Report Background			MADEP Background		Region IX PRG (10/2004)			
Parameter Name	Frequency of Detection		Range of Non Detect Concentrations			Range of Detected Concentrations			Average of All Samples	Min	Max	Median	1995	2002	Residential Soil (mg/kg)		Industrial Soil (mg/kg)	
Volatile Organics (mg/Kg)																		
1,2,3-Trichlorobenzene	1	/ 97	0.005	:	1	0.44	-	**0.44**	7.09E-02									
1,2,4-Trimethylbenzene	2	/ 97	0.005	:	0.74	0.39	-	0.68	7.23E-02						5.20E+01	nc	1.70E+02	nc
1,2-Dichlorobenzene	1	/ 97	0.005	:	1	0.16	-	0.16	6.81E-02						6.00E+02	sat	6.00E+02	sat
1,2-Dichloroethane	2	/ 176	0.0007	:	1600	0.002	-	0.035	6.87E+00						2.80E-01	ca*	6.00E-01	ca*
1,3,5-Trimethylbenzene	1	/ 97	0.005	:	1	0.11	-	0.11	6.75E-02						2.10E+01	nc	7.00E+01	nc
1,4-Dichlorobenzene	1	/ 97	0.005	:	1	0.27	-	0.27	6.92E-02						3.40E+00	ca	7.90E+00	ca
2,4,4-Trimethyl-1-pentene	74	/ 157	1.3E-06	:	89	0.002	-	**750**	1.40E+01									
2,4,4-Trimethyl-2-Pentene	56	/ 157	1.3E-06	:	190	0.001	-	**140**	4.04E+00									
2-Butanone (MEK)	19	/ 176	0.0022	:	1600	0.0006	-	0.49	7.56E+00						2.20E+04	nc	1.10E+05	nc
2-Hexanone	11	/ 176	0.0022	:	1600	0.001	-	**3.8**	7.02E+00									
4-Methyl-2-Pentanone (MIBK)	3	/ 176	0.0022	:	1600	0.005	-	0.027	6.99E+00						5.30E+03	nc	4.70E+04	nc
Acetone	19	/ 176	0.0022	:	1600	0.016	-	180	7.92E+00						1.40E+04	nc	5.40E+04	nc
Benzene	5	/ 176	0.0007	:	1600	0.0005	-	0.1	6.86E+00						6.40E-01	ca*	1.40E+00	ca*
Carbon Disulfide	3	/ 102	0.0014	:	1600	0.001	-	0.013	1.18E+01						3.60E+02	nc	7.20E+02	sat
Carbon Tetrachloride	1	/ 176	0.0007	:	1600	0.009	-	0.009	6.87E+00						2.50E-01	ca**	5.50E-01	ca*
Chlorobenzene	1	/ 176	0.0007	:	1600	0.017	-	0.017	6.87E+00						1.50E+02	nc	5.30E+02	nc
Chloroform	4	/ 176	0.0007	:	1600	0.001	-	0.007	6.87E+00						2.20E-01	ca	4.70E-01	ca
Chloromethane (Methyl Chloride)	2	/ 176	0.0014	:	1600	0.0004	-	0.28	6.91E+00						4.70E+01	nc	1.60E+02	nc
Ethylbenzene	12	/ 165	0.0007	:	1600	0.0019	-	6.7	5.39E+00						4.00E+02	sat	4.00E+02	sat
Formaldehyde	15	/ 22	0.11	:	0.12	0.13	-	1.2	2.68E-01						9.20E+03	nc	1.00E+05	nc
Hydrazine	1	/ 30	0.058	:	0.41	1.9	-	**1.9**	1.86E-01						1.60E-01	ca	5.70E-01	ca
Isopropyl Benzene	2	/ 97	0.005	:	1	0.22	-	0.37	7.16E-02						5.70E+02	nc	2.00E+03	nc
m,p-Xylene	3	/ 87	0.0385	:	1	0.096	-	**0.5**	8.12E-02									
Methylene Chloride	31	/ 176	0.0014	:	1600	0.002	-	2	6.93E+00						9.10E+00	ca	2.10E+01	ca
o-Xylene	1	/ 87	0.0385	:	1	0.15	-	**0.15**	7.51E-02									
p-Isopropyl Toluene	10	/ 97	0.005	:	0.2	0.46	-	**18**	5.10E-01									
Styrene	7	/ 176	0.0007	:	1600	0.0005	-	3.3	6.88E+00						1.70E+03	sat	1.70E+03	sat
Tetrachloroethene (PCE)	7	/ 176	0.0007	:	1600	0.0008	-	0.014	6.87E+00						4.80E-01	ca*	1.30E+00	ca
Toluene	40	/ 166	0.0007	:	1600	0.0003	-	13	5.56E+00						5.20E+02	sat	5.20E+02	sat
Trichloroethene (TCE)	3	/ 176	0.0007	:	1600	0.01	-	0.08	6.86E+00						5.30E-02	ca	1.10E-01	ca
Xylenes, Total	5	/ 78	0.0007	:	1600	0.0011	-	0.091	1.11E+01						2.70E+02	nc	4.20E+02	sat
Semivolatile Organics (mg/Kg)																		
1,2,4-Trichlorobenzene	3	/ 265	0.012	:	670	0.075	-	0.088	4.73E+00						6.20E+01	nc	2.20E+02	nc
1,2-Dichlorobenzene	1	/ 265	0.012	:	670	0.17	-	0.17	4.73E+00						6.00E+02	sat	6.00E+02	sat
1,4-Dichlorobenzene	1	/ 265	0.012	:	670	0.23	-	0.23	4.73E+00						3.40E+00	ca	7.90E+00	ca
2,4-Dimethylphenol	1	/ 269	0.012	:	670	1.8	-	1.8	4.67E+00						1.20E+03	nc	1.20E+04	nc
2,4-Dinitrophenol	2	/ 269	0.06	:	3300	0.21	-	0.24	9.92E+00						1.20E+02	nc	1.20E+03	nc
2-Methylnaphthalene	1	/ 264	0.012	:	670	0.063	-	0.063	4.59E+00						5.60E+01	nc	1.90E+02	nc
3-Nitroaniline	2	/ 269	0.06	:	3300	0.3	-	0.34	2.30E+01						1.80E+01	nc	8.20E+01	ca**
4-Chloroaniline	3	/ 269	0.012	:	800	0.1	-	0.12	7.98E+00						2.40E+02	nc	2.50E+03	nc
4-Chlorophenyl-phenylether	1	/ 269	0.012	:	670	0.17	-	**0.17**	4.66E+00									
4-Nitroaniline	2	/ 269	0.06	:	3300	0.21	-	0.23	2.30E+01						2.30E+01	ca**	8.20E+01	ca*
Anthracene	2	/ 264	0.012	:	670	0.028	-	7.6	4.61E+00						2.20E+04	nc	1.00E+05	max
Benzo(a)anthracene	5	/ 264	0.012	:	670	0.048	-	**18**	4.64E+00						6.20E-01	ca	2.10E+00	ca
Benzo(a)pyrene	2	/ 264	0.012	:	670	0.055	-	**23**	4.67E+00						6.20E-02	ca	2.10E-01	ca
Benzo(b)fluoranthene	7	/ 264	0.012	:	670	0.039	-	**17**	4.64E+00	0.058	0.062	0.06		**2**	6.20E-01	ca	2.10E+00	ca
Benzo(g,h,i)perylene	1	/ 264	0.012	:	670	9.5	-	9.5	4.62E+00						2.30E+03	nc	2.90E+04	nc
Benzo(k)fluoranthene	1	/ 264	0.012	:	670	21	-	21	4.66E+00						6.20E+00	ca	2.10E+01	ca
bis(2-EthylHexyl)phthalate	175	/ 269	0.012	:	1.4	0.09	-	**6700**	1.21E+02						3.50E+01	ca*	1.20E+02	ca
Butylbenzylphthalate	10	/ 269	0.012	:	670	0.035	-	4.5	4.68E+00						1.20E+04	nc	1.00E+05	max
Chrysene	5	/ 264	0.012	:	670	0.057	-	18	4.64E+00						6.20E+01	ca	2.10E+02	ca
Dibenzofuran	2	/ 269	0.012	:	670	0.095	-	0.11	4.66E+00						1.50E+02	nc	1.60E+03	nc
Diethylphthalate	2	/ 269	0.012	:	670	0.046	-	0.057	4.66E+00						4.90E+04	nc	1.00E+05	max
Di-n-butylphthalate	16	/ 269	0.012	:	670	0.032	-	507	7.00E+00						6.10E+03	nc	6.20E+04	nc
Di-n-octylphthalate	17	/ 269	0.012	:	670	0.014	-	0.88	4.66E+00						2.40E+03	nc	2.50E+04	nc

Table 4.1-6
Summary of Subsurface Soil Analytical Data For Current Conditions - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

									1997 Smith Report Background			MADEP Background		Region IX PRG (10/2004)			
Parameter Name	Frequency of Detection			Range of Non Detect Concentrations			Range of Detected Concentrations		Average of All Samples	Min	Max	Median	1995	2002	Residential Soil (mg/kg)		Industrial Soil (mg/kg)	
Fluoranthene	7	/	264	0.012	:	670	0.038	- 37	4.72E+00	0.047	0.066	0.057		**4**	2.30E+03	nc	2.20E+04	nc
Indeno (1,2,3-cd) pyrene	3	/	264	0.012	:	670	0.28	- **10**	4.62E+00						6.20E-01	ca	2.10E+00	ca
Naphthalene	3	/	266	0.012	:	670	0.092	- 0.63	4.56E+00						5.60E+01	nc	1.90E+02	nc
N-Nitroso-di-n-propylamine	1	/	269	0.118	:	670	1.6	- **1.6**	4.67E+00						6.90E-02	ca	2.50E-01	ca
N-Nitrosodiphenylamine	57	/	269	0.012	:	400	0.12	- **3400**	3.30E+01						9.90E+01	ca*	3.50E+02	ca*
Phenanthrene	8	/	264	0.012	:	670	0.052	- 33	4.71E+00	0.043	0.043	0.043		**3**	2.30E+03	nc	2.90E+04	nc
Phenol	6	/	269	0.118	:	670	0.055	- 6.6	4.71E+00						1.80E+04	nc	1.00E+05	max
Pyrene	12	/	264	0.012	:	670	0.043	- 35	4.70E+00	0.047	0.065	0.056		**4**	2.30E+03	nc	2.90E+04	nc
Pesticides/PCBs (mg/Kg)																		
4,4'-DDD	1	/	134	0.0001	:	0.21	0.04	- 0.04	1.22E-02						2.40E+00	ca	1.00E+01	ca
4,4'-DDT	4	/	134	0.0001	:	0.21	0.02	- 0.054	1.28E-02						1.70E+00	ca*	7.00E+00	ca*
Aldrin	3	/	134	0.0001	:	0.21	0.014	- 0.032	9.52E-03						2.90E-02	ca*	1.00E-01	ca
Alpha-BHC	1	/	134	0.00005	:	0.21	0.024	- 0.024	9.33E-03						9.00E-02	ca	3.60E-01	ca
Endosulfan I	1	/	135	0.00005	:	0.21	0.036	- **0.036**	9.42E-03									
Endosulfan Sulfate	1	/	134	0.0001	:	0.21	0.15	- **0.15**	1.30E-02									
Endrin	2	/	134	0.0001	:	0.21	0.022	- 0.089	1.27E-02						1.80E+01	nc	1.80E+02	nc
Endrin Ketone	1	/	47	0.0001	:	0.046	0.045	- **0.045**	1.67E-02									
Gamma-BHC (Lindane)	6	/	134	0.00005	:	0.21	0.02	- 0.2	1.17E-02						4.40E-01	ca*	1.70E+00	ca
Inorganics (mg/Kg)																		
Aluminum, Total	115	/	115		:		200	- 10000	4.52E+03	6100	7900	7000	13000	10000	7.60E+04	nc	1.00E+05	max
Antimony, Total	3	/	70	0.5	:	20	1.1	- 41	6.77E+00				1.4	**1**	3.10E+01	nc	4.10E+02	nc
Arsenic, Total	80	/	118	0.81	:	13	0.9	- **89**	4.86E+00	6.2	7.1	6.7	17	**20**	3.90E-01	ca*	1.60E+00	ca
Barium, Total	74	/	76	11	:	40	2.8	- 90	2.07E+01	11	22	17	45	**50**	5.40E+03	nc	6.70E+04	nc
Beryllium, Total	9	/	69	0.06	:	1.5	0.075	- 0.23	5.16E-01				0.4	0.4	1.50E+02	nc	1.90E+03	ca**
Cadmium, Total	27	/	167	0.1	:	3	0.18	- 4.8	4.41E-01				2	**2**	3.70E+01	nc	4.50E+02	nc
Calcium, Total	60	/	60		:		150	- **160000**	4.80E+03	125	**2000**	620						
Chromium, Total	324	/	325	11	:	11	3.5	- **7900**	3.91E+02	14	16	15	29	**30**	2.10E+02	ca	4.50E+02	ca
Cobalt, Total	48	/	60	1.5	:	10	0.94	- 7.6	2.60E+00	2.4	3.7	3.1	4.4	**4**	9.00E+02	ca**	1.90E+03	ca*
Copper, Total	51	/	70	2	:	23	2.5	- 47	7.02E+00	5.1	6.4	5.8	38	**40**	3.10E+03	nc	4.10E+04	nc
Hexavalent Chromium, Total	6	/	6		:		0.47	- 19.9	8.69E+00					30	3.00E+01	ca**	6.40E+01	ca
Iron, Total	105	/	105		:		580	- 87000	6.41E+03	9200	12000	11000	17000	**20000**	2.30E+04	nc	1.00E+05	max
Lead, Total	107	/	167	1.59	:	13	1.6	- 62.5	5.85E+00	11	11	10.5	99	100	4.00E+02	nc	8.00E+02	nc
Magnesium, Total	59	/	60	1000	:	1000	150	- **4700**	1.78E+03	2400	3000	2700	4900	5000				
Manganese, Total	60	/	60		:		6.1	- 340	8.02E+01	100	150	125	300	**300**	1.80E+03	nc	1.90E+04	nc
Mercury, Total	16	/	129	0.04	:	0.202	0.06	- **7**	1.18E-01				0.3	**0.3**				
Nickel, Total	55	/	70	3	:	8	2.5	- 18	5.80E+00	5.5	6.5	6	17	20	1.60E+03	nc	2.00E+04	nc
Potassium, Total	59	/	60	1000	:	1000	130	- **2100**	7.30E+02	120	**1400**	260						
Silver, Total	2	/	85	0.6	:	13	0.7	- 4.5	1.06E+00				0.6	**0.6**	3.90E+02	nc	5.10E+03	nc
Sodium, Total	64	/	72	56	:	70	21	- **25300**	7.78E+02	22.5	**130**	29						
Vanadium, Total	57	/	60	1.5	:	10	2.6	- 26	1.04E+01	12	16	14	29	30	7.80E+01	nc	1.00E+03	nc
Zinc, Total	69	/	70	2.5	:	2.5	3.2	- 310	2.28E+01	16	21	19	116	**100**	2.30E+04	nc	1.00E+05	max
Chloride	32	/	59	40	:	40	2.06	- **360**	4.96E+01									
Cyanide	3	/	44	1.16	:	2	2.3	- 5.4	1.14E+00						1.20E+03	nc	1.20E+04	nc
Flash Point	8	/	8		:		200	- **200**	2.00E+02									
Nitrate as N	2	/	2		:		14	- **24**	1.90E+01									
Nitrogen, Ammonia	78	/	88	4.7	:	8	3.6	- **4700**	2.40E+02	17	**37**	26						

Table 4.1-6
Summary of Subsurface Soil Analytical Data For Current Conditions - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

										1997 Smith Report Background			MADEP Background		Region IX PRG (10/2004)			
Parameter Name	Frequency of Detection			Range of Non Detect Concentrations			Range of Detected Concentrations			Average of All Samples	Min	Max	Median	1995	2002	Residential Soil (mg/kg)		Industrial Soil (mg/kg)	
pH	23	/	23		:		4.7	-	**7.67**	6.38E+00									
Specific Conductance	6	/	6		:		16	-	**33**	2.68E+01									
Sulfate as SO4	46	/	58	20	:	80	22	-	**285000**	8.03E+03	30	**30**	< 40						
Total Organic Carbon (TOC)	9	/	9		:		2370	-	**28000**	1.02E+04									
Urea	2	/	5	20	:	20	220	-	**350**	1.20E+02									
TCLP Chromium (mg/L)																			
TCLP Chromium	7	/	8	0.05	:	0.05	0.063	-	0.84	3.49E-01	14	16	15	29	30	2.10E+02	ca	4.50E+02	ca
TPH (mg/Kg)																			
Diesel Range Organics	10	/	10		:		5.1	-	**63**	1.91E+01									
VPH (mg/Kg)																			
C5-C8 Aliphatics (FID)	24	/	44	1.02	:	2.8	3	-	**1500**	1.09E+02									
C5-C8 Aliphatics, Unadjusted	24	/	44	1.02	:	2.8	3	-	**1600**	1.12E+02									
C9-C10 Aromatics (PID)	17	/	44	0.34	:	8.2	3.1	-	**69**	7.77E+00									
C9-C12 Aliphatics (FID)	12	/	44	0.34	:	8.2	2.7	-	**21**	3.50E+00									
C9-C12 Aliphatics, Unadjusted	21	/	44	0.34	:	4.8	2.7	-	**59**	1.05E+01									
Ethylbenzene	9	/	44	0.0681	:	0.48	0.55	-	5.5	6.62E-01						4.00E+02	sat	4.00E+02	sat
Toluene	3	/	44	0.0681	:	0.8	1.4	-	19	7.22E-01						5.20E+02	sat	5.20E+02	sat
Xylenes, Total	5	/	37	0.2	:	0.48	0.24	-	4.6	3.53E-01						2.70E+02	nc	4.20E+02	sat
VPH Concentration (Total)	26	/	37	1.8	:	2.8	3.2	-	**1600**	1.46E+02									
EPH (mg/Kg)																			
Acenaphthene	1	/	45	0.117	:	0.8	6.2	-	6.2	3.28E-01						3.70E+03	nc	2.90E+04	nc
Acenaphthylene	2	/	45	0.117	:	0.8	0.86	-	0.88	2.24E-01						2.30E+03	nc	2.90E+04	nc
Benzo(a)anthracene	5	/	45	0.117	:	0.8	0.44	-	**5.9**	4.09E-01						6.20E-01	ca	2.10E+00	ca
Benzo(a)pyrene	1	/	45	0.117	:	0.8	0.45	-	**0.45**	2.00E-01						6.20E-02	ca	2.10E-01	ca
Benzo(g,h,i)perylene	8	/	45	0.117	:	0.8	0.47	-	2.6	3.08E-01						2300	nc	29000	nc
Benzo(k)fluoranthene	1	/	45	0.117	:	0.8	0.59	-	0.59	2.03E-01						6.20E+00	ca	2.10E+01	ca
C11-C22 Aromatics (FID)	36	/	45	3.6	:	25.3	4.6	-	**2100**	2.82E+02									
C11-C22 Aromatics, Unadjusted	36	/	45	3.6	:	25.3	4.6	-	**2100**	3.02E+02									
C19-C36 Aliphatics (PID)	26	/	45	3.5	:	25.3	5.1	-	**1300**	6.07E+01									
C9-C18 Aliphatics (FID)	26	/	45	3.5	:	25.3	4.5	-	**380**	3.09E+01									
Fluoranthene	3	/	45	0.117	:	0.8	0.47	-	5.7	3.29E-01	0.047	0.066	0.057		**4**	2300	nc	22000	nc
Fluorene	2	/	45	0.117	:	0.8	1.7	-	2.7	2.83E-01						2.70E+03	nc	2.60E+04	nc
Indeno (1,2,3-cd) pyrene	3	/	45	0.117	:	0.8	0.38	-	**10**	4.30E-01						6.20E-01	ca	2.10E+00	ca
Naphthalene	1	/	45	0.117	:	0.8	0.77	-	0.77	2.07E-01						5.60E+01	nc	1.90E+02	nc
EPH Concentration (Total)	37	/	43	3.6	:	3.7	5.2	-	**3800**	4.01E+02									

mg/Kg = milligrams per kilogram
MADEP = Massachusetts Department of Environmnetal Protection
PRG = Preliminary Remediation Goal
nc = non-cancer basis
ca = carcinogenic basis
1997 Smiith Report = 1997 Phase II Comprehensive Site Assessment

Prepared/Date: KJC 8/7/07
Checked/Date: MJM 8/8/07

BOLD	in column indicating upper end of range of concentrations, maximum concentration is greater than Industrial Soil PRG or there is no PRG avaialable
BOLD	in column indicating a background concentration, maximum concentration is greater than that background concentration

Table 4.1-7
Surface Water Samples Not Representative of Current Conditions - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles- Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Dioxin/Kemppore	Metals-Total	Metals-Filtered	Inorganics/Physical	Field	Field- pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SW	10/5/2000	South Ditch	NP-1	1150-SD-SW11D		65															
SW	10/5/2000	South Ditch	SW11A	1150-SD-SW11A		65															
SW	10/5/2000	South Ditch	SW11B	1150-SD-SW11B		65															
SW	10/5/2000	South Ditch	SW11C	1150-SD-SW11C		65															
SW	10/5/2000	South Ditch	SW11E	1150-SD-SW11E		65															
SW	10/6/2000	South Ditch	NP-1	97598-SWLOC-14										1	1	1					
SW	10/6/2000	South Ditch	SW11B	97598-SWLOC-10										1	1	1					
SW	10/6/2000	South Ditch	SW11C	97598-SWLOC-11										1	1	1					
SW	10/6/2000	South Ditch	SW11E	97598-SWLOC-16										1	1	1					
SW	10/6/2000	South Ditch	SWLOC-12	97598-SWLOC-12										1	1	1					
SW	10/6/2000	South Ditch	SWLOC-9	97598-SWLOC-9										1	1	1					
SW	10/7/2000	South Ditch	NP-1	1150-SD-SWA1		65			17					1	1	1					
SW	10/9/2000	South Ditch	NP-1	1150-SD-SWA2		65			17					1	1	1					
SW	10/10/2000	South Ditch	NP-1	1150-SD-SWA3		65			17					1	1	1					
SW	10/11/2000	South Ditch	NP-1	1150-SD-SWA4		65			17					1	1	1					
SW	10/12/2000	South Ditch	NP-1	1150-SD-SWA5		65			17					1	1	1					
SW	10/18/2000	South Ditch	NP-1	1150-SD-SWA6		65			17					1	1	1					
SW	10/19/2000	South Ditch	NP-1	1150-SD-SWA7		65			17					1	1	1					
SW	10/20/2000	South Ditch	NP-1	1150-SD-SWA8		65			17					1	1	1					
SW	10/20/2000	South Ditch	NP-1	1150-SD-SWA9		65			17					1	1	1					
SW	10/23/2000	South Ditch	NP-1	1150-SD-SWA10		65			16					1	1	1					
SW	10/24/2000	South Ditch	NP-1	1150-SD-SWB1		65			17					1	1	1					
SW	10/25/2000	South Ditch	NP-1	1150-SD-SWB2		65			17					1	1	1					
SW	10/26/2000	South Ditch	NP-1	1150-SD-SWC1		65			17					1	1	1					
SW	10/27/2000	South Ditch	NP-1	1150-SD-SWC2		65			17					1	1	1					
SW	10/30/2000	South Ditch	NP-1	1150-SD-SWC3		65			17					1	1	1					
SW	10/31/2000	South Ditch	NP-1	1150-SD-SWC4		65			17					1	1	1					
SW	11/1/2000	South Ditch	NP-1	1150-SD-SWC5		65			17					1	1	1					
SW	11/2/2000	South Ditch	NP-1	1150-SD-SWC6		65			17					1	1	1					
SW	11/3/2000	South Ditch	NP-1	1150-SD-SWC7		132			17					1	1	1					
SW	11/4/2000	South Ditch	NP-1	1150-SD-SWC8		132			17					1	1	1					
SW	11/6/2000	South Ditch	NP-1	1150-SD-SWC9		132			17					1	1	1					
SW	11/7/2000	South Ditch	NP-1	1150-SD-SWC10		65			17					1	1	1					
SW	11/8/2000	South Ditch	NP-1	1150-SD-SWC11		65			17					1	1	1					
SW	11/9/2000	South Ditch	NP-1	1150-SD-SWC12		132			17					1	1	1					
SW	11/10/2000	South Ditch	NP-1	1150-SD-SWC13		132			17					1	1	1					
SW	11/12/2000	South Ditch	NP-1	1150-SD-SWC14					17					1	1	1					
SW	11/13/2000	South Ditch	NP-1	1150-SD-SWC15					17					1	1	1					
SW	11/14/2000	South Ditch	NP-1	1150-SD-SWC16					17					1	1	1					
SW	11/15/2000	South Ditch	ISCO1	1150-OPWD-SWC17												1					
SW	11/15/2000	South Ditch	NP-1	1150-SD-SWC17					17					1	1	1					

Table 4.1-7
Surface Water Samples Not Representative of Current Conditions - OU1

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Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles- Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals-Total	Metals-Filtered	Inorganics/Physical	Field	Field_pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SW	11/16/2000	South Ditch	ISCO1	1150-OPWD-SWC18												1					
SW	11/16/2000	South Ditch	NP-1	1150-SD-SWC18					17					1	1	1					
SW	11/17/2000	South Ditch	ISCO1	1150-OPWD-SWC19												1					
SW	11/17/2000	South Ditch	NP-1	1150-SD-SWC19					17					1	1	1					
SW	11/18/2000	South Ditch	ISCO1	1150-OPWD-SWC20												1					
SW	11/18/2000	South Ditch	NP-1	1150-SD-SWC20					17					1	1	1					
SW	11/19/2000	South Ditch	ISCO1	1150-OPWD-SWC21												1					
SW	11/19/2000	South Ditch	NP-1	1150-SD-SWC21					17					1	1	1					
SW	11/20/2000	South Ditch	ISCO1	1150-OPWD-SWC22												1					
SW	11/20/2000	South Ditch	NP-1	1150-SD-SWC22					17					1	1	1					
SW	11/21/2000	South Ditch	ISCO1	1150-OPWD-SWC23												1					
SW	11/21/2000	South Ditch	NP-1	1150-SD-SWC23					17					1	1	1					
SW	11/22/2000	South Ditch	ISCO1	1150-OPWD-SWC24												1					
SW	11/22/2000	South Ditch	NP-1	1150-SD-SWC24					17					1	1	1					
SW	11/27/2000	South Ditch	ISCO1	1150-OPWD-SWC25												1					
SW	11/27/2000	South Ditch	ISCO1	1150-OPWD-SWC26												1					
SW	11/27/2000	South Ditch	NP-1	1150-SD-SWC25		67			17					1	1	1					
SW	11/28/2000	South Ditch	NP-1	1150-SD-SWC26					17					1	1	1					
SW	11/29/2000	South Ditch	ISCO1	1150-OPWD-SWC27												1					
SW	11/29/2000	South Ditch	NP-1	1150-SD-SWC27					17					1	1	1					
SW	11/30/2000	South Ditch	ISCO1	1150-OPWD-SWC28										3	3	1					
SW	11/30/2000	South Ditch	NP-1	1150-SD-SWC28					17					3	3	1					
SW	12/1/2000	South Ditch	ISCO1	1150-OPWD-SWC29												1					
SW	12/1/2000	South Ditch	NP-1	1150-SD-SWC29		65			17					1	1	1					
SW	12/3/2000	South Ditch	ISCO1	1150-OPWD-SWC30												1					
SW	12/3/2000	South Ditch	NP-1	1150-SD-SWC30		65								1	1	1					
SW	12/4/2000	South Ditch	ISCO1	1150-OPWD-SWC31												1					
SW	12/4/2000	South Ditch	NP-1	1150-SD-SWC31		65								1	1	1					
SW	12/5/2000	South Ditch	ISCO1	1150-OPWD-SWC32												1					
SW	12/5/2000	South Ditch	NP-1	1150-SD-SWC32		65								1	1	1					
SW	12/6/2000	South Ditch	ISCO1	1150-OPWD-SWC33												1					
SW	12/6/2000	South Ditch	NP-1	1150-SD-SWC33		65								1	1	1					
SW	12/7/2000	South Ditch	ISCO1	1150-OPWD-SWC34												1					
SW	12/7/2000	South Ditch	NP-1	1150-SD-SWC34		65								1	1	1					
SW	12/8/2000	South Ditch	ISCO1	1150-OPWD-SWC35												1					
SW	12/8/2000	South Ditch	NP-1	1150-SD-SWC35		65								1	1	1					
SW	12/9/2000	South Ditch	NP-1	1150-SD-SWC36		65								1	1	1					
SW	12/11/2000	South Ditch	ISCO1	1150-OPWD-SWC37												1					
SW	12/11/2000	South Ditch	NP-1	1150-SD-SWC37		65								1	1	1					
SW	12/12/2000	South Ditch	ISCO1	1150-OPWD-SWC38												1					
SW	12/12/2000	South Ditch	NP-1	1150-SD-SWC38		65								1	1	1					

Table 4.1-7
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Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles_Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals_Total	Metals_Filtered	Inorganics/Physical	Field	Field_pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SW	12/13/2000	South Ditch	ISCO1	1150-OPWD-SWC39											1						
SW	12/13/2000	South Ditch	NP-1	1150-SD-SWC39		65							1	1	1						
SW	12/21/2000	South Ditch	ISCO1	1150-OPWD-SWD1									1	1	1						
SW	12/21/2000	South Ditch	NP-1	1150-SD-SWD1									1	1	1						
SW	12/29/2000	South Ditch	ISCO1	1150-OPWD-SWD2									1	1	1						
SW	12/29/2000	South Ditch	NP-1	1150-SD-SWD2									1	1	1						
SW	1/4/2001	South Ditch	ISCO1	1150-OPWD-SWD3									1	1	1						
SW	1/4/2001	South Ditch	NP-1	1150-SD-SWD3									1	1	1						
SW	1/11/2001	South Ditch	ISCO1	1150-OPWD-SWD4									1	1	1						
SW	1/11/2001	South Ditch	NP-1	1150-SD-SWD4									1	1	1						
SW	1/18/2001	South Ditch	ISCO1	1150-OPWD-SWD5									1	1	1						
SW	1/18/2001	South Ditch	NP-1	1150-SD-SWD5									1	1	1						
SW	1/25/2001	South Ditch	ISCO1	1150-OPWD-SWD6									1	1	1						
SW	1/25/2001	South Ditch	NP-1	1150-SD-SWD6									1	1	1						
SW	2/2/2001	South Ditch	ISCO1	1150-OPWD-SWD7									1	1	1						
SW	2/2/2001	South Ditch	NP-1	1150-SD-SWD7									1	1	1						
SW	2/9/2001	South Ditch	ISCO1	1170-ISCO1-1									1	1	1						
SW	2/9/2001	South Ditch	ISCO2	1170-ISCO2-1									1	1	1						
SW	2/9/2001	South Ditch	NP-1	1170-NP1-1									1	1	1						
SW	2/15/2001	South Ditch	ISCO1	1170-ISCO1-2									1	1	1						
SW	2/15/2001	South Ditch	ISCO2	1170-ISCO2-2									1	1	1						
SW	2/15/2001	South Ditch	NP-1	1170-NP1-2									1	1	1						
SW	2/23/2001	South Ditch	ISCO1	1170-ISCO1-3									1	1	2						
SW	2/23/2001	South Ditch	ISCO2	1170-ISCO2-3									1	1	2						
SW	2/23/2001	South Ditch	NP-1	1170-NP1-3									1	1	2						
SW	3/1/2001	South Ditch	ISCO1	1170-ISCO1-4									1	1	2						
SW	3/1/2001	South Ditch	ISCO2	1170-ISCO2-4									1	1	2						
SW	3/9/2001	South Ditch	ISCO1	1170-ISCO1-5									1	1	2						
SW	3/9/2001	South Ditch	ISCO2	1170-ISCO2-5									1	1	2						
SW	3/16/2001	South Ditch	ISCO1	1170-ISCO1-6									1	2	4						
SW	3/16/2001	South Ditch	ISCO2	1170-ISCO2-6									1	2	4						
SW	3/23/2001	South Ditch	ISCO1	1170 ISCO1-7									1	2	4						
SW	3/23/2001	South Ditch	ISCO1	1170 ISCO1-8									1	2	4						
SW	3/23/2001	South Ditch	ISCO2	1170 ISCO2-7									1	2	4						
SW	3/23/2001	South Ditch	ISCO2	1170 ISCO2-8									1	2	4						
SW	4/2/2001	South Ditch	ISCO1	1170-ISCO1-9									1	2	4						
SW	4/2/2001	South Ditch	ISCO2	1170-ISCO2-9									1	2	4						
SW	4/9/2001	South Ditch	ISCO1	1170-ISCO1-10									1	2	4						
SW	4/9/2001	South Ditch	ISCO2	1170-ISCO2-10									1	2	4						
SW	4/16/2001	South Ditch	ISCO1	1170-ISCO1-11									1	2	4						
SW	4/16/2001	South Ditch	ISCO2	1170-ISCO2-11									1	2	4						

Table 4.1-7
Surface Water Samples Not Representative of Current Conditions - OU1

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Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles_Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Dioxin/Furans	Metals_Total	Metals_Filtered	Inorganics/Physical	Field	Field_pH	Total Petroleum Hydrocarbons	Volatile Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons
SW	4/23/2001	South Ditch	ISCO1	1170-ISCO1-12										1	2	4					
SW	4/23/2001	South Ditch	ISCO2	1170-ISCO2-12										1	2	4					
SW	4/30/2001	South Ditch	ISCO1	1170-ISCO1-13										1	2	4					
SW	4/30/2001	South Ditch	ISCO2	1170-ISCO2-13										1	2	4					
SW	6/5/2001	South Ditch	ISCO1	1170-SD26-1										1	1	1					
SW	6/5/2001	South Ditch	ISCO2	1170-SD26-4										1	1	1					
SW	6/5/2001	South Ditch	SD26-2	1170-SD26-2										1	1	1					
SW	6/5/2001	South Ditch	SW11C	1170-SD26-3										1	1	1					
SW	6/6/2001	South Ditch	ISCO2	1170-ISCO2-27										1	1						
SW	6/7/2001	South Ditch	ISCO2	1170-ISCO2-28										1	1						

Prepared/Date: KJC 8/14/07
Checked/Date: MH 8/14/07

Table 4.1-8
Surface Water Samples Representative of Current Conditions - OU1

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Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles_Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field_pH	TotalPetroleumHydrocarbons	VolatilePetroleum Hydrocarbons	ExtractablePetroleumHydrocarbons
SW	7/20/2000	South Ditch	NP-1	NP-1C	65	65			30	7	7		26		23	1		6	12	22
SW	7/20/2000	South Ditch	NP-2	NP-2C	65	65			30	7	7		26		23	1		6	12	22
SW	7/20/2000	South Ditch	NP-2	NP-2T	65	65			30	7	7		26	25	23	1		6	12	22
SW	9/20/2000	South Ditch	NP-1	1140-SD-SW1		65			17				1		1					
SW	9/21/2000	South Ditch	NP-1	1140-SD-SW2		65			17				1		1					
SW	9/22/2000	South Ditch	NP-1	1140-SD-SW3		65			17				1		1					
SW	9/23/2000	South Ditch	NP-1	1140-SD-SW4		65			17				1		1					
SW	9/25/2000	South Ditch	NP-1	1140-SD-SW5		65			17				1		1					
SW	9/26/2000	South Ditch	NP-1	1140-SD-SW6		65			17				1		1					
SW	9/27/2000	South Ditch	NP-1	1140-SD-SW7					17				1		1					
SW	9/28/2000	South Ditch	NP-1	1140-SD-SW8		65			17				1		1					
SW	9/29/2000	South Ditch	NP-1	1140-SD-SW9		65			17				1		1					
SW	10/2/2000	South Ditch	NP-1	1140-SD-SW10		65			17				1		1					
SW	10/4/2000	South Ditch	NP-1	1140-SD-SW11		65			17				1		1					
SW	5/7/2001	South Ditch	ISCO1	1170-ISCO1-14									1	2	4					
SW	5/7/2001	South Ditch	ISCO2	1170-ISCO2-14									1	2	4					
SW	5/14/2001	South Ditch	ISCO1	1170-ISCO1-15									1	2	4					
SW	5/14/2001	South Ditch	ISCO2	1170-ISCO2-15		67							1	2	4					
SW	5/15/2001	South Ditch	ISCO2	1170-ISCO2-16		67							1	1						
SW	5/16/2001	South Ditch	ISCO2	1170-ISCO2-17		67							1	1						
SW	5/17/2001	South Ditch	ISCO2	1170-ISCO2-18		67							1	1						
SW	5/18/2001	South Ditch	ISCO2	1170-ISCO2-19		67							1	1						
SW	5/21/2001	South Ditch	ISCO1	1170-ISCO1-20									1	1	4					
SW	5/21/2001	South Ditch	ISCO2	1170-ISCO2-20									1	1	4					
SW	5/23/2001	South Ditch	ISCO2	1170-ISCO2-21		65							1	1						
SW	5/24/2001	South Ditch	ISCO2	1170-ISCO2-22		65							1	1						
SW	5/29/2001	South Ditch	ISCO2	1170-ISCO2-23									1	1						
SW	5/30/2001	South Ditch	ISCO2	1170-ISCO2-24									1	1						
SW	6/4/2001	South Ditch	ISCO1	1170-ISCO1-25									1	2	4					
SW	6/4/2001	South Ditch	ISCO2	1170-ISCO2-25									1	2	4					
SW	6/9/2001	South Ditch	NP-1	1170-SD-29									1	1						
SW	6/11/2001	South Ditch	ISCO2	1170-ISCO2-30									1	2	4					
SW	6/18/2001	South Ditch	ISCO1	1170-ISCO1-31									1	2	4					
SW	6/18/2001	South Ditch	ISCO2	1170-ISCO2-31									1	2	4					
SW	6/25/2001	South Ditch	ISCO1	1170-ISCO1-32									1	2	4					
SW	6/25/2001	South Ditch	ISCO2	1170-ISCO2-32									1	2	4					
SW	7/2/2001	South Ditch	ISCO1	1170-ISCO1-33 MS/MSD									1	2	4					
SW	7/2/2001	South Ditch	ISCO2	1170-ISCO2-33									1	2	4					
SW	7/9/2001	South Ditch	ISCO1	1170-ISCO1-34									1	2	4					
SW	7/9/2001	South Ditch	ISCO2	1170-ISCO2-34									1	2	4					
SW	7/16/2001	South Ditch	ISCO2	1170-ISCO2-35									1	1	4					
SW	7/23/2001	South Ditch	ISCO1	1170-ISCO1-36 MS/MSD									1	2	4					

Table 4.1-8
Surface Water Samples Representative of Current Conditions - OU1

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Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles_Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field_pH	TotalPetroleumHydrocarbons	VolatilePetroleum Hydrocarbons	ExtractablePetroleumHydrocarbons
SW	7/30/2001	South Ditch	ISCO1	1170-ISCO1-37 MS/MSD									1	2	4						
SW	7/30/2001	South Ditch	TD1	1170-TD1-37									1	2							
SW	7/30/2001	South Ditch	TD2	1170-TD2-37									1	2							
SW	7/30/2001	South Ditch	TD3	1170-TD3-37									1	2							
SW	8/6/2001	South Ditch	ISCO1	1170-ISCO1-38									1	2	4						
SW	8/6/2001	South Ditch	ISCO2	1170-ISCO2-38 MS/MSD									1	2	4						
SW	8/13/2001	South Ditch	ISCO1	1170-ISCO1-39									1	2	4						
SW	8/13/2001	South Ditch	ISCO2	1170-ISCO2-39									1	2	4						
SW	8/20/2001	South Ditch	ISCO1	1170-ISCO1-40									1	2	4						
SW	8/20/2001	South Ditch	ISCO2	1170-ISCO2-40									1	2	4						
SW	8/27/2001	South Ditch	ISCO1	1170-ISCO1-41									1	2	4						
SW	8/27/2001	South Ditch	ISCO2	1170-ISCO2-41									1	2	4						
SW	9/4/2001	South Ditch	ISCO1	1170-ISCO1-42									1	2	4						
SW	11/12/2001	South Ditch	ISCO1	1170-ISCO1-44									1	2	4						
SW	11/12/2001	South Ditch	ISCO2	1170-ISCO2-44									1	2	4						
SW	11/12/2001	South Ditch	PZ-16RSW	1170-PZ16-44									1	2	4						
SW	11/12/2001	South Ditch	SD-17	1170-PZ17-44 MS/MSD									1	2	4						
SW	12/3/2001	South Ditch	ISCO1	1170-ISCO1-45 MS/MSD									1	2	4						
SW	12/3/2001	South Ditch	ISCO2	1170-ISCO2-45									1	2	4						
SW	12/10/2001	South Ditch	ISCO1	1170-ISCO1-46 MS/MSD									1	2	4						
SW	12/10/2001	South Ditch	ISCO2	1170-ISCO2-46									1	2	4						
SW	12/10/2001	South Ditch	PZ-16RSW	1170-PZ16-46									1	2	4						
SW	12/10/2001	South Ditch	SD-17	1170-PZ17-46									1	2	4						
SW	12/17/2001	South Ditch	ISCO1	1170-ISCO1-47 MS/MSD									1	2	4						
SW	12/17/2001	South Ditch	ISCO2	1170-ISCO2-47									1	2	4						
SW	12/26/2001	South Ditch	ISCO1	1170-ISCO1-48 MS/MSD									1	2	4						
SW	12/26/2001	South Ditch	ISCO2	1170-ISCO2-48									1	2	4						
SW	12/31/2001	South Ditch	ISCO1	1170-ISCO1-49									1	2	4						
SW	12/31/2001	South Ditch	ISCO2	1170-ISCO2-49 MS/MSD									1	2	4						
SW	1/7/2002	South Ditch	ISCO1	1170-ISCO1-50 MS/MSD									1	2	8						
SW	1/7/2002	South Ditch	ISCO2	1170-ISCO2-50									1	2	8						
SW	1/7/2002	South Ditch	PZ-16RSW	1170-PZ16-50									1	2	8						
SW	1/7/2002	South Ditch	SD-17	1170-PZ17-50									1	2	8						
SW	2/4/2002	South Ditch	ISCO1	1170-ISCO1-51 MS/MSD									1	2	8						
SW	2/4/2002	South Ditch	ISCO2	1170-ISCO2-51									1	2	8						
SW	2/4/2002	South Ditch	PZ-16RSW	1170-PZ16-51									1	2	8						
SW	2/4/2002	South Ditch	SD-17	1170-PZ17-51									1	2	8						
SW	2/25/2002	South Ditch	ISCO1	1170-ISCO1-52 MS/MSD									1	2	9						
SW	2/25/2002	South Ditch	ISCO2	1170-ISCO2-52									1	2	8						
SW	2/25/2002	South Ditch	PZ-16RSW	1170-PZ16-52									1	2	8						
SW	2/25/2002	South Ditch	SD-17	1170-PZ17-52									1	2	8						
SW	3/15/2002	Biocell	BIOCELL	1140-BIO-COMP MS/MSD				68										6			

Table 4.1-8
Surface Water Samples Representative of Current Conditions - OU1

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Olin Chemical Superfund Site
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Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles_Low_Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field_pH	TotalPetroleumHydrocarbons	VolatilePetroleum Hydrocarbons	ExtractablePetroleumHydrocarbons
SW	3/25/2002	South Ditch	ISCO1	1170-ISCO1-53 MS/MSD									1	2	8	1					
SW	3/25/2002	South Ditch	ISCO2	1170-ISCO2-53									1	2	8	1					
SW	3/25/2002	South Ditch	PZ-16RSW	1170-PZ16-53									1	2	8	1					
SW	3/25/2002	South Ditch	SD-17	1170-PZ17-53									1	2	8	1					
SW	4/22/2002	South Ditch	ISCO1	1170-ISCO1-54 MS/MSD									1	2	9						
SW	4/22/2002	South Ditch	ISCO2	1170-ISCO2-54									1	2	8						
SW	4/22/2002	South Ditch	PZ-16RSW	1170-PZ16-54									1	2	8						
SW	4/22/2002	South Ditch	SD-17	1170-PZ17-54									1	2	8						
SW	5/20/2002	South Ditch	ISCO1	1170-ISCO1-55									1	2	6						
SW	5/20/2002	South Ditch	ISCO2	1170-ISCO2-55									1	2	6						
SW	5/20/2002	South Ditch	SD-17	1170-PZ17-55									1	2	6						
SW	6/24/2002	South Ditch	ISCO1	1170-ISCO1-56									1	2	6						
SW	6/24/2002	South Ditch	ISCO2	1170-ISCO2-56									1	2	6						
SW	6/24/2002	South Ditch	SD-17	1170-PZ17-56									1	2	6						
SW	7/22/2002	South Ditch	ISCO1	1170-ISCO1-57									1	2	6						
SW	7/22/2002	South Ditch	SD-17	1170-PZ17-57									1	2	6						
SW	8/12/2002	South Ditch	ISCO1	1170-ISCO1-58									1	2	6						
SW	8/12/2002	South Ditch	SD-17	1170-PZ17-58									1	2	6						
SW	9/9/2002	South Ditch	ISCO1	1170-ISCO1-59									1	2	6						
SW	9/9/2002	South Ditch	SD-17	1170-PZ17-59									1	2	6						
SW	10/7/2002	South Ditch	ISCO1	1170-ISCO1-60									1	2	6						
SW	10/7/2002	South Ditch	SD-17	1170-PZ17-60									1	2	6						
SW	11/4/2002	South Ditch	ISCO1	1170-ISCO1-61									1	2	6						
SW	11/4/2002	South Ditch	ISCO2	1170-ISCO2-61									1	2	6						
SW	11/4/2002	South Ditch	SD-17	1170-PZ17-61									1	2	6						
SW	12/9/2002	South Ditch	ISCO1	1170-ISCO1-62									1	2	6						
SW	12/9/2002	South Ditch	ISCO2	1170-ISCO2-62									1	2	6						
SW	12/9/2002	South Ditch	SD-17	1170-PZ17-62									1	2	6						
SW	2/3/2003	South Ditch	ISCO1	1170-ISCO1-63									1	2	4						
SW	2/3/2003	South Ditch	ISCO2	1170-ISCO2-63									1	2	4						
SW	2/3/2003	South Ditch	SD-17	1170-PZ-17-63									1	2	4						
SW	2/6/2003	South Ditch	ISCO1	1170-ISCO1-63											2						
SW	2/6/2003	South Ditch	ISCO2	1170-ISCO2-63											2						
SW	2/6/2003	South Ditch	SD-17	1170-PZ-17-63											2						
SW	5/5/2003	South Ditch	ISCO1	1170-ISCO1-64									1	2	4		1				
SW	5/5/2003	South Ditch	ISCO2	1170-ISCO2-64									1	2	4		1				
SW	5/5/2003	South Ditch	SD-17	1170-PZ-17-64									1	2	4		1				
SW	5/19/2003	South Ditch	ISCO1	1170-ISCO1-64											2						
SW	5/19/2003	South Ditch	ISCO1	1170-ISCO1-AC									1		1	1	1				
SW	5/19/2003	South Ditch	ISCO2	1170-ISCO2-64											2						
SW	5/19/2003	South Ditch	SD-17	1170-PZ-17-64											2						
SW	5/23/2003	South Ditch	ISCO1	1170-ISCO1-AG									1		1	1	1				

Table 4.1-8
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Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles-Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field-pH	TotalPetroleumHydrocarbons	VolatilePetroleum Hydrocarbons	ExtractablePetroleumHydrocarbons
SW	5/26/2003	South Ditch	ISCO1	1170-ISCO1-AJ									1		1	1	1				
SW	5/26/2003	South Ditch	ISCO1	1170-ISCO1-AK									1		1	1	1				
SW	5/26/2003	South Ditch	ISCO1	1170-ISCO1-AL									1		1	1	1				
SW	5/27/2003	South Ditch	ISCO1	1170-ISCO1-AM									1		1	1	1				
SW	5/27/2003	South Ditch	ISCO1	1170-ISCO1-AN									1		1	1	1				
SW	5/27/2003	South Ditch	ISCO1	1170-ISCO1-AO									1		1	1	1				
SW	5/28/2003	South Ditch	ISCO1	1170-ISCO1-AP									1		1	1	1				
SW	5/30/2003	South Ditch	ISCO1	1170-ISCO1-AR									3		3						
SW	6/1/2003	South Ditch	ISCO1	1170-ISCO1-AT									3		3						
SW	6/1/2003	South Ditch	ISCO1	1170-ISCO1-AU									3		3						
SW	6/1/2003	South Ditch	ISCO1	1170-ISCO1-AV									3		3						
SW	6/1/2003	South Ditch	ISCO1	1170-ISCO1-AX									3		3						
SW	6/7/2003	South Ditch	ISCO1	1170-ISCO1-BD									3		3	1	1				
SW	6/7/2003	South Ditch	ISCO2	1170-ISCO2-AA									3		3	1	1				
SW	6/8/2003	South Ditch	ISCO2	1170-ISCO2-AB									3		3	1	1				
SW	6/12/2003	South Ditch	ISCO1	1170-ISCO1-BG									3		3	1	1				
SW	6/12/2003	South Ditch	ISCO2	1170-ISCO2-AF									3		3	1	1				
SW	6/14/2003	South Ditch	ISCO1	1170-ISCO1-BI									3		3	1	1				
SW	6/14/2003	South Ditch	ISCO2	1170-ISCO2-AH									3		3	1	1				
SW	6/22/2003	South Ditch	ISCO1	1170-ISCO1-BR									3		3	1	1				
SW	6/22/2003	South Ditch	ISCO1	1170-ISCO1-BU									3		3	1	1				
SW	6/22/2003	South Ditch	ISCO1	1170-ISCO1-BV									3		3	1	1				
SW	6/22/2003	South Ditch	ISCO1	1170-ISCO1-BW									3		3						
SW	6/22/2003	South Ditch	ISCO2	1170-ISCO2-AP									3		3	1	1				
SW	6/22/2003	South Ditch	ISCO2	1170-ISCO2-AQ									3		3	1	1				
SW	6/22/2003	South Ditch	ISCO2	1170-ISCO2-AR									3		3	1	1				
SW	6/23/2003	South Ditch	ISCO1	1170-ISCO1-BX									3		3	1	1				
SW	6/23/2003	South Ditch	ISCO2	1170-ISCO2-AS									3		3	1	1				
SW	6/23/2003	South Ditch	ISCO2	1170-ISCO2-AT									3		3	1	1				
SW	6/25/2003	South Ditch	ISCO1	1170-ISCO1-BZ									3		3	1	1				
SW	6/25/2003	South Ditch	ISCO2	1170-ISCO2-AV									3		3	1	1				
SW	7/10/2003	South Ditch	ISCO1	1170-ISCO1-64			1														
SW	7/10/2003	South Ditch	ISCO2	1170-ISCO2-64			1														
SW	7/10/2003	South Ditch	SD-17	1170-P217R-64			1														
SW	8/11/2003	South Ditch	ISCO1	1170-ISCO1-65									1	2	6						
SW	8/11/2003	South Ditch	ISCO2	1170-ISCO2-65									1	2	6						
SW	8/11/2003	South Ditch	SD-17	1170-PZ-17-65									1	2	6						
SW	11/17/2003	South Ditch	ISCO1	1170-ISCO1-66									1	2	6						
SW	11/17/2003	South Ditch	ISCO2	1170-ISCO2-66									1	2	6						
SW	11/17/2003	South Ditch	SD-17	1170-PZ17-66									1	2	6						
SW	2/2/2004	South Ditch	ISCO1	1170-ISCO1-67									1	2	6		1				
SW	2/2/2004	South Ditch	SD-17	1170-PZ-17-67									1	2	6		1				

Table 4.1-8
Surface Water Samples Representative of Current Conditions - OU1

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Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles_Low_Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field_pH	TotalPetroleumHydrocarbons	VolatilePetroleum Hydrocarbons	ExtractablePetroleumHydrocarbons
SW	5/10/2004	South Ditch	ISCO1	1170-ISCO1-68									1	2	6		1				
SW	5/10/2004	South Ditch	ISCO2	1170-ISCO2-68									1	2	6		1				
SW	5/10/2004	South Ditch	SD-17	1170-PZ-17-68									1	2	6		1				
SW	8/9/2004	South Ditch	ISCO1	1170-ISCO1-69									1	2	6		1				
SW	8/9/2004	South Ditch	ISCO2	1170-ISCO2-69									1	2	6		1				
SW	8/9/2004	South Ditch	SD-17	1170-PZ-17-69									1	2	6		1				
SW	11/1/2004	South Ditch	ISCO1	1170-ISCO1-70									1	2	6		1				
SW	11/1/2004	South Ditch	ISCO2	1170-ISCO2-70									1	2	6		1				
SW	11/1/2004	South Ditch	SD-17	1170-PZ-17-70									1	2	6		1				
SW	1/31/2005	South Ditch	ISCO1	1170-ISCO1-71									1	2	6		1				
SW	1/31/2005	South Ditch	ISCO2	1170-ISCO2-71									1	2	6		1				
SW	1/31/2005	South Ditch	SD-17	1170-PZ-17-71									1	2	6		1				
SW	5/9/2005	South Ditch	ISCO1	1170-ISCO1-72									1	2	6		1				
SW	5/9/2005	South Ditch	ISCO2	1170-ISCO2-72									1	2	6		1				
SW	5/9/2005	South Ditch	SD-17	1170-PZ-17-72									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-A	SDSW-A-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-B	SDSW-B-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-C	SDSW-C-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-D	SDSW-D-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-E	SDSW-E-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-F	SDSW-F-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-G	SDSW-G-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-H	SDSW-H-01									1	2	6		1				
SW	5/9/2005	South Ditch	SDSW-I	SDSW-I-01									1	2	6		1				
SW	8/2/2005	South Ditch	ISCO1	1170-ISCO1-73									1	2	6		1				
SW	8/2/2005	South Ditch	SD-17	1170-PZ-17-73									1	2	6		1				
SW	8/2/2005	South Ditch	SDSW-A	SD-SW-A-02									3	3	6		1				
SW	8/2/2005	South Ditch	SDSW-C	SD-SW-C-02									3	3	6		1				
SW	8/2/2005	South Ditch	SDSW-D	SD-SW-D-02									3	3	6		1				
SW	9/22/2005	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-01												4	1				
SW	9/22/2005	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-01												4	1				
SW	9/22/2005	South Ditch	PZ-18R	PZ-18R-SURFACE-F-01												4	1				
SW	9/22/2005	South Ditch	PZ-20	PZ-20-SURFACE-F-01												4	1				
SW	9/22/2005	South Ditch	PZ-21	PZ-21-SURFACE-F-01												4	1				
SW	9/22/2005	South Ditch	PZ-22	PZ-22-SURFACE-F-01												4	1				
SW	10/26/2005	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-02												4	1				
SW	10/26/2005	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-02												4	1				
SW	10/26/2005	South Ditch	PZ-18R	PZ-18R-SURFACE-F-02												4	1				
SW	10/26/2005	South Ditch	PZ-20	PZ-20-SURFACE-F-02												4	1				
SW	10/26/2005	South Ditch	PZ-21	PZ-21-SURFACE-F-02												4	1				
SW	10/26/2005	South Ditch	PZ-22	PZ-22-SURFACE-F-02												4	1				
SW	10/26/2005	South Ditch	PZ-23	PZ-23-SURFACE-F-02												4	1				

Table 4.1-8
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Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles-Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field-pH	Totalpetroleum Hydrocarbons	Volatilepetroleum Hydrocarbons	Extractable PetroleumHydrocarbons
SW	11/8/2005	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-03A												4	1				
SW	11/8/2005	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-03A												4	1				
SW	11/8/2005	South Ditch	PZ-20	PZ-20-SURFACE-F-03A												4	1				
SW	11/21/2005	South Ditch	ISCO1	1170-ISCO1-74									1	2	6		1				
SW	11/21/2005	South Ditch	ISCO2	1170-ISCO2-74									1	2	6		1				
SW	11/21/2005	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-03B												4	1				
SW	11/21/2005	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-03B												4	1				
SW	11/21/2005	South Ditch	PZ-18R	PZ-18R-SURFACE-F-03B												4	1				
SW	11/21/2005	South Ditch	PZ-20	PZ-20-SURFACE-F-03B												4	1				
SW	11/21/2005	South Ditch	PZ-21	PZ-21-SURFACE-F-03B												4	1				
SW	11/21/2005	South Ditch	PZ-22	PZ-22-SURFACE-F-03B												4	1				
SW	11/21/2005	South Ditch	PZ-23	PZ-23-SURFACE-F-03B												4	1				
SW	11/21/2005	South Ditch	SD-17	1170-PZ-17-74									1	2	6		1				
SW	11/21/2005	South Ditch	SDSW-A	SD-SW-A-03									3	3	6		1				
SW	11/21/2005	South Ditch	SDSW-B	SD-SW-B-03									3	3	6		1				
SW	11/21/2005	South Ditch	SDSW-C	SD-SW-C-03									3	3	6		1				
SW	11/21/2005	South Ditch	SDSW-D	SD-SW-D-03									3	3	6		1				
SW	11/21/2005	South Ditch	SDSW-E	SD-SW-E-03									3	3	6		1				
SW	11/21/2005	South Ditch	SDSW-F	SD-SW-F-03									3	3	6		1				
SW	11/21/2005	South Ditch	SDSW-G	SD-SW-G-03									3	3	6		1				
SW	11/21/2005	South Ditch	SDSW-H	SD-SW-H-03									3	3	6		1				
SW	11/21/2005	Ephemeral Ditch	SDSW-J	SD-SW-J-03									3	3	6		1				
SW	12/5/2005	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-04A												4	1				
SW	12/5/2005	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-04A												4	1				
SW	12/5/2005	South Ditch	PZ-20	PZ-20-SURFACE-F-04A												4	1				
SW	12/19/2005	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-04B												4	1				
SW	12/19/2005	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-04B												4	1				
SW	12/19/2005	South Ditch	PZ-20	PZ-20-SURFACE-F-04B												4	1				
SW	12/19/2005	South Ditch	PZ-21	PZ-21-SURFACE-F-04B												4	1				
SW	12/19/2005	South Ditch	PZ-22	PZ-22-SURFACE-F-04B												4	1				
SW	12/19/2005	South Ditch	PZ-23	PZ-23-SURFACE-F-04B												4	1				
SW	1/9/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-05A												4	1				
SW	1/9/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-05A												4	1				
SW	1/9/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-05A												4	1				
SW	1/24/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-05B												4	1				
SW	1/24/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-05B												4	1				
SW	1/24/2006	South Ditch	PZ-18R	PZ-18R-SURFACE-F-05B												4	1				
SW	1/24/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-05B												4	1				
SW	1/24/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-05B												4	1				
SW	1/24/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-05B												4	1				
SW	1/24/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-05B												4	1				
SW	2/20/2006	South Ditch	ISCO1	1170-ISCO1-75											3						

Table 4.1-8
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Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles-Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field- pH	Totalpetroleum Hydrocarbons	Volatilepetroleum Hydrocarbons	Extractable PetroleumHydrocarbons
SW	2/20/2006	South Ditch	ISCO2	1170-ISCO2-75											4						
SW	2/20/2006	South Ditch	SD-17	1170-PZ-17-75											4						
SW	2/20/2006	South Ditch	SDSW-A	SDSW-A-03											4						
SW	2/20/2006	South Ditch	SDSW-B	SDSW-B-03											4						
SW	2/20/2006	South Ditch	SDSW-C	SDSW-C-03											4						
SW	2/20/2006	South Ditch	SDSW-D	SDSW-D-03											4						
SW	2/20/2006	South Ditch	SDSW-E	SDSW-E-03											4						
SW	2/20/2006	South Ditch	SDSW-F	SDSW-F-03											4						
SW	2/20/2006	South Ditch	SDSW-G	SDSW-G-03											4						
SW	2/20/2006	South Ditch	SDSW-H	SDSW-H-03											4						
SW	2/20/2006	Ephemeral Ditch	SDSW-J	SDSW-J-03											2						
SW	2/21/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-06												4	1				
SW	2/21/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-06												4	1				
SW	2/21/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-06												4	1				
SW	2/21/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-06												4	1				
SW	2/21/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-06												4	1				
SW	2/21/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-06												4	1				
SW	3/7/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-07A												4	1				
SW	3/7/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-07A												4	1				
SW	3/7/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-07A												4	1				
SW	3/20/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-07B												4	1				
SW	3/20/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-07B												4	1				
SW	3/20/2006	South Ditch	PZ-18R	PZ-18R-SURFACE-F-07B												4	1				
SW	3/20/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-07B												4	1				
SW	3/20/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-07B												4	1				
SW	3/20/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-07B												4	1				
SW	3/20/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-07B												4	1				
SW	4/24/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-08												4	1				
SW	4/24/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-08												4	1				
SW	4/24/2006	South Ditch	PZ-18R	PZ-18RR-SURFACE-F-08												4	1				
SW	4/24/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-08												4	1				
SW	4/24/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-08												4	1				
SW	4/24/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-08												4	1				
SW	4/24/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-08												4	1				
SW	5/8/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-09A												4	1				
SW	5/8/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-09A												4	1				
SW	5/8/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-09A												4	1				
SW	5/23/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-09B												4	1				
SW	5/23/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-09B												4	1				
SW	5/23/2006	South Ditch	PZ-18R	PZ-18R-SURFACE-F-09B												4	1				
SW	5/23/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-09B												4	1				
SW	5/23/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-09B												4	1				

Table 4.1-8
Surface Water Samples Representative of Current Conditions - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Semivolatiles	NDMA	Semivolatiles_Low Level	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals,Total	Metals,Filtered	Inorganics/Physical	Field	Field_pH	TotalPetroleumHydrocarbons	VolatilePetroleum Hydrocarbons	ExtractablePetroleumHydrocarbons
SW	5/23/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-09B													4	1			
SW	5/23/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-09B													4	1			
SW	6/5/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-10A													4	1			
SW	6/5/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-10A													4	1			
SW	6/5/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-10A													4	1			
SW	6/19/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-10B													4	1			
SW	6/19/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-10B													4	1			
SW	6/19/2006	South Ditch	PZ-18R	PZ-18R-SURFACE-F-10B													4	1			
SW	6/19/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-10B													4	1			
SW	6/19/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-10B													4	1			
SW	6/19/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-10B													4	1			
SW	6/19/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-10B													4	1			
SW	7/5/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-11A													4	1			
SW	7/5/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-11A													4	1			
SW	7/5/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-11A													4	1			
SW	7/18/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-11B													4	1			
SW	7/18/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-11B													4	1			
SW	7/18/2006	South Ditch	PZ-18R	PZ-18R-SURFACE-F-11B													4	1			
SW	7/18/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-11B													4	1			
SW	7/18/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-11B													4	1			
SW	7/18/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-11B													4	1			
SW	7/18/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-11B													4	1			
SW	8/10/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-12A													4	1			
SW	8/10/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-12A													4	1			
SW	8/10/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-12A													4	1			
SW	8/22/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-12B													4	1			
SW	8/22/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-12B													4	1			
SW	8/22/2006	South Ditch	PZ-18R	PZ-18R-SURFACE-F-12B													4	1			
SW	8/22/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-12B													4	1			
SW	8/22/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-12B													4	1			
SW	8/22/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-12B													4	1			
SW	8/22/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-12B													4	1			
SW	9/18/2006	South Ditch	PZ-16RR	PZ-16RR-SURFACE-F-13A													4	1			
SW	9/18/2006	South Ditch	PZ-17RR	PZ-17RR-SURFACE-F-13A													4	1			
SW	9/18/2006	South Ditch	PZ-18R	PZ-18R-SURFACE-F-13A													4	1			
SW	9/18/2006	South Ditch	PZ-20	PZ-20-SURFACE-F-13A													4	1			
SW	9/18/2006	South Ditch	PZ-21	PZ-21-SURFACE-F-13A													4	1			
SW	9/18/2006	South Ditch	PZ-22	PZ-22-SURFACE-F-13A													4	1			
SW	9/18/2006	South Ditch	PZ-23	PZ-23-SURFACE-F-13A													4	1			

Prepared/Date: KJC 8/14/07
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Table 4.1-9
Summary of Surface Water Analytical Data for Current Conditions - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Semivolatile Organics (mg/L)	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Surface Water Background
bis(2-EthylHexyl)phthalate	11 / 20	55%	0.01 : 0.01	0.0024 - 0.22	2.54E-02	**0.004**
N-Nitrosodimethylamine	3 / 3	100%	:	0.0000057 - 0.00021	8.59E-05	
Metals, Total (mg/L)						
Aluminum, Total	36 / 36	100%	:	0.106 - 60	3.48E+00	219
Antimony, Total	1 / 3	33%	0.02 : 0.02	0.069 - 0.069	2.97E-02	ND
Arsenic, Total	1 / 3	33%	0.01 : 0.01	0.041 - 0.041	1.70E-02	0.247
Barium, Total	2 / 3	67%	0.01 : 0.01	0.018 - 0.045	2.27E-02	0.989
Beryllium, Total	1 / 3	33%	0.002 : 0.002	0.0097 - 0.0097	3.90E-03	**0.0084**
Cadmium, Total	1 / 3	33%	0.001 : 0.001	0.0014 - 0.0014	8.00E-04	0.0118
Calcium, Total	6 / 6	100%	:	31 - 86	5.48E+01	**30.7**
Chromium, Total	177 / 190	93%	0.005 : 0.01	0.007 - 11	3.40E-01	**0.219**
Cobalt, Total	1 / 3	33%	0.01 : 0.01	0.014 - 0.014	8.00E-03	0.168
Copper, Total	1 / 3	33%	0.02 : 0.02	0.25 - 0.25	9.00E-02	0.544
Iron, Total	36 / 36	100%	:	0.37 - 81	3.51E+00	343
Lead, Total	1 / 3	33%	0.01 : 0.01	0.028 - 0.028	1.27E-02	1.37
Magnesium, Total	3 / 3	100%	:	3 - 7.7	4.90E+00	20
Manganese, Total	3 / 3	100%	:	0.02 - 0.39	1.93E-01	12.3
Nickel, Total	1 / 3	33%	0.02 : 0.02	0.034 - 0.034	1.80E-02	0.134
Potassium, Total	3 / 3	100%	:	1.7 - 2	1.83E+00	21.7
Sodium, Total	15 / 15	100%	:	8.7 - 140	9.64E+01	**126**
Strontium, Total	3 / 3	100%	:	0.096 - 0.13	1.15E-01	
Vanadium, Total	1 / 3	33%	0.01 : 0.01	0.038 - 0.038	1.60E-02	0.264
Zinc, Total	1 / 3	33%	0.05 : 0.05	0.17 - 0.17	7.33E-02	2.94
Metals, Filtered (mg/L)						
Aluminum, Filtered	83 / 141	59%	0.05 : 0.1	0.025 - 4.63	3.15E-01	
Calcium, Filtered	1 / 1	100%	:	31 - 31	3.10E+01	
Chromium, Filtered	93 / 153	61%	0.005 : 0.01	0.005 - 1.33	6.16E-02	
Magnesium, Filtered	1 / 1	100%	:	2.4 - 2.4	2.40E+00	
Manganese, Filtered	1 / 1	100%	:	0.026 - 0.026	2.60E-02	
Potassium, Filtered	1 / 1	100%	:	1.7 - 1.7	1.70E+00	
Sodium, Filtered	13 / 13	100%	:	20 - 160	1.13E+02	
Strontium, Filtered	1 / 1	100%	:	0.09 - 0.09	9.00E-02	
Inorganics (mg/L)						
Bicarbonate alkalinity as CaCO3	23 / 23	100%	:	16 - 150	4.23E+01	
Chemical Oxygen Demand (COD)	1 / 3	33%	20 : 20	28 - 28	1.60E+01	
Chloride	177 / 178	99%	1 : 1	18 - 540	1.17E+02	**110**
Hardness by Calculation	2 / 2	100%	:	77 - 110	9.35E+01	**87**
Nitrate & Nitrite as N	82 / 85	96%	0.05 : 0.05	0.063 - 6.9	1.33E+00	
Nitrate as N	70 / 70	100%	:	0.088 - 8.6	1.36E+00	

Table 4.1-9
Summary of Surface Water Analytical Data for Current Conditions - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Percent Detected	Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Surface Water Background
Nitrite as N	26	/	69	38%	0.01	:	0.1	0.01	-	0.18	2.77E-02	
Nitrogen, Ammonia	154	/	154	100%		:		0.26	-	200	4.63E+01	ND
Nitrogen, Total Kjeldahl as N	2	/	3	67%	1	:	1	1.1	-	79	2.69E+01	
Odor **(TON)**	3	/	3	100%		:		1	-	1	1.00E+00	
pH **(pH units)**	43	/	43	100%		:		5.47	-	7.92	6.39E+00	
Phosphate, Total as P	3	/	3	100%		:		0.68	-	0.95	8.40E-01	
Specific Conductance **(umhos/cm)**	122	/	122	100%		:		152	-	4780	9.94E+02	
Sulfate as SO4	186	/	187	99%	20	:	20	9.5	-	1400	2.84E+02	**24**
Total Dissolved Solids (TDS)	3	/	3	100%		:		430	-	750	5.40E+02	**280**
Total Organic Carbon (TOC)	3	/	3	100%		:		1.3	-	35	1.40E+01	
Total Suspended Solids	2	/	3	67%	5	:	5	7.5	-	320	1.10E+02	
Turbidity **(NTU)**	3	/	3	100%		:		0.63	-	12	4.84E+00	
Field Measurements (mg/L)												
Dissolved Oxygen	112	/	112	100%		:		2.4	-	15.26	8.60E+00	
Hardness as CaCO3	4	/	4	100%		:		74	-	150	1.31E+02	
Nitrogen, Ammonia	106	/	112	95%	0.1	:	0.1	2.5	-	150	3.95E+01	
pH **(pH units)**	185	/	185	100%		:		4.2	-	7.8	6.19E+00	
Specific Conductance **(umhos/cm)**	139	/	139	100%		:		200	-	6260	1.16E+03	

BOLD maximum concentration is greater than that background concentration

mg/L - milligrams per Liter
NTU - Nephelometric Turbidity Units
umhos/cm - microOhms per centimeter

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Table 4.1-10
Summary of Background Surface Water Data

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples
Volatile Organics (mg/L)										
1,1,1-Trichloroethane (TCA)	1	/	6	0.005	:	0.005	0.004	-	0.004	2.75E-03
Tetrachloroethene (PCE)	1	/	6	0.005	:	0.005	0.004	-	0.004	2.75E-03
Toluene	1	/	6	0.005	:	0.005	0.013	-	0.013	4.25E-03
Xylenes, Total	1	/	6	0.005	:	0.005	0.019	-	0.019	5.25E-03
Semivolatile Organics (mg/L)										
bis(2-EthylHexyl)phthalate	1	/	7	0.01	:	0.01	0.004	-	0.004	4.86E-03
Diethylphthalate	1	/	7	0.01	:	0.01	0.0008	-	0.0008	4.40E-03
Di-n-butylphthalate	1	/	7	0.01	:	0.01	0.001	-	0.001	4.43E-03
Metals, Total (mg/L)										
Aluminum, Total	2	/	7	0.1	:	0.1	0.37	-	219	3.14E+01
Arsenic, Total	1	/	7	0.008	:	0.008	0.247	-	0.247	3.87E-02
Barium, Total	7	/	7		:		0.01	-	0.989	1.59E-01
Beryllium, Total	1	/	7	0.005	:	0.005	0.0084	-	0.0084	3.34E-03
Cadmium, Total	1	/	7	0.01	:	0.01	0.0118	-	0.0118	5.97E-03
Calcium, Total	7	/	7		:		9.9	-	30.7	1.98E+01
Chromium, Total	1	/	7	0.015	:	0.015	0.219	-	0.219	3.77E-02
Cobalt, Total	1	/	7	0.03	:	0.03	0.168	-	0.168	3.69E-02
Copper, Total	1	/	7	0.025	:	0.025	0.544	-	0.544	8.84E-02
Iron, Total	7	/	7		:		0.16	-	343	4.95E+01
Lead, Total	1	/	7	0.005	:	0.005	1.37	-	1.37	1.98E-01
Magnesium, Total	7	/	7		:		2.1	-	20	5.21E+00
Manganese, Total	7	/	7		:		0.01	-	12.3	1.80E+00
Mercury, Total	1	/	7	0.0002	:	0.0002	0.0021	-	0.0021	3.86E-04
Nickel, Total	1	/	7	0.04	:	0.04	0.134	-	0.134	3.63E-02
Potassium, Total	7	/	7		:		1.2	-	21.7	5.04E+00
Selenium, Total	1	/	7	0.01	:	0.01	0.0134	-	0.0134	6.20E-03
Sodium, Total	7	/	7		:		32	-	126	5.56E+01
Thallium, Total	1	/	7	0.015	:	0.015	0.0193	-	0.0193	9.19E-03
Vanadium, Total	1	/	7	0.025	:	0.025	0.264	-	0.264	4.84E-02
Zinc, Total	4	/	7	0.025	:	0.025	0.03	-	2.94	4.41E-01
Inorganic (mg/L)										
Chloride	4	/	4		:		68	-	110	8.33E+01
Hardness by Calculation	4	/	4		:		35	-	87	5.85E+01
Sulfate as SO4	4	/	4		:		19	-	24	2.13E+01
Total Dissolved Solids (TDS)	4	/	4		:		150	-	280	1.98E+02

mg/L = milligrams per Liter

Prepared/Date: KJC 08/07/07
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Table 4.1-11
Sediment Sample List - Excavated

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Volatiles	Semivolatiles	Pesticides	PCBs	Metals, Total	Inorganics/Physical	Field
SD	01-Sep-92	South Ditch	SW-10	SW-10			36	65	21		23	4	
SD	01-Sep-92	South Ditch	SW-11	SW-11			36	65	21		23	4	
SD	01-Sep-92	South Ditch	SW-14	SW-14			36	65	21		23	4	
SD	01-Sep-92	Delta	SW-7	SW-07			36	65	21		23	4	
SD	01-Sep-92	Central Pond	SW-8	SW-08			36	65	21		23	4	
SD	01-Sep-92	South Ditch	SW-9	SW-09			36	65	21		23	4	
SD	02-Sep-92	Buried Debris Area	SW-12	SW-12			36	65	21		23	4	
SD	02-Sep-92	On-Property West Ditch	SW-13	SW-13			36	65	21		23	4	
SD	01-Dec-92	South Ditch	SW-10	SW-10			36	65	21		23	4	
SD	01-Dec-92	South Ditch	SW-11	SW-11			36	65	21		23	4	
SD	01-Dec-92	Buried Debris Area	SW-12	SW-12			36	65	21		23	4	
SD	01-Dec-92	On-Property West Ditch	SW-13	SW-13			36	65	21		24	6	
SD	01-Dec-92	South Ditch	SW-14	SW-14			36	65	21		23	4	
SD	01-Dec-92	Delta	SW-7	SW-07			36	65	21		23	4	
SD	01-Dec-92	Central Pond	SW-8	SW-08			36	65	21		24	6	
SD	01-Dec-92	South Ditch	SW-9	SW-09			36	65	21		23	4	
SD	02-Feb-95	South Ditch	SED-17	SED-17,11"							12	5	1
SD	13-Sep-95	Central Pond	POND	POND			36	64	21	7	23	1	
SD	11-Oct-96	Buried Debris Area	BS001	BS001WDXXX					21	7	23		
SD	11-Oct-96	West Ditch Wetland	BS002	BS002WDXXX					21	7	23		
SD	20-Jan-97	Buried Debris Area	BS005	BS005WDX				65	21		23	1	
SD	20-Jan-97	On-Property West Ditch	BS006	BS006WDX				65	21		23	1	
SD	20-Jan-97	South Ditch	BS008	BS008SD				65	21		23	1	
SD	20-Jan-97	Central Pond	BS009	BS009PND				65	21		23	1	
SD	20-Jan-97	Central Pond	BS010	BS010PND				65	21		23	1	
SD	04-Aug-99	On-Property West Ditch	RAM-1	RAM-1				67					
SD	04-Aug-99	On-Property West Ditch	RAM-10	RAM-10			64	67					
SD	04-Aug-99	On-Property West Ditch	RAM-11	RAM-11				67					
SD	04-Aug-99	On-Property West Ditch	RAM-12	RAM-12				67					
SD	04-Aug-99	Buried Debris Area	RAM-13	RAM-13			64	67					
SD	04-Aug-99	Buried Debris Area	RAM-14	RAM-14			64	67					
SD	04-Aug-99	Buried Debris Area	RAM-15	RAM-15			64	67					
SD	04-Aug-99	On-Property West Ditch	RAM-2	RAM-2			64	67					
SD	04-Aug-99	On-Property West Ditch	RAM-3	RAM-3				67					
SD	04-Aug-99	On-Property West Ditch	RAM-4	RAM-4				67					
SD	04-Aug-99	On-Property West Ditch	RAM-5	RAM-5				67					
SD	04-Aug-99	On-Property West Ditch	RAM-6	RAM-6				67					
SD	04-Aug-99	On-Property West Ditch	RAM-7	RAM-7			64	67					
SD	04-Aug-99	On-Property West Ditch	RAM-8	RAM-8				67					
SD	04-Aug-99	On-Property West Ditch	RAM-9	RAM-9				67					
SD	18-Jan-00	Buried Debris Area	RSD-03	RSD-03			37	66		7	22	1	
SD	18-Jan-00	Buried Debris Area	RSD-04	RSD-04			37	66			22	1	

Table 4.1-11
Sediment Sample List - Excavated

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Volatiles	Semivolatiles	Pesticides	PCBs	Metals, Total	Inorganics/Physical	Field	
SD	18-Jan-00	On-Property West Ditch	RSD-05	RSD-05			37	66		7	23	1		
SD	18-Jan-00	South Ditch	RSD-06	RSD-06			37	66		7	22	1		
SD	18-Jan-00	South Ditch	RSD-07	RSD-07			37	66		7	22	1		
SD	18-Jan-00	Central Pond	RSD-08	RSD-08			37	66		7	22	1		
SD	22-May-00	On-Property West Ditch	RAM-1	RAM #1				67				1		
SD	22-May-00	On-Property West Ditch	RAM-10	RAM #10				67				1		
SD	22-May-00	On-Property West Ditch	RAM-11	RAM #11				67				1		
SD	22-May-00	On-Property West Ditch	RAM-12	RAM #12				67				1		
SD	22-May-00	On-Property West Ditch	RAM-2	RAM #2				67				1		
SD	22-May-00	On-Property West Ditch	RAM-3	RAM #3				67				1		
SD	22-May-00	On-Property West Ditch	RAM-4	RAM #4				67				1		
SD	22-May-00	On-Property West Ditch	RAM-5	RAM #5				67				1		
SD	22-May-00	On-Property West Ditch	RAM-6	RAM #6				67				1		
SD	22-May-00	On-Property West Ditch	RAM-7	RAM #7				67				1		
SD	22-May-00	On-Property West Ditch	RAM-8	RAM #8				67				1		
SD	22-May-00	On-Property West Ditch	RAM-9	RAM #9				67				1		
SD	23-May-00	West Ditch Wetland	RSD-20	RSD-20	3.6	3.6					1	1		
SD	23-May-00	West Ditch Wetland	RSD-21	RSD-21	5.3	5.3					1	1		
SD	23-May-00	West Ditch Wetland	RSD-22	RSD-22	1.2	1.2					1	1		
SD	23-May-00	Buried Debris Area	RSD-23	RSD-23	0.5	0.5					1	1		
SD	23-May-00	Central Pond	RSD-24	RSD-24	0.5	0.5					1	1		
SD	23-May-00	Central Pond	RSD-25	RSD-25	1.2	1.2					1	1		
SD	23-May-00	Central Pond	RSD-26	RSD-26	0.75	0.75					1	1		
SD	23-May-00	Central Pond	RSD-27	RSD-27	0.67	0.67					1	1		
SD	23-May-00	Central Pond	RSD-28	RSD-28	0.5	0.5					1	1		
SD	23-May-00	South Ditch	RSD-29	RSD-29	0.75	0.75					1	1		
SD	23-May-00	South Ditch	RSD-30	RSD-30	0.5	0.5					1	1		
SD	23-May-00	South Ditch	RSD-31	RSD-31	0.17	0.17					1	1		
SD	23-May-00	South Ditch	RSD-32	RSD-32	0.5	0.5					1	1		
SD	23-May-00	South Ditch	RSD-33	RSD-33	2.1	2.1					1	1		
SD	23-May-00	South Ditch	RSD-34	RSD-34	0.33	0.33					1	1		
SD	23-May-00	South Ditch	RSD-35	RSD-35	0.5	0.5					1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-1	1140-WDW-1D	2.6	4.2		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-1	1140-WDW-1S	2.1	2.6		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-2	1140-WDW-2D	2.6	4.2		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-2	1140-WDW-2S	2.1	2.6		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-4	1140-WDW-4D	3	4.1		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-4	1140-WDW-4S	2.5	3		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-5	1140-WDW-5D	2.1	3.2		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-5	1140-WDW-5S	1.6	2.1		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-7	1140-WDW-7D	-0.3	0.6		67			1	1		
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-7	1140-WDW-7S	-0.8	-0.3		67			1	1		

Table 4.1-11
Sediment Sample List - Excavated

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Volatiles	Semivolatiles	Pesticides	PCBs	Metals, Total	Inorganics/Physical	Field
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-9	1140-WDW-9D	-0.2	0.8		67			1	1	
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-9	1140-WDW-9S	-0.7	-0.2		67			1	1	
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-15	1120-WDW-15D (6-30)	1.1	3.1		67			1	1	
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-15	1120-WDW-15S (0-6)	0.6	1.1		67			1	1	
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-18	1120-WDW-18D (6-30)	-0.2	1.8		67			1	1	
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-18	1120-WDW-18S (0-6)	-0.7	-0.2		67			1	1	
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-21C	1120-WDW-21CD (6-30)	0.5	2.5		67			8	1	
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-21C	1120-WDW-21CS (0-6)	0	0.5		67			8	1	
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-3	1120-WDW-3D (6-30)	2.8	4.8	62	67			8	1	
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-3	1120-WDW-3S (0-6)	2.3	2.8	62	67			8	1	
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-8	1120-WDW-8D (6-30)	-0.6	1.4	62	67			8	1	
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-8	1120-WDW-8S (0-6)	-1.1	-0.6	62	67			8	1	
SD	19-Sep-00	Central Pond	CP-C1	1140-CP-C1	5.6	5.6		67			1	1	
SD	19-Sep-00	Central Pond	CP-C2	1140-CP-C2	6	6		67			1	1	
SD	19-Sep-00	Central Pond	CP-C3	1140-CP-C3	5.4	5.4		67			1	1	
SD	19-Sep-00	Central Pond	CP-C4	1140-CP-C4	5	5	64	67			8	1	
SD	19-Sep-00	Central Pond	CP-C5	1140-CP-C5	4.8	4.8		67			1	1	
SD	19-Sep-00	Central Pond	CP-C6	1140-CP-C6	5.3	5.3		67			1	1	
SD	19-Sep-00	Central Pond	CP-C7	1140-CP-C7	4.9	4.9		67			1	1	
SD	19-Sep-00	Central Pond	CP-C8	1140-CP-C8	5.7	5.7	64	67			8	1	
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C10	1140-WDW-C10	0.5	0.5	64	67	19		8	1	
SD	01-Nov-00	On-Property West Ditch Wetland	WDW-C21	1140-WDW-C21	0.5	0.5		67			1	1	
SD	01-Nov-00	On-Property West Ditch Wetland	WDW-C22	1140-WDW-C22	-0.6	-0.6		67			1	1	
SD	01-Nov-00	On-Property West Ditch Wetland	WDW-C25	1140-WDW-C25	-0.1	-0.1		67			1	1	

Prepared/Date: KJC 8/14/07
Checked/Date: MH 8/14/07

Table 4.1-12
Sediment Sample List - Unknown

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Semivolatiles	Metals, Total	Inorganics/Physical	Field	Oil &Gr ease
SD	14-May-90		SS-14 SED	SS-14 SED						1	1
SD	23-May-00	West Ditch Wetland	RSD-16	RSD-16	1.5	1.5		1	1		
SD	23-May-00	West Ditch Wetland	RSD-17	RSD-17	1.3	1.3		1	1		
SD	23-May-00	West Ditch Wetland	RSD-18	RSD-18	1.4	1.4		1	1		
SD	23-May-00	West Ditch Wetland	RSD-19	RSD-19	1.3	1.3		1	1		
SD	23-May-00		RSD-36	RSD-36	3	3	67	1	1		
SD	23-May-00		RSD-37	RSD-37			67	1	1		
SD	23-May-00		RSD-38	RSD-38			67	1	1		
SD	23-May-00		RSD-39	RSD-39			67	1	1		

Prepared/Date: KJC 8/14/07
Checked/Date: MH 8/14/07

Table 4.1-13
Sediment Sample List - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Metals-Total	Inorganics/Physical	Field	Field - pH	Oil & Grease	Extractable Petroleum Hydrocarbons
SD	20-Jan-97	South Ditch	BS011	BS011WMD				65			21		23	1				
SD	18-Jan-00		RSD-01	RSD-01				66					22	1				
SD	18-Jan-00		RSD-01	RSD-01RE			37											
SD	18-Jan-00		RSD-02	RSD-02			37	66					22	1				
SD	18-Jan-00		RSD-10	RSD-10			37	66					23	1				
SD	18-Jan-00		RSD-12	RSD-12			37	66					22	1				
SD	19-Jan-00		RSD-09	RSD-09			37	66					22	1				
SD	19-Jan-00		RSD-11	RSD-11			37	66					22	1				
SD	19-Jan-00	Ephemeral Ditch	RSD-13	RSD-13			37	66					22	1				
SD	19-Jan-00	Ephemeral Ditch	RSD-14	RSD-14			37	66					22	1				
SD	19-Jan-00	Ephemeral Ditch	RSD-15	RSD-15			37	66					22	1				
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-11	1140-WDW-11S	0	0.5		67					1	1				
SD	25-Aug-00	On-Property West Ditch Wetland	WDW-11	1140-WDW-11D	0.5	2.1		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-12	1120-WDW-12S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-12	1120-WDW-12D (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-13	1120-WDW-13S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-13	1120-WDW-13D (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-17	1120-WDW-17S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-17	1120-WDW-17D (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-19	1120-WDW-19S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-19	1120-WDW-19D (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-21A	1120-WDW-21AS (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-21A	1120-WDW-21AD (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-21B	1120-WDW-21BS (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-21B	1120-WDW-21BD (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-22	1120-WDW-22S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-22	1120-WDW-22D (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-24	1120-WDW-24S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-24	1120-WDW-24D (6-24)	0.5	2		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-25	1120-WDW-25S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-25	1120-WDW-25D (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-26	1120-WDW-26S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-26	1120-WDW-26D (6-24)	0.5	2		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-28	1120-WDW-28S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-28	1120-WDW-28D (6-24)	0.5	2		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-29	1120-WDW-29S (0-6)	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-29	1120-WDW-29D (6-30)	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-30	1120-WDW-30S	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-30	1120-WDW-30D	0.5	2.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-31	1120-WDW-31S	0	0.5		67					1	1				
SD	30-Aug-00	On-Property West Ditch Wetland	WDW-31	1120-WDW-31D	0.5	2.5		67					1	1				
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-10	1120-WDW-10S (0-6)	0.4	0.9		67					8	1				
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-10	1120-WDW-10D (6-30)	0.9	2.9		67					8	1				
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-14	1120-WDW-14S (0-6)	0	0.5	62	67					8	1				

Table 4.1-13
Sediment Sample List - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Metals-Total	Inorganics/Physical	Field	Field - pH	Oil & Grease	Extractable Petroleum Hydrocarbons
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-14	1120-WDW-14D (6-30)	0.5	2.5	62	66				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-16	1120-WDW-16S (0-6)	0	0.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-16	1120-WDW-16D (6-30)	0.5	2.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-20	1120-WDW-20S (0-6)	0	0.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-20	1120-WDW-20D (6-30)	0.5	2.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-23	1120-WDW-23S (0-6)	0	0.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-23	1120-WDW-23D (6-30)	0.5	2.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-27	1120-WDW-27S (0-6)	0	0.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-27	1120-WDW-27D (6-30)	0.5	2.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-32	1120-WDW-32S (0-6)	0	0.5	62	67				8	1					
SD	31-Aug-00	On-Property West Ditch Wetland	WDW-32	1120-WDW-32D (6-30)	0.5	2.5	62	67				8	1					
SD	11-Oct-00	On-Property West Ditch Wetland	WDW-C12	1140-WDW-C12	2.1	2.1		67				1	1					
SD	11-Oct-00	On-Property West Ditch Wetland	WDW-C15	1140-WDW-C15	1.5	1.5		67				1	1					
SD	11-Oct-00	On-Property West Ditch Wetland	WDW-C3	1140-WDW-C3	2.5	2.5		67				1	1					
SD	11-Oct-00	On-Property West Ditch Wetland	WDW-C6	1140-WDW-C6	2.5	2.5		67				1	1					
SD	11-Oct-00	On-Property West Ditch Wetland	WDW-C9	1140-WDW-C9	3.5	3.5		67				1	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C1	1140-WDW-C1	0.5	0.5		67				1	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C11	1140-WDW-C11	2.2	2.2	64	67			19	8	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C13	1140-WDW-C13	0.5	0.5		67				1	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C14	1140-WDW-C14	0.5	0.5		67				1	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C16	1140-WDW-C16	0.5	0.5		67				1	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C2	1140-WDW-C2	0.5	0.5		67				1	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C4	1140-WDW-C4	0.4	0.4	64	67			19	8	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C5	1140-WDW-C5	0.7	0.7	64	67			19	8	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C7	1140-WDW-C7	2.7	2.7		67				1	1					
SD	18-Oct-00	On-Property West Ditch Wetland	WDW-C8	1140-WDW-C8	0.2	0.2		67				1	1					
SD	27-Oct-00	Buried Debris Area	BD-C17	1120-BD-C17	0.2	0.2	64	67			19	8	1					
SD	27-Oct-00	Buried Debris Area	BD-C27	1120-BD-C27	0.5	0.5	64	67			19	8	1					
SD	27-Oct-00	Buried Debris Area	BD-C32	1120-BD-C32	0.6	0.6	64	67			19	8	1					
SD	01-Nov-00	On-Property West Ditch Wetland	WDW-C17	1140-WDW-C17	0.5	0.5		67				1	1					
SD	01-Nov-00	On-Property West Ditch Wetland	WDW-C19	1140-WDW-C19	0.5	0.5		67				1	1					
SD	02-Nov-00	On-Property West Ditch Wetland	WDW-C18	1140-WDW-C18	2.7	2.7	64	67			19	8	1					
SD	02-Nov-00	On-Property West Ditch Wetland	WDW-C20	1140-WDW-C20	3.1	3.1	64	67			19	8	1					
SD	02-Nov-00	On-Property West Ditch Wetland	WDW-C23	1140-WDW-C23	3	3		67				1	1					
SD	02-Nov-00	On-Property West Ditch Wetland	WDW-C24	1140-WDW-C24	1.5	1.5		67				1	1					
SD	17-Sep-01	South Ditch	SDC-1	1010-SED-SDC-1S	0	0.5	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-1	1010-SED-SDC-1D	0.5	1.3		67				9	4					22
SD	17-Sep-01	South Ditch	SDC-1	1010-SED-SDC-1D	0.5	1.3	64						1					
SD	17-Sep-01	South Ditch	SDC-2	1010-SED-SDC-2S	0	0.5	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-3	1010-SED-SDC-3S	0	0.5	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-3	1010-SED-SDC-3D	0.5	1.3	64	67				9	5					22
SD	17-Sep-01	South Ditch	SDC-4	1010-SED-SDC-4S	0	0.5	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-4	1010-SED-SDC-4D	0.5	1.8	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-5	1010-SED-SDC-5S	0	0.5	64	67				9	4					22

Table 4.1-13
Sediment Sample List - OU1

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Metals-Total	Inorganics/Physical	Field	Field - pH	Oil & Grease	Extractable Petroleum Hydrocarbons
SD	17-Sep-01	South Ditch	SDC-5	1010-SED-SDC-5D	0.5	2	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-6	1010-SED-SDC-6S	0	0.5	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-6	1010-SED-SDC-6D	0.5	1.4	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-7	1010-SED-SDC-7S	0	0.5	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-7	1010-SED-SDC-7D	0.5	1.1	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-8	1010-SED-SDC-8S	0	0.5	64	67				9	4					22
SD	17-Sep-01	South Ditch	SDC-8	1010-SED-SDC-8D	0.5	1.1	64	67				9	5					22
SD	17-Jun-03	On-Property West Ditch	SD-SD1	SD-SD1-03-01	0	0.25			1			15	1					
SD	17-Jun-03	On-Property West Ditch	SD-SD1	SD-SD1-15-01	0.25	1.25			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD2	SD-SD2-03-01	0	0.25			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD2	SD-SD2-15-01	0.25	1.25			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD3	SD-SD3-03-01	0	0.25			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD3	SD-SD3-15-01	0.25	1.25			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD4	SD-SD4-03-01	0	0.25			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD4	SD-SD4-12-01	0.25	1			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD5	SD-SD5-03-01	0	0.25			1			15	1					
SD	17-Jun-03	South Ditch	SD-SD5	SD-SD5-13-01	0.25	1.08			1			15	1					
SD	10-Aug-04	On-Property West Ditch	SD-SD1	SD-SD1-03-02	0	0.25						3	2					
SD	10-Aug-04	On-Property West Ditch	SD-SD1	SD-SD1-15-02	0.25	1.25						3	2					
SD	10-Aug-04	South Ditch	SD-SD2	SD-SD2-03-02	0	0.25						3	2					
SD	10-Aug-04	South Ditch	SD-SD2	SD-SD2-12-02	0.25	1						3	2					
SD	10-Aug-04	South Ditch	SD-SD3	SD-SD3-03-02	0	0.25						3	2					
SD	10-Aug-04	South Ditch	SD-SD3	SD-SD3-12-02	0.25	1						3	2					
SD	10-Aug-04	South Ditch	SD-SD4	SD-SD4-03-02	0	0.25						3	2					
SD	10-Aug-04	South Ditch	SD-SD4	SD-SD4-12-02	0.25	1						3	2					
SD	10-Aug-04	South Ditch	SD-SD5	SD-SD5-03-02	0	0.25						3	2					
SD	10-Aug-04	South Ditch	SD-SD5	SD-SD5-15-02	0.25	1.25						3	2					
SD	19-May-05	On-Property West Ditch	SD-SD1	SD-SD1-(15)-03								3	1		1			
SD	19-May-05	On-Property West Ditch	SD-SD1	SD-SD1-03-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD2	SD-SD2-(12)-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD2	SD-SD2-03-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD3	SD-SD3-(15)-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD3	SD-SD3-03-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD4	SD-SD4-(10)-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD4	SD-SD4-03-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD5	SD-SD5-(15)-03								3	1		1			
SD	19-May-05	South Ditch	SD-SD5	SD-SD5-03-03								3	1		1			
SD	22-Aug-05	Lower South Ditch	BS030	BS030LSD-02	0	0.5		68		16	19	24	5					
SD	22-Aug-05	Lower South Ditch	BS030	BS030LSD-02 RE	0	0.5		68					1					
SD	22-Aug-05	Lower South Ditch	BS031	BS031LSD-02	0	0.5		68		16	19	24	5					
SD	22-Aug-05	Lower South Ditch	BS032	BS032LSD-02	0	0.5		68		16	19	24	5					
SD	22-Aug-05	Lower South Ditch	BS032	BS032LSD-02 RE	0	0.5		68					1					

Prepared/Date: KJC 08/14/07
Checked/Date: MH 08/14/07

Table 4.1-14
Summary Statistics of OU1 Sediment

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Maximum Detected Background Concentration
Volatile Organics (mg/Kg)						
2,4,4-Trimethyl-1-pentene	6 / 32	19%	0.008 : 0.98	0.088 - 5.4	4.80E-01	ND
2,4,4-Trimethyl-2-Pentene	4 / 32	13%	0.008 : 0.98	0.022 - 2.3	2.79E-01	ND
Acetone	3 / 44	7%	0.013 : 38	0.095 - 0.34	5.48E+00	**0.19**
Benzene	1 / 44	2%	0.007 : 1.9	4.4 - 4.4	3.74E-01	ND
Chlorobenzene	1 / 44	2%	0.007 : 1.9	0.11 - 0.11	2.77E-01	ND
Ethylbenzene	2 / 44	5%	0.007 : 1.9	0.26 - 0.54	2.88E-01	ND
m,p-Xylene	1 / 35	3%	0.14 : 1.9	0.58 - 0.58	3.57E-01	
Methylene Chloride	3 / 44	7%	0.007 : 1.9	0.66 - 1.1	3.91E-01	**0.013**
Semivolatile Organics (mg/Kg)						
Benzo(b)fluoranthene	1 / 78	1%	0.36 : 440	3 - 3	5.97E+00	**0.77**
Benzoic Acid	1 / 96	1%	1.8 : 5700	0.11 - 0.11	1.71E+02	0.26
bis(2-EthylHexyl)phthalate	57 / 96	59%	0.39 : 54	0.26 - 24827	7.37E+02	**2**
Di-n-butylphthalate	5 / 96	5%	0.36 : 1100	0.016 - 263	3.45E+01	ND
Fluoranthene	1 / 78	1%	0.36 : 440	6.1 - 6.1	6.01E+00	**1.2**
N-Nitrosodiphenylamine	3 / 96	3%	0.36 : 1100	0.13 - 2.6	3.40E+01	ND
Phenanthrene	1 / 78	1%	0.36 : 440	3.2 - 3.2	5.97E+00	**0.46**
Pyrene	1 / 78	1%	0.36 : 440	4.2 - 4.2	5.99E+00	**1**
Polyaromatic Hydrocarbons (mg/Kg)						
Benzo(a)anthracene	3 / 3	100%	:	0.31 - 3.1	1.31E+00	
Benzo(a)pyrene	3 / 3	100%	:	0.032 - 0.099	6.03E-02	
Benzo(b)fluoranthene	2 / 3	67%	0.088 : 0.088	0.046 - 0.067	5.23E-02	
Benzo(g,h,i)perylene	3 / 3	100%	:	0.13 - 0.64	3.00E-01	
Benzo(k)fluoranthene	2 / 3	67%	0.088 : 0.088	0.014 - 0.025	2.77E-02	
Chrysene	3 / 3	100%	:	0.061 - 0.44	1.88E-01	
Dibenzo(a,h)anthracene	3 / 3	100%	:	0.028 - 0.26	1.12E-01	
Fluoranthene	3 / 3	100%	:	0.13 - 1.8	7.07E-01	
Indeno (1,2,3-cd) pyrene	1 / 3	33%	0.026 : 0.03	0.19 - 0.19	7.27E-02	
Phenanthrene	3 / 3	100%	:	0.038 - 0.1	6.47E-02	
Pyrene	3 / 3	100%	:	0.052 - 0.16	9.70E-02	
Pesticides/PCBs (mg/Kg)						
4,4'-DDT	1 / 12	8%	0.0061 : 0.54	0.062 - 0.062	8.76E-02	
Heptachlor	1 / 12	8%	0.011 : 0.54	0.00059 - 0.00059	8.31E-02	
Hexachlorobenzene	1 / 3	33%	0.011 : 0.013	0.037 - 0.037	1.63E-02	
Inorganics (mg/Kg)						
Aluminum, Total	65 / 65	100%	:	1100 - 23000	6.34E+03	**20400**
Antimony, Total	1 / 23	4%	0.624 : 5.1	2 - 2	8.77E-01	ND
Arsenic, Total	17 / 51	33%	2 : 27	2.1 - 35	6.03E+00	44

Table 4.1-14
Summary Statistics of OU1 Sediment

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Maximum Detected Background Concentration
Barium, Total	37 / 38	97%	19 : 19	3.4 - 90	2.83E+01	106
Beryllium, Total	8 / 23	35%	0.07 : 0.3	0.12 - 2.2	3.37E-01	ND
Cadmium, Total	13 / 60	22%	0.062 : 5	0.212 - 1.2	6.62E-01	ND
Calcium, Total	13 / 13	100%	:	130 - 1900	5.72E+02	4100
Chromium, Total	111 / 130	85%	6 : 19	1.7 - 10000	5.54E+02	**24.4**
Cobalt, Total	7 / 13	54%	0.6 : 2	2.2 - 8.7	2.63E+00	23.3
Copper, Total	11 / 13	85%	1 : 1	1.4 - 22	6.05E+00	58.3
Hexavalent Chromium, Total	6 / 19	32%	0.75 : 6.9	7.9 - 95	9.00E+00	**1.2**
Iron, Total	65 / 65	100%	:	210 - 92000	9.51E+03	**34100**
Lead, Total	51 / 60	85%	3 : 9	2.5 - 110	2.29E+01	147
Magnesium, Total	13 / 13	100%	:	44 - 739	2.99E+02	3900
Manganese, Total	13 / 13	100%	:	4 - 87	2.73E+01	776
Mercury, Total	23 / 50	46%	0.06 : 0.3	0.045 - 1.8	3.01E-01	**0.54**
Nickel, Total	20 / 23	87%	1 : 2	2.1 - 18	7.45E+00	21.4
Potassium, Total	7 / 13	54%	99 : 1000	68 - 210	1.67E+02	980
Silver, Total	1 / 38	3%	0.6 : 27	0.877 - 0.877	2.92E+00	ND
Sodium, Total	5 / 13	38%	65 : 510	100 - 3200	3.65E+02	**332**
Thallium, Total	1 / 23	4%	0.6 : 4	0.96 - 0.96	6.77E-01	3.6
Vanadium, Total	23 / 23	100%	:	1.9 - 80	1.59E+01	**32**
Zinc, Total	21 / 23	91%	3 : 4	3.3 - 2060	1.18E+02	**379**
Nitrogen, Ammonia	4 / 4	100%	:	54 - 264	1.50E+02	897
pH	15 / 15	100%	:	6.26 - 7.42	6.92E+00	
Sulfide	0 / 3	0%	350 : 440	-	1.97E+02	
Field Measurements (pH units)						
pH	10 / 10	100%	:	6.16 - 6.98	6.51E+00	
EPH (mg/Kg)						
Chrysene	1 / 15	7%	0.5 : 23	1.7 - 1.7	4.81E+00	
Fluoranthene	1 / 15	7%	0.5 : 23	34 - 34	6.97E+00	
Indeno (1,2,3-cd) pyrene	1 / 15	7%	0.5 : 23	19 - 19	5.97E+00	
C11-C22 Aromatics (FID)	15 / 15	100%	:	41 - 21000	7.78E+03	
C11-C22 Aromatics, Unadjusted	15 / 15	100%	:	41 - 21000	7.78E+03	
C19-C36 Aliphatics (PID)	15 / 15	100%	:	47 - 16000	5.46E+03	
C9-C18 Aliphatics (FID)	15 / 15	100%	:	9.5 - 3100	1.05E+03	
EPH Concentration (Total)	15 / 15	100%	:	110 - 39000	1.43E+04	

Prepared/Date: KJC 08/15/07
Checked/Date: MH 08/17/07

mg/Kg = milligrams per kilogram
ND = Not detected
BOLD = maximum concentration is greater than that background concentration

Table 4.1-15
Background Sediment Data

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples
Volatile Organics (mg/Kg)				
1,1,1-Trichloroethane (TCA)	2 / 6	0.009 : 0.015	0.013 - 0.019	9.50E-03
2-Butanone (MEK)	1 / 6	0.027 : 0.044	0.13 - 0.13	3.77E-02
Acetone	2 / 6	0.027 : 0.044	0.011 - 0.19	4.66E-02
Methylene Chloride	2 / 6	0.023 : 0.029	0.01 - 0.013	1.26E-02
Tetrachloroethene (PCE)	5 / 6	0.012 : 0.012	0.006 - 0.025	1.42E-02
Xylenes, Total	2 / 6	0.012 : 0.015	0.004 - 0.009	6.58E-03
Semivolatile Organics (mg/Kg)				
Acenaphthylene	1 / 6	0.53 : 0.96	0.078 - 0.078	3.16E-01
Anthracene	1 / 6	0.53 : 0.96	0.088 - 0.088	3.17E-01
Benzo(a)anthracene	1 / 6	0.53 : 0.96	0.42 - 0.42	3.73E-01
Benzo(a)pyrene	2 / 6	0.53 : 0.96	0.42 - 0.53	3.95E-01
Benzo(b)fluoranthene	2 / 6	0.53 : 0.79	0.75 - 0.77	4.76E-01
Benzo(g,h,i)perylene	1 / 6	0.53 : 0.96	0.11 - 0.11	3.21E-01
Benzo(k)fluoranthene	1 / 6	0.53 : 0.96	0.69 - 0.69	4.18E-01
Benzoic Acid	1 / 1	:	0.26 - 0.26	2.60E-01
bis(2-EthylHexyl)phthalate	5 / 6	0.96 : 0.96	0.24 - 2	9.52E-01
Chrysene	2 / 6	0.53 : 0.79	0.51 - 0.64	4.14E-01
Diethylphthalate	1 / 6	0.53 : 0.96	0.052 - 0.052	3.11E-01
Fluoranthene	2 / 6	0.53 : 0.79	0.86 - 1.2	5.66E-01
Indeno (1,2,3-cd) pyrene	1 / 6	0.53 : 0.96	0.12 - 0.12	3.23E-01
Phenanthrene	1 / 6	0.53 : 0.96	0.46 - 0.46	3.79E-01
Pyrene	2 / 6	0.53 : 0.79	0.75 - 1	5.14E-01
Pesticides/PCBs (mg/Kg)				
4,4'-DDD	11 / 16	0.005 : 0.01	0.0028 - 0.26	3.30E-02
4,4'-DDE	9 / 16	0.005 : 0.01	0.0028 - 0.46	3.78E-02
4,4'-DDT	3 / 16	0.005 : 0.012	0.0016 - 0.031	5.73E-03
Alpha-Chlordane	2 / 16	0.0026 : 0.01	0.003 - 0.0056	2.48E-03
Dieldrin	2 / 16	0.005 : 0.018	0.017 - 0.027	6.77E-03
Gamma-Chlordane	2 / 16	0.0026 : 0.01	0.0013 - 0.0053	2.35E-03

Table 4.1-15
Background Sediment Data

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples
Inorganics (mg/Kg)										
Aluminum, Total	7	/	7		:		1100	-	20400	9.51E+03
Arsenic, Total	7	/	7		:		4.8	-	44	1.57E+01
Barium, Total	7	/	7		:		8.2	-	106	3.99E+01
Calcium, Total	7	/	7		:		1000	-	4100	2.11E+03
Chromium, Total	7	/	7		:		11	-	24.4	1.65E+01
Cobalt, Total	3	/	7	4.9	:	7.2	6.7	-	23.3	7.16E+00
Copper, Total	6	/	7	5.7	:	5.7	15	-	58.3	2.52E+01
Hexavalent Chromium, Total	5	/	6	0.5	:	0.5	0.53	-	1.2	6.52E-01
Iron, Total	7	/	7		:		4000	-	34100	1.17E+04
Lead, Total	7	/	7		:		11	-	147	5.40E+01
Magnesium, Total	7	/	7		:		220	-	3900	1.76E+03
Manganese, Total	7	/	7		:		55	-	776	3.54E+02
Mercury, Total	3	/	7	0.14	:	0.35	0.27	-	0.54	2.31E-01
Nickel, Total	4	/	7	7.8	:	9.6	11	-	21.4	1.10E+01
Potassium, Total	6	/	7	100	:	100	270	-	980	4.87E+02
Sodium, Total	7	/	7		:		70	-	332	1.73E+02
Thallium, Total	1	/	7	2.5	:	4.9	3.6	-	3.6	2.03E+00
Vanadium, Total	7	/	7		:		8.9	-	32	2.04E+01
Zinc, Total	7	/	7		:		18	-	379	1.11E+02
Nitrogen, Ammonia	1	/	1		:		897	-	897	8.97E+02
Total Organic Carbon (TOC)	16	/	16		:		15000	-	570000	1.51E+05

mg/Kg = milligrams per kilogram

Prepared/Date: KJC 08/15/07
Checked/Date: MH 08/17/07

Table 4.1-16
Summary Statistics of West Ditch Wetland Area Sediment

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Sediment Background
Volatile Organics (mg/Kg)						
2,4,4-Trimethyl-1-pentene	2 / 10	20%	0.018 : 0.98	1.3 - 5.4	9.06E-01	ND
2,4,4-Trimethyl-2-Pentene	2 / 10	20%	0.018 : 0.98	0.59 - 2.3	5.25E-01	ND
Acetone	2 / 22	9%	2.9 : 38	0.095 - 0.34	8.51E+00	**0.19**
Benzene	1 / 22	5%	0.018 : 1.9	4.4 - 4.4	6.25E-01	ND
Chlorobenzene	1 / 22	5%	0.018 : 1.9	0.11 - 0.11	4.30E-01	ND
Ethylbenzene	1 / 22	5%	0.018 : 1.9	0.54 - 0.54	4.46E-01	ND
m,p-Xylene	1 / 20	5%	0.14 : 1.9	0.58 - 0.58	4.92E-01	
Methylene Chloride	3 / 22	14%	0.018 : 1.9	0.66 - 1.1	5.37E-01	**0.013**
Semivolatile Organics (mg/Kg)						
Benzo(b)fluoranthene	1 / 70	1%	0.36 : 440	3 - 3	6.61E+00	**0.77**
bis(2-EthylHexyl)phthalate	37 / 70	53%	1.1 : 54	1.1 - 871	2.69E+01	**2**
Di-n-butylphthalate	4 / 70	6%	0.36 : 54	0.45 - 263	7.28E+00	ND
Fluoranthene	1 / 70	1%	0.36 : 440	6.1 - 6.1	6.66E+00	**1.2**
N-Nitrosodiphenylamine	1 / 70	1%	0.36 : 440	2.6 - 2.6	6.62E+00	ND
Phenanthrene	1 / 70	1%	0.36 : 440	3.2 - 3.2	6.62E+00	**0.46**
Pyrene	1 / 70	1%	0.36 : 440	4.2 - 4.2	6.63E+00	**1**
Inorganics (mg/Kg)						
Aluminum, Total	30 / 30	100%	:	1100 - 14000	4.54E+03	20400
Arsenic, Total	3 / 24	13%	2 : 9	3.9 - 7.77	3.23E+00	44
Barium, Total	4 / 4	100%	:	3.4 - 41.1	2.38E+01	106
Beryllium, Total	1 / 4	25%	0.1 : 0.164	0.61 - 0.61	2.04E-01	ND
Cadmium, Total	5 / 26	19%	0.2 : 2	0.229 - 1.2	5.28E-01	ND
Calcium, Total	2 / 2	100%	:	200 - 900	5.50E+02	4100
Chromium, Total	57 / 76	75%	6 : 19	4.5 - 410	3.63E+01	**24.4**
Copper, Total	2 / 2	100%	:	2.1 - 17	9.55E+00	58.3
Iron, Total	30 / 30	100%	:	270 - 17000	4.74E+03	34100
Lead, Total	19 / 26	73%	4 : 9	2.5 - 110	2.38E+01	147
Magnesium, Total	2 / 2	100%	:	88 - 180	1.34E+02	3900
Manganese, Total	2 / 2	100%	:	4 - 22	1.30E+01	776
Mercury, Total	5 / 24	21%	0.06 : 0.3	0.23 - 0.44	1.39E-01	0.54
Nickel, Total	3 / 4	75%	2 : 2	6.7 - 11.4	7.10E+00	21.4
Sodium, Total	1 / 2	50%	99 : 99	3200 - 3200	1.62E+03	**332**
Vanadium, Total	4 / 4	100%	:	3 - 27	1.69E+01	379
Zinc, Total	4 / 4	100%	:	5.2 - 47.4	2.84E+01	
Field Measurements						
pH **(pH units)**	2 / 2	100%	:	6.42 - 6.42	6.42E+00	

Prepared/Date: KJC 08/15/07
Checked/Date: MH 08/17/07

BOLD maximum concentration is greater than that background concentration

mg/Kg = milligrams per kilogram
ND = Not detected

Table 4.1-17
Summary Statistics for Upper South Ditch Sediment

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Sediment Background
Inorganics (mg/Kg)						
Aluminum, Total	24 / 24	100%	:	4300 - 23000	8511.7	**20400**
Arsenic, Total	8 / 8	100%	:	5.36 - 13.1	8.0	44
Barium, Total	8 / 8	100%	:	14.8 - 57.8	39.4	106
Cadmium, Total	7 / 8	88%	0.062 : 0.062	0.212 - 0.902	0.4	ND
Chromium, Total	24 / 24	100%	:	15 - 4200	330.8	**24.4**
Iron, Total	24 / 24	100%	:	6570 - 92000	15837.1	**34100**
Lead, Total	8 / 8	100%	:	4.33 - 50.7	33.0	147
Nickel, Total	8 / 8	100%	:	6.55 - 12.4	9.6	21.4
Silver, Total	1 / 8	13%	0.624 : 0.826	0.877 - 0.877	0.4	ND
Vanadium, Total	8 / 8	100%	:	11.9 - 27.4	18.9	32
Zinc, Total	8 / 8	100%	:	14.4 - 2060	305.4	**379**
Field Measurements						
pH **(pH units)**	8 / 8	100%	:	6.16 - 6.98	6.5	

Prepared/Date: KJC 08/15/07
Checked/Date: MH 08/17/07

BOLD maximum concentration is greater than that background concentration

mg/Kg = milligrams per kilogram
ND = Not detected

Table 4.1-18
Summary Statistics for Lower South Ditch and Ephemeral Drainage Area Sediment

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Sediment Background
Volatile Organics (mg/Kg)						
2,4,4-Trimethyl-1-pentene	4 / 22	18%	0.008 : 0.71	0.088 - 2.8	2.87E-01	ND
2,4,4-Trimethyl-2-Pentene	2 / 22	9%	0.008 : 0.71	0.022 - 1	1.67E-01	ND
Acetone	1 / 22	5%	0.013 : 14	0.13 - 0.13	2.44E+00	0.19
Ethylbenzene	1 / 22	5%	0.007 : 0.71	0.26 - 0.26	1.30E-01	ND
Semivolatile Organics (mg/Kg)						
Benzoic Acid	1 / 26	4%	1.9 : 5700	0.11 - 0.11	5.44E+02	0.26
bis(2-EthylHexyl)phthalate	20 / 26	77%	0.39 : 0.97	0.26 - 24827	2.65E+03	**2**
Di-n-butylphthalate	1 / 26	4%	0.39 : 1100	0.016 - 0.016	1.08E+02	ND
N-Nitrosodiphenylamine	2 / 26	8%	0.39 : 1100	0.13 - 1.4	1.08E+02	ND
Polyaromatic Hydrocarbons (mg/Kg)						
Benzo(a)anthracene	3 / 3	100%	:	0.31 - 3.1	1.31E+00	**0.42**
Benzo(a)pyrene	3 / 3	100%	:	0.032 - 0.099	6.03E-02	0.53
Benzo(b)fluoranthene	2 / 3	67%	0.088 : 0.088	0.046 - 0.067	5.23E-02	0.77
Benzo(g,h,i)perylene	3 / 3	100%	:	0.13 - 0.64	3.00E-01	**0.11**
Benzo(k)fluoranthene	2 / 3	67%	0.088 : 0.088	0.014 - 0.025	2.77E-02	0.69
Chrysene	3 / 3	100%	:	0.061 - 0.44	1.88E-01	0.64
Dibenzo(a,h)anthracene	3 / 3	100%	:	0.028 - 0.26	1.12E-01	ND
Fluoranthene	3 / 3	100%	:	0.13 - 1.8	7.07E-01	**1.2**
Indeno (1,2,3-cd) pyrene	1 / 3	33%	0.026 : 0.03	0.19 - 0.19	7.27E-02	**0.12**
Phenanthrene	3 / 3	100%	:	0.038 - 0.1	6.47E-02	0.46
Pyrene	3 / 3	100%	:	0.052 - 0.16	9.70E-02	1
Pesticides/PCBs (mg/Kg)						
4,4'-DDT	1 / 4	25%	0.0061 : 0.013	0.062 - 0.062	1.93E-02	**0.031**
Heptachlor	1 / 4	25%	0.011 : 0.02	0.00059 - 0.00059	5.65E-03	ND
Hexachlorobenzene	1 / 3	33%	0.011 : 0.013	0.037 - 0.037	1.63E-02	ND
Inorganics (mg/Kg)						
Aluminum, Total	11 / 11	100%	:	1200 - 15000	6.50E+03	20400
Antimony, Total	1 / 11	9%	1 : 5.1	2 - 2	1.22E+00	ND
Arsenic, Total	6 / 19	32%	8 : 27	2.1 - 35	8.72E+00	44
Barium, Total	25 / 26	96%	19 : 19	3.6 - 90	2.56E+01	106
Beryllium, Total	7 / 11	64%	0.07 : 0.3	0.12 - 2.2	5.78E-01	ND
Cadmium, Total	1 / 26	4%	0.1 : 5	0.94 - 0.94	8.85E-01	ND
Calcium, Total	11 / 11	100%	:	130 - 1900	5.76E+02	4100
Chromium, Total	26 / 26	100%	:	1.7 - 10000	2.34E+03	**24.4**
Cobalt, Total	7 / 11	64%	0.6 : 1	2.2 - 8.7	2.97E+00	23.3
Copper, Total	9 / 11	82%	1 : 1	1.4 - 22	5.42E+00	58.3
Hexavalent Chromium, Total	6 / 19	32%	0.75 : 6.9	7.9 - 95	9.00E+00	**1.2**

Table 4.1-18
Summary Statistics for Lower South Ditch and Ephemeral Drainage Area Sediment

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Sediment Background
Iron, Total	11 / 11	100%	:	210 - 35000	8.73E+03	**34100**
Lead, Total	24 / 26	92%	3 : 8	4.2 - 57	1.88E+01	147
Magnesium, Total	11 / 11	100%	:	44 - 739	3.28E+02	3900
Manganese, Total	11 / 11	100%	:	6.9 - 87	2.99E+01	776
Mercury, Total	18 / 26	69%	0.06 : 0.17	0.045 - 1.8	4.51E-01	**0.54**
Nickel, Total	9 / 11	82%	1 : 1	2.1 - 18	6.05E+00	21.4
Potassium, Total	7 / 11	64%	220 : 1000	68 - 210	1.83E+02	980
Sodium, Total	4 / 11	36%	65 : 510	100 - 330	1.36E+02	332
Thallium, Total	1 / 11	9%	0.6 : 4	0.96 - 0.96	8.05E-01	3.6
Vanadium, Total	11 / 11	100%	:	1.9 - 80	1.34E+01	**32**
Zinc, Total	9 / 11	82%	3 : 4	3.3 - 57	1.48E+01	379
Nitrogen, Ammonia	4 / 4	100%	:	54 - 264	1.50E+02	897
pH **(pH units)**	15 / 15	100%	:	6.26 - 7.42	6.92E+00	
EPH (mg/Kg)						
Chrysene	1 / 15	7%	0.5 : 23	1.7 - 1.7	4.81E+00	**0.64**
Fluoranthene	1 / 15	7%	0.5 : 23	34 - 34	6.97E+00	**1.2**
Indeno (1,2,3-cd) pyrene	1 / 15	7%	0.5 : 23	19 - 19	5.97E+00	**0.12**
C11-C22 Aromatics (FID)	15 / 15	100%	:	41 - 21000	7.78E+03	
C11-C22 Aromatics, Unadjusted	15 / 15	100%	:	41 - 21000	7.78E+03	
C19-C36 Aliphatics (PID)	15 / 15	100%	:	47 - 16000	5.46E+03	
C9-C18 Aliphatics (FID)	15 / 15	100%	:	9.5 - 3100	1.05E+03	
EPH Concentration (Total)	15 / 15	100%	:	110 - 39000	1.43E+04	

BOLD maximum concentration is greater than that background concentration

mg/Kg = milligrams per kilogram
ND = Not detected

Prepared/Date: KJC 8/07/07
Checked/Date: MH 8/14/07

Table 4.2-1
Surface Water Samples Representative of Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field_pH
SW	6/4/2001	East Ditch	ISCO3	1170-ISCO3-25										1	2	4			
SW	7/2/2001	East Ditch	ISCO3	1170-ISCO3-33										1	2	4			
SW	8/6/2001	East Ditch	ISCO3	1170-ISCO3-38										1	2	4			
SW	9/4/2001	East Ditch	ISCO3	1170-ISCO3-42										1	2	4			
SW	10/8/2001	East Ditch	ISCO3	1170-ISCO3-43										1	2	4			
SW	10/17/2001	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 D										5	5	3			
SW	10/17/2001	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1 MS/MSD										5	5	3			
SW	10/17/2001	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2										5	5	3			
SW	10/17/2001	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3										5	5	3			
SW	10/17/2001	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6										5	5	3			
SW	10/17/2001	Maple Meadow Brook	MMB-SW/SD-7	MMB-SW7										5	5	3			
SW	10/18/2001	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4										5	5	3			
SW	10/18/2001	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5										5	5	3			
SW	10/18/2001	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A										5	5	3			
SW	11/12/2001	East Ditch	ISCO3	1170-ISCO3-44										1	2	4			
SW	12/10/2001	East Ditch	ISCO3	1170-ISCO3-46										1	2	4			
SW	1/7/2002	East Ditch	ISCO3	1170-ISCO3-50										1	2	8			
SW	2/4/2002	East Ditch	ISCO3	1170-ISCO3-51										1	2	8			
SW	2/25/2002	East Ditch	ISCO3	1170-ISCO3-52										1	2	8			
SW	3/25/2002	East Ditch	ISCO3	1170-ISCO3-53										1	2	8	1		
SW	4/22/2002	East Ditch	ISCO3	1170-ISCO3-54										1	2	8			
SW	5/20/2002	East Ditch	ISCO3	1170-ISCO3-55										1	2	6			
SW	6/12/2002	Maple Meadow Brook	MMB-SW/SD-1	MMBSW1-02										5	5	3			
SW	6/12/2002	Maple Meadow Brook	MMB-SW/SD-2	MMBSW2-02										5	5	3			
SW	6/12/2002	Maple Meadow Brook	MMB-SW/SD-3	MMBSW3-02										5	5	3			
SW	6/12/2002	Maple Meadow Brook	MMB-SW/SD-6	MMBSW6-02										5	5	3			
SW	6/12/2002	Maple Meadow Brook	MMB-SW/SD-7	MMBSW7-02										5	5	3			
SW	6/13/2002	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW04-02										5	5	3			
SW	6/13/2002	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW05-02										5	5	3			
SW	6/13/2002	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A-02										5	5	3			
SW	6/24/2002	East Ditch	ISCO3	1170-ISCO3-56										1	2	6			
SW	7/22/2002	East Ditch	ISCO3	1170-ISCO3-57										1	2	6			
SW	11/4/2002	East Ditch	ISCO3	1170-ISCO3-61										1	2	6			
SW	11/14/2002	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N										17	15	8			
SW	11/14/2002	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S										17	15	8			
SW	11/14/2002	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS										17	15	8			
SW	11/14/2002	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW										17	15	8			
SW	12/9/2002	East Ditch	ISCO3	1170-ISCO3-62										1	2	6			
SW	12/9/2002	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N				1			1								

Table 4.2-1
Surface Water Samples Representative of Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field_pH
SW	12/9/2002	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S				1			1								
SW	12/9/2002	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS				1			1								
SW	12/9/2002	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW				1			1								
SW	2/3/2003	East Ditch	ISCO3	1170-ISCO3-63											1	2	4		
SW	2/6/2003	East Ditch	ISCO3	1170-ISCO3-63													2		
SW	2/12/2003	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S				1			1				17	15	6		
SW	2/12/2003	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS				1			1				17	15	6		
SW	2/12/2003	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW				1			1				17	15	6		
SW	5/5/2003	East Ditch	ISCO3	1170-ISCO3-64											1	2	4		1
SW	5/19/2003	East Ditch	ISCO3	1170-ISCO3-64													2		
SW	5/21/2003	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N				1	1		1				17	15	7		1
SW	5/21/2003	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S				1	1		1				17	15	7		1
SW	5/21/2003	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS				1	1		1				17	15	7		1
SW	5/21/2003	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW				1	1		1				17	15	7		1
SW	6/3/2003	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3-03					1										1
SW	6/3/2003	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4-03					1										1
SW	6/3/2003	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6-03					1										1
SW	6/3/2003	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW8-03					1										1
SW	6/3/2003	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW9-03					1										1
SW	6/18/2003	East Ditch	EDSD/SW6	EDSW6-01	68			65	1	16	20	9			24	23	16		
SW	6/19/2003	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-01	68			65	1	16	20	9	18	2	24	23	16		
SW	6/19/2003	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-01	68			65	1	16	20	9	18	2	24	23	16		
SW	6/19/2003	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-01	68			65	1	16	20	9	18	2	24	23	16		
SW	6/19/2003	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-01	68			65	1	16	20	9	18	2	24	23	16		
SW	6/19/2003	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-01	68			65	1	16	20	9	18	2	24	23	16		
SW	6/19/2003	East Ditch	EDSD/SW6	EDSW6-01									18	2					
SW	7/10/2003	East Ditch	ISCO3	1170-ISCO3-64					1										
SW	8/11/2003	East Ditch	ISCO3	1170-ISCO3-65											1	2	6		
SW	8/20/2003	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SW-N				1			1				17	15	7		
SW	8/20/2003	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SW-S				1			1				17	15	7		
SW	8/20/2003	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SW-WS				1			1				17	15	7		
SW	8/20/2003	Off-Property West Ditch	OPWD-SW-SDW	OPWD-SW-SDW				1			1				17	15	7		
SW	9/23/2003	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-02	74			68	1	18	19	9	11	2	24	23	16		
SW	9/23/2003	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-02	74			68	1	18	19	9	11	2	24	23	16		
SW	9/23/2003	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-02	74			68	1	18	19	9	11	2	24	23	16		
SW	9/23/2003	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-02	74			68	1	18	19	9	11	2	24	23	16		
SW	9/23/2003	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-02	74			68	1	18	19	9	11	2	24	23	16		
SW	9/23/2003	East Ditch	EDSD/SW6	EDSW6-02	74			68	1	18	19	9	11	2	24	23	16		
SW	11/10/2003	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2		2			1						1	19	10		

Table 4.2-1
Surface Water Samples Representative of Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field_pH
SW	11/10/2003	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6		2			1						1	19	10		
SW	11/11/2003	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3		2			1						1	19	10		
SW	11/12/2003	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1		2			1						1	19	10		
SW	11/12/2003	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10		2			1						1	19	10		
SW	11/12/2003	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4		2			1						1	19	10		
SW	11/13/2003	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11		2			1						1	19	10		
SW	11/13/2003	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5		2			1						1	19	10		
SW	11/13/2003	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8		2			1						1	19	10		
SW	11/13/2003	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A		2			1						1	19	10		
SW	11/13/2003	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9		2			1						1	19	10		
SW	11/17/2003	East Ditch	ISCO3	1170-ISCO3-66											1	2	6		
SW	2/2/2004	East Ditch	ISCO3	1170-ISCO3-67											1	2	6		1
SW	2/3/2004	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11					1							19	9		
SW	2/3/2004	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2					1							19	9		1
SW	2/3/2004	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3					1							19	9		1
SW	2/3/2004	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5					1							19	9		1
SW	2/3/2004	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8					1							19	9		1
SW	2/3/2004	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A					1							19	9		1
SW	2/3/2004	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9					1							19	9		1
SW	2/4/2004	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1					1							19	9		1
SW	2/4/2004	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10					1							19	9		1
SW	2/4/2004	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4					1							19	9		1
SW	4/28/2004	East Ditch	EDSD/SW5 (EDBS11)	EDSW5-03	75			68	1		19	7		2	25	23	16		1
SW	4/28/2004	East Ditch	EDSD/SW6	EDSW6-03	75			68	1		19	7		2	25	23	16		1
SW	4/28/2004	East Ditch	EDSD/SW7	EDSW7-01	75			68	1		19	7		2	25	23	16		1
SW	4/28/2004	East Ditch	EDSD/SW8	EDSW8-01	75			68	1		19	7		2	25	23	16		1
SW	4/29/2004	East Ditch	EDSD/SW0	EDSW0-01	75			68	1		19	7			25	23	16		1
SW	4/29/2004	East Ditch	EDSD/SW0	EDSW0-03										2					
SW	4/29/2004	East Ditch	EDSD/SW1 (EDBS5)	EDSW1-03	75			68	1		19	7		2	25	23	16		1
SW	4/29/2004	East Ditch	EDSD/SW2 (EDBS6)	EDSW2-03	75			68	1		19	7		2	25	23	16		1
SW	4/29/2004	East Ditch	EDSD/SW3 (EDBS8)	EDSW3-03	75			68	1		19	7		2	25	23	16		1
SW	4/29/2004	East Ditch	EDSD/SW4 (EDBS10)	EDSW4-03	75			68	1		19	7		2	25	23	16		1
SW	5/10/2004	East Ditch	ISCO3	1170-ISCO3-68											1	2	6		1
SW	5/11/2004	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11					1							19	9		1
SW	5/11/2004	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2					1							19	9		1
SW	5/11/2004	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5					1							19	9		1
SW	5/11/2004	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8					1							19	9		1
SW	5/11/2004	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A					1							19	9		1
SW	5/12/2004	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3					1							19	9		1

Table 4.2-1
Surface Water Samples Representative of Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field_pH
SW	5/12/2004	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6					1							19	9		1
SW	5/12/2004	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9					1							19	9		1
SW	5/13/2004	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1					1							19	9		1
SW	5/13/2004	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10					1							19	9		1
SW	5/13/2004	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4					1							19	9		1
SW	8/9/2004	East Ditch	ISCO3	1170-ISCO3-69											1	2	6		1
SW	8/11/2004	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9					1							19	9		1
SW	8/12/2004	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1					1							19	9		1
SW	8/12/2004	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6					1							19	9		1
SW	8/17/2004	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A					1							19	9		1
SW	10/5/2004	East Ditch	EDLBSW1	EDLBSW1-01	75	2	3	68	1	18	19	7	11	2	25	23	15		1
SW	10/5/2004	East Ditch	EDSD/SW7	EDSW7-02	75	2	3	68	1	18	19	7	11	2	25	23	15		1
SW	10/5/2004	East Ditch	EDSD/SW8	EDSW8-02	75	2	3	68	1	18	19	7	11	2	25	23	15		1
SW	11/1/2004	East Ditch	ISCO3	1170-ISCO3-70											1	2	6		1
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11					1										
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11												19	9		1
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW5					1										
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5												19	9		1
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6					1										
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6												19	9		1
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A					1										
SW	11/15/2004	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A												19	9		1
SW	11/16/2004	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2					1										
SW	11/16/2004	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2												19	9		1
SW	11/16/2004	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3					1										
SW	11/16/2004	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3												19	9		1
SW	11/17/2004	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW10					1										
SW	11/17/2004	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10												19	9		1
SW	11/17/2004	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW4					1										
SW	11/17/2004	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4												19	9		1
SW	11/18/2004	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW1					1										
SW	11/18/2004	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1												19	9		1

Table 4.2-1
Surface Water Samples Representative of Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field_pH
SW	11/18/2004	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW8					1										
SW	11/18/2004	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8											19	9			1
SW	11/18/2004	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW9					1										
SW	11/18/2004	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9											19	9			1
SW	1/31/2005	East Ditch	ISCO3	1170-ISCO3-71										1	2	1			1
SW	2/1/2005	East Ditch	ISCO3	1170-ISCO3-71												5			
SW	2/15/2005	East Ditch	EDLBSW1	EDLBSW1-02	75	2	3	68	1	18	19	7	10	2	25	23	15		
SW	2/15/2005	East Ditch	EDSD/SW7	EDSW7-03	75	2	3	68	1	18	19	7	10	2	25	23	15		
SW	2/15/2005	East Ditch	EDSD/SW8	EDSW8-03	75	2	3	68	1	18	19	7	10	2	25	23	15		
SW	5/9/2005	East Ditch	ISCO3	1170-ISCO3-72										1	2	6			1
SW	5/10/2005	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2					1						19	9			1
SW	5/11/2005	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11					1						19	9			1
SW	5/11/2005	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3					1						19	9			1
SW	5/11/2005	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5					1						19	9			1
SW	5/11/2005	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8					1						19	9			1
SW	5/11/2005	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A					1						19	9			1
SW	5/12/2005	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1					1							9			1
SW	5/12/2005	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10					1						19	9			1
SW	5/12/2005	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4					1						19	9			1
SW	5/12/2005	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9					1						19	9			1
SW	5/13/2005	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1											19				
SW	5/13/2005	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6					1						19	9			1
SW	7/26/2005	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2					1						19	9			1
SW	7/26/2005	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3					1						19	9			1
SW	7/28/2005	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1					1						19	9			1
SW	7/28/2005	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11					1						19	9			1
SW	7/28/2005	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5					1						19	9			1
SW	7/28/2005	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6					1						19	9			1
SW	7/28/2005	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8					1						19	9			1
SW	7/28/2005	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A					1						19	9			1
SW	7/28/2005	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9					1						19	9			1
SW	7/29/2005	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10											19	9			1
SW	7/29/2005	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4					1						19	9			1
SW	11/8/2005	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11					1						19	9			1
SW	11/8/2005	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2					1						19	9			1
SW	11/8/2005	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3					1						19	9			1
SW	11/8/2005	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5					1						19	9			1
SW	11/8/2005	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8					1						19	9			1
SW	11/8/2005	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A					1						19	9			1

Table 4.2-1
Surface Water Samples Representative of Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Volatiles	Acetaldehyde/Formaldehyde	Hydrazine	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Opex/Kempore	Metals, Total	Metals, Filtered	Inorganics/Physical	Field	Field_pH
SW	11/9/2005	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1					1							19	9		1
SW	11/9/2005	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4					1							19	9		1
SW	11/9/2005	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6					1							19	9		1
SW	11/9/2005	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9					1							19	9		1
SW	11/17/2005	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10					1							19	9		1
SW	11/21/2005	East Ditch	ISCO3	1170-ISCO3-74											1	2	6		1
SW	2/20/2006	East Ditch	ISCO3	1170-ISCO3-75													4		
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-1	MMB-SW-1					1							22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-10	MMB-SW-10					1							22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW11												22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-11	MMB-SW-11					1										
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW2												22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-2	MMB-SW-2					1										
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW3												22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-3	MMB-SW-3					1										
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-4	MMB-SW-4					1							22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-5	MMB-SW-5					1							22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW6												22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-6	MMB-SW-6					1										
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-8	MMB-SW-8					1							22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW8A												22	9		1
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SW-8A					1										
SW	5/25/2006	Maple Meadow Brook	MMB-SW/SD-9	MMB-SW-9					1							22	9		1

Prepared/Date: KJC 8/14/07
Checked/Date: PHT 10/01/2007

Table 4.2-2
Summary of Surface Water Analytical Data for Current Conditions - East Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Surface Water Background
Volatile Organics (mg/L)						
1,1,1-Trichloroethane (TCA)	13 / 27	48%	0.001 : 0.001	0.0007 - 0.018	2.58E-03	**0.004**
1,1-Dichloroethane	6 / 27	22%	0.001 : 0.001	0.00053 - 0.0026	6.46E-04	ND
1,1-Dichloroethene	3 / 27	11%	0.001 : 0.005	0.0006 - 0.002	6.89E-04	ND
2,4,4-Trimethyl-1-pentene	4 / 27	15%	0.001 : 0.005	0.0015 - 0.0065	1.04E-03	ND
2,4,4-Trimethyl-2-Pentene	1 / 27	4%	0.001 : 0.005	0.00084 - 0.00084	5.87E-04	ND
Benzene	2 / 27	7%	0.001 : 0.005	0.00059 - 0.0006	5.81E-04	ND
Chlorobenzene	2 / 27	7%	0.001 : 0.005	0.00055 - 0.00077	5.86E-04	ND
Chloroethane	2 / 27	7%	0.002 : 0.01	0.003 - 0.003	1.30E-03	ND
cis-1,2-Dichloroethene	18 / 27	67%	0.001 : 0.005	0.00083 - 0.021	5.31E-03	
Ethylbenzene	2 / 27	7%	0.001 : 0.005	0.0006 - 0.0009	5.93E-04	ND
m,p-Xylene	10 / 27	37%	0.001 : 0.001	0.00054 - 0.0034	7.01E-04	
Methyl-t-butyl ether (MTBE)	9 / 27	33%	0.001 : 0.005	0.00056 - 0.00095	6.61E-04	
Tetrachloroethene (PCE)	5 / 27	19%	0.001 : 0.005	0.00052 - 0.001	6.07E-04	0.004
Tetrahydrofuran	1 / 21	5%	0.01 : 0.05	0.011 - 0.011	6.24E-03	
Toluene	17 / 27	63%	0.001 : 0.001	0.00098 - 0.24	1.57E-02	**0.013**
Trichloroethene (TCE)	20 / 27	74%	0.001 : 0.005	0.0009 - 0.022	4.39E-03	ND
Vinyl Chloride	2 / 27	7%	0.001 : 0.005	0.0017 - 0.002	6.74E-04	ND
Semivolatile Organics (mg/L)						
N-Nitrosodimethylamine	19 / 28	68%	2E-06 : 0.00003	4.4E-06 - 4.5E-05	1.30E-05	
Polyaromatic Hydrocarbons (mg/L)						
Acenaphthylene	1 / 18	6%	0.001 : 0.0015	0.00035 - 0.00035	5.50E-04	
Anthracene	3 / 18	17%	0.00005 : 0.001	1.3E-05 - 2.2E-05	2.85E-04	
Benzo(a)anthracene	4 / 18	22%	0.00013 : 0.001	4.7E-05 - 0.0022	3.92E-04	
Benzo(a)pyrene	5 / 18	28%	0.00013 : 0.0002	8.9E-05 - 0.0021	2.47E-04	
Benzo(b)fluoranthene	6 / 18	33%	0.00005 : 0.001	5.4E-05 - 0.0045	5.64E-04	
Benzo(g,h,i)perylene	4 / 18	22%	0.0002 : 0.001	0.00034 - 0.0024	4.50E-04	
Benzo(k)fluoranthene	6 / 18	33%	0.00005 : 0.001	2.2E-05 - 0.0023	3.91E-04	
Chrysene	6 / 18	33%	0.00013 : 0.001	8.3E-05 - 0.0019	4.46E-04	
Dibenzo(a,h)anthracene	2 / 18	11%	0.0003 : 0.0005	0.00014 - 0.0013	2.63E-04	
Fluoranthene	4 / 18	22%	0.00013 : 0.001	6.9E-05 - 0.0017	4.02E-04	
Fluorene	4 / 18	22%	0.00025 : 0.001	0.00012 - 0.007	6.90E-04	
Indeno (1,2,3-cd) pyrene	6 / 18	33%	0.00013 : 0.0005	5.9E-05 - 0.0019	3.00E-04	
Phenanthrene	9 / 18	50%	0.0001 : 0.001	1.4E-05 - 0.0018	5.79E-04	
Pyrene	5 / 18	28%	0.00025 : 0.001	0.00021 - 0.0054	7.59E-04	
Herbicides (mg/L)						
DCPA	1 / 6	17%	0.00015 : 0.00016	0.00051 - 0.00051	1.49E-04	
Metals, Total (mg/L)						

Table 4.2-2
Summary of Surface Water Analytical Data for Current Conditions - East Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Surface Water Background
Aluminum, Total	23 / 27	85%	0.05 : 0.05	0.074 - 19.2	1.15E+00	219
Antimony, Total	1 / 27	4%	0.003 : 0.03	0.003 - 0.003	3.11E-03	ND
Arsenic, Total	19 / 27	70%	0.002 : 0.002	0.0022 - 0.227	1.60E-02	0.247
Barium, Total	27 / 27	100%	:	0.025 - 0.487	5.61E-02	0.989
Cadmium, Total	2 / 27	7%	0.0005 : 0.001	0.001 - 0.007	6.67E-04	0.0118
Calcium, Total	27 / 27	100%	:	30 - 68	4.36E+01	**30.7**
Chromium, Total	31 / 59	53%	0.005 : 0.01	0.006 - 0.91	3.76E-02	**0.219**
Copper, Total	5 / 27	19%	0.01 : 0.01	0.016 - 0.346	2.30E-02	0.544
Iron, Total	27 / 27	100%	:	0.056 - 360	1.72E+01	**343**
Lead, Total	5 / 27	19%	0.001 : 0.001	0.0022 - 0.113	5.87E-03	1.37
Magnesium, Total	27 / 27	100%	:	3.9 - 11	6.39E+00	20
Manganese, Total	27 / 27	100%	:	0.11 - 8.12	1.10E+00	12.3
Mercury, Total	1 / 27	4%	0.0002 : 0.0002	0.00063 - 0.00063	1.20E-04	0.0021
Nickel, Total	6 / 27	22%	0.005 : 0.01	0.007 - 0.065	7.33E-03	0.134
Potassium, Total	23 / 27	85%	4 : 20	2.94 - 14	6.21E+00	21.7
Sodium, Total	27 / 27	100%	:	32.7 - 140	6.20E+01	**126**
Trivalent Chromium, Total	9 / 15	60%	0.01 : 0.01	0.011 - 0.057	1.90E-02	
Vanadium, Total	2 / 27	7%	0.005 : 0.01	0.015 - 0.38	1.83E-02	**0.264**
Zinc, Total	10 / 27	37%	0.025 : 0.05	0.031 - 1.48	1.07E-01	2.94
Metals, Filtered (mg/L)						
Aluminum, Filtered	21 / 57	37%	0.05 : 0.1	0.049 - 0.839	7.56E-02	
Arsenic, Filtered	18 / 27	67%	0.002 : 0.002	0.0017 - 0.0047	2.28E-03	
Barium, Filtered	27 / 27	100%	:	0.024 - 0.053	3.20E-02	
Calcium, Filtered	27 / 27	100%	:	36 - 71	4.42E+01	
Chromium, Filtered	4 / 59	7%	0.005 : 0.01	0.001 - 0.378	9.70E-03	
Copper, Filtered	2 / 27	7%	0.01 : 0.02	0.014 - 0.016	6.85E-03	
Iron, Filtered	26 / 27	96%	0.05 : 0.05	0.085 - 1.82	5.52E-01	
Lead, Filtered	1 / 27	4%	0.001 : 0.001	0.0012 - 0.0012	5.26E-04	
Magnesium, Filtered	27 / 27	100%	:	4.1 - 12	6.37E+00	
Manganese, Filtered	27 / 27	100%	:	0.11 - 2.05	7.96E-01	
Nickel, Filtered	4 / 27	15%	0.005 : 0.01	0.008 - 0.01	4.85E-03	
Potassium, Filtered	19 / 27	70%	2 : 4	3.3 - 19	5.39E+00	
Sodium, Filtered	27 / 27	100%	:	32.8 - 130	6.42E+01	
Zinc, Filtered	6 / 27	22%	0.025 : 0.05	0.038 - 0.2	3.92E-02	
Inorganics (mg/L)						
Bicarbonate alkalinity as CaCO3	32 / 32	100%	:	23 - 118	5.53E+01	
Chloride	58 / 58	100%	:	12.6 - 340	1.04E+02	**110**
Nitrate & Nitrite as N	20 / 20	100%	:	0.11 - 2.6	1.44E+00	

Table 4.2-2
Summary of Surface Water Analytical Data for Current Conditions - East Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Surface Water Background
Nitrate as N	39 / 39	100%	:	0.41 - 3.2	1.26E+00	
Nitrite as N	4 / 39	10%	0.01 : 0.2	0.01 - 7.9	4.23E-01	
Nitrogen, Ammonia	59 / 59	100%	:	0.11 - 128	1.22E+01	ND
Nitrogen, Total Kjeldahl as N	23 / 27	85%	1 : 1	1.1 - 32.4	1.31E+01	
Orthophosphate as P	6 / 27	22%	0.1 : 0.1	0.11 - 0.27	7.48E-02	
pH **(pH units)**	10 / 10	100%	:	5.56 - 6.84	6.49E+00	
Phosphorous	27 / 27	100%	:	0.66 - 10.4	4.20E+00	
Specific Conductance	48 / 48	100%	:	279 - 2950	6.65E+02	
Sulfate as SO4	57 / 58	98%	2 : 2	21.9 - 864	1.05E+02	**24**
Total Alkalinity as CaCO3	27 / 27	100%	:	23 - 118	5.78E+01	
Turbidity	27 / 27	100%	:	0.14 - 47	8.50E+00	
Field Measurements (mg/L)						
pH **(pH units)**	20 / 20	100%	:	4.9 - 7.6	6.42E+00	
Hardness as CaCO3	1 / 1	100%	:	180 - 180	1.80E+02	

Prepared/Date: KJC 8/07/2007
Checked/Date: PHT 10/01/2007

Table 4.2-3
Summary of Surface Water Analytical Data for Current Conditions - Off-Property West Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Percent Detected	Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Surface Water Background
Semivolatile Organics (mg/L)												
N-Nitrosodimethylamine	2	/	4	50%	0.000002	:	0.000005	0.000014	-	0.000087	2.61E-05	
Metals, Total (mg/L)												
Aluminum, Total	15	/	15	100%		:		0.104	-	8.2	1.66E+00	219
Cadmium, Total	2	/	15	13%	0.001	:	0.002	0.001	-	0.006	9.67E-04	0.0118
Calcium, Total	15	/	15	100%		:		3.35	-	44.4	2.06E+01	**30.7**
Chromium, Total	13	/	15	87%	0.005	:	0.005	0.006	-	0.262	5.35E-02	**0.219**
Cobalt, Total	3	/	15	20%	0.01	:	0.02	0.011	-	0.018	7.60E-03	0.168
Copper, Total	4	/	15	27%	0.01	:	0.02	0.016	-	0.035	1.06E-02	0.544
Iron as Fe+2	14	/	15	93%	0.2	:	0.2	0.57	-	6.92	3.15E+00	
Iron as Fe+3	12	/	15	80%	0.2	:	0.2	0.23	-	10.5	2.48E+00	
Iron, Total	15	/	15	100%		:		0.323	-	15.9	5.47E+00	343
Lead, Total	5	/	15	33%	0.005	:	0.005	0.007	-	0.034	7.67E-03	1.37
Magnesium, Total	15	/	15	100%		:		0.636	-	5.03	2.89E+00	20
Manganese, Total	15	/	15	100%		:		0.064	-	1.18	4.86E-01	12.3
Nickel, Total	5	/	15	33%	0.01	:	0.02	0.01	-	0.053	1.21E-02	0.134
Potassium, Total	5	/	15	33%	2	:	4	1.69	-	7.64	2.09E+00	21.7
Sodium, Total	15	/	15	100%		:		11.2	-	330	6.75E+01	**126**
Zinc, Total	7	/	15	47%	0.05	:	0.1	0.054	-	0.252	8.31E-02	2.94
Metals, Filtered (mg/L)												
Aluminum, Filtered	10	/	15	67%	0.1	:	0.1	0.201	-	0.61	2.43E-01	
Calcium, Filtered	15	/	15	100%		:		3.47	-	46.7	2.15E+01	
Chromium, Filtered	10	/	15	67%	0.005	:	0.005	0.005	-	0.042	1.14E-02	
Cobalt, Filtered	2	/	15	13%	0.01	:	0.01	0.013	-	0.019	6.47E-03	
Copper, Filtered	3	/	15	20%	0.01	:	0.02	0.013	-	0.022	1.03E-02	
Iron, Filtered	15	/	15	100%		:		0.265	-	7.07	2.62E+00	
Lead, Filtered	2	/	15	13%	0.005	:	0.005	0.006	-	0.007	3.03E-03	
Magnesium, Filtered	15	/	15	100%		:		0.618	-	5.91	2.92E+00	
Manganese, Filtered	15	/	15	100%		:		0.065	-	1.23	4.75E-01	
Nickel, Filtered	2	/	15	13%	0.01	:	0.02	0.011	-	0.02	9.07E-03	
Potassium, Filtered	6	/	15	40%	2	:	2	1.78	-	11.3	2.21E+00	
Sodium, Filtered	15	/	15	100%		:		9.57	-	539	8.26E+01	
Zinc, Filtered	5	/	15	33%	0.05	:	0.05	0.055	-	0.123	4.82E-02	
Inorganics (mg/L)												
Bicarbonate alkalinity as CaCO3	14	/	15	93%	1	:	1	3	-	59	2.04E+01	
Nitrate as N	11	/	15	73%	0.05	:	0.05	0.051	-	0.476	1.14E-01	
Nitrite as N	1	/	15	7%	0.01	:	0.01	0.011	-	0.011	5.40E-03	
Nitrogen, Ammonia	15	/	15	100%		:		0.2	-	43.3	1.12E+01	ND

Table 4.2-3
Summary of Surface Water Analytical Data for Current Conditions - Off-Property West Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Surface Water Background
pH **(pH units)**	4 / 4	100%	:	4.1 - 5.66	5.19E+00	
Total Alkalinity as CaCO3	8 / 8	100%	:	3 - 59	2.89E+01	
Total Organic Carbon (TOC)	15 / 15	100%	:	5.8 - 45	1.60E+01	
Field Measurements (pH units)						
pH	4 / 4	100%	:	5.1 - 6.11	5.83E+00	

Prepared/Date: KJC 8/07/2007
Checked/Date: PHT 10/01/2007

Table 4.2-4
Summary of Surface Water Data Representative of Current Conditions - Maple Meadow Brook Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Percent Detected	Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Surface Water Background
Semivolatile Organics (mg/L)												
N-Nitrosodimethylamine	5	/	102	5%	0.0000019	:	0.0000077	0.000002	-	0.0000039	1.12E-06	
Metals, Total (mg/L)												
Aluminum, Total	11	/	17	65%	0.05	:	0.1	0.099	-	9.97	1.34E+00	219
Calcium, Total	17	/	17	100%		:		15	-	45	2.60E+01	**30.7**
Iron, Total	17	/	17	100%		:		0.65	-	72.6	1.16E+01	343
Potassium, Total	17	/	17	100%		:		3.41	-	11	5.41E+00	21.7
Sodium, Total	17	/	17	100%		:		26	-	86.1	4.62E+01	126
Metals, Filtered (mg/L)												
Antimony, Filtered	4	/	98	4%	0.006	:	0.01	0.013	-	0.036	5.29E-03	
Arsenic, Filtered	10	/	98	10%	0.001	:	0.01	0.001	-	0.0017	3.51E-03	
Barium, Filtered	97	/	98	99%	0.01	:	0.01	0.01	-	0.083	3.07E-02	
Beryllium, Filtered	1	/	98	1%	0.001	:	0.002	0.000098	-	0.000098	6.03E-04	
Calcium, Filtered	116	/	116	100%		:		2.5	-	44	2.29E+01	
Chromium, Filtered	2	/	99	2%	0.005	:	0.01	0.00084	-	0.15	4.78E-03	
Iron, Filtered	116	/	116	100%		:		0.029	-	28.8	1.51E+00	
Lead, Filtered	8	/	98	8%	0.005	:	0.01	0.0035	-	0.017	3.29E-03	
Magnesium, Filtered	99	/	99	100%		:		2	-	6.65	3.94E+00	
Manganese, Filtered	99	/	99	100%		:		0.06	-	9.2	8.08E-01	
Nickel, Filtered	3	/	98	3%	0.01	:	0.01	0.0026	-	0.082	5.74E-03	
Potassium, Filtered	108	/	116	93%	2	:	2	1.8	-	10	3.95E+00	
Silver, Filtered	7	/	98	7%	0.005	:	0.005	0.00099	-	0.0099	2.55E-03	
Sodium, Filtered	116	/	116	100%		:		29	-	350	6.97E+01	
Thallium, Filtered	9	/	98	9%	0.001	:	0.01	0.00072	-	0.0017	2.29E-03	
Vanadium, Filtered	4	/	98	4%	0.01	:	0.01	0.00065	-	0.01	4.93E-03	
Zinc, Filtered	21	/	98	21%	0.05	:	0.05	0.002	-	0.011	2.08E-02	
Inorganics (mg/L)												
Bicarbonate alkalinity as CaCO3	99	/	99	100%		:		6	-	77	3.05E+01	
Chloride	99	/	99	100%		:		41	-	740	1.33E+02	**110**
Nitrate as N	49	/	99	49%	0.05	:	0.05	0.021	-	2.6	1.94E-01	
Nitrite as N	32	/	116	28%	0.01	:	0.2	0.007	-	1	2.81E-02	
Nitrogen, Ammonia	112	/	116	97%	0.1	:	0.1	0.1	-	6.8	7.31E-01	ND
pH **(pH Units)**	12	/	12	100%		:		6.2	-	6.74	6.53E+00	
Specific Conductance **(umhos/cm)**	99	/	99	100%		:		207	-	2810	5.26E+02	
Sulfate as SO4	111	/	116	96%	2	:	2	2.6	-	55	1.37E+01	**24**
Total Alkalinity as CaCO3	98	/	98	100%		:		6	-	77	3.04E+01	
Field Measurement (pH Units)												
pH	91	/	91	100%		:		5.13	-	7.83	6.69E+00	

Prepared/Date: KJC 8/07/07
Checked/date: PHT 10/01/2007

Table 4.2-5
Sediment Samples Representative of Current Conditions - OU2

Draft Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Matrix	Date Sampled	Area	Location	COC Sample	Upper Depth	Lower Depth	Volatiles	Semivolatiles	NDMA	Polynuclear Aromatics	Pesticides	PCBs	Herbicides	Metals, Total	Inorganics/Physical	Field	
SD	20-Jan-97	West Ditch	BS007	BS007WDO				65			21			23	1		
SD	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SD1 D											3		
SD	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-1	MMB-SD1 MS/MSD											3		
SD	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-2	MMB-SD2											3		
SD	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-3	MMB-SD3											3		
SD	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-6	MMB-SD6											3		
SD	17-Oct-01	Maple Meadow Brook	MMB-SW/SD-7	MMB-SD7											3		
SD	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-4	MMB-SD4											3		
SD	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-5	MMB-SD5											3		
SD	18-Oct-01	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SD8A											3		
SD	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-1	MMBSD1-02											3		
SD	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-2	MMBSD2-02											3		
SD	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-3	MMBSD3-02											3		
SD	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-6	MMBSD6-02											3		
SD	12-Jun-02	Maple Meadow Brook	MMB-SW/SD-7	MMBSD7-02											3		
SD	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-4	MMB-SD04-02											3		
SD	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-5	MMB-SD05-02											3		
SD	13-Jun-02	Maple Meadow Brook	MMB-SW/SD-8A	MMB-SD8A-02											3		
SD	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-N	OPWD-SD-N-01			68	65	1					22	2		
SD	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-S	OPWD-SD-S-01			68	65	1					22	2		
SD	17-Jun-03	Off-property West Ditch	OPWD-SD/SO/SW-WS	OPWD-SD-WS-01			68	65	1					22	2		
SD	18-Jun-03	East Ditch	EDSD/SW6	EDSD6-01			68	65	2	16	20	9	18	24	9		
SD	19-Jun-03	East Ditch	EDSD/SW1 (EDBS5)	EDSD1-01			68	65	2	16	20	9	18	24	9		
SD	19-Jun-03	East Ditch	EDSD/SW2 (EDBS6)	EDSD2-01			68	65	2	16	20	9	18	24	9		
SD	19-Jun-03	East Ditch	EDSD/SW3 (EDBS8)	EDSD3-01			68	65	2	16	20	9	18	24	9		
SD	19-Jun-03	East Ditch	EDSD/SW4 (EDBS10)	EDSD4-01			68	65	2	16	20	9	18	24	9		
SD	19-Jun-03	East Ditch	EDSD/SW5 (EDBS11)	EDSD5-01			68	65	2	16	20	9	18	24	9		
SD	20-Nov-03	North Pond	NPSED1	NPSED1-SED1	0	1	75	68	1		19		11	8	6		
SD	28-Apr-04	East Ditch	EDSD/SW7	EDSD7-01			75	68	1		19	9		25	15		
SD	28-Apr-04	East Ditch	EDSD/SW8	EDSD8-01			75	68	1		19	9		25	15		
SD	29-Apr-04	East Ditch	EDSD/SW0	EDSD0-01				68	1		19	9		25	14		

Prepared/Date: KJC 8/14/07
Checked/Date: MH 8/14/07

Table 4.2-6
Summary of Sediment Analytical Data for Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Percent Detected	Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Maximum Background Detected Concentration
Volatile Organics (mg/Kg)												
2,4,4-Trimethyl-1-pentene	1	/	12	8%	0.0029	:	0.37	15	-	15	1.28E+00	ND
Acetone	9	/	12	75%	5.5	:	15	0.18	-	3.3	1.91E+00	**0.19**
Carbon Disulfide	1	/	12	8%	0.003	:	0.73	0.0078	-	0.0078	6.71E-02	ND
cis-1,2-Dichloroethene	3	/	12	25%	0.0029	:	0.73	0.011	-	0.036	6.54E-02	
Trichloroethene (TCE)	4	/	12	33%	0.004	:	0.73	0.0038	-	0.043	6.43E-02	ND
Semivolatile Organics (mg/Kg)												
Acenaphthylene	2	/	14	14%	0.2	:	3.9	0.021	-	0.32	5.03E-01	**0.078**
Anthracene	3	/	14	21%	0.25	:	3.9	0.028	-	0.28	5.03E-01	**0.088**
Benzo(a)anthracene	7	/	14	50%	0.25	:	3.9	0.26	-	2.8	7.98E-01	**0.42**
Benzo(a)pyrene	7	/	14	50%	0.25	:	3.9	0.26	-	3.1	8.53E-01	**0.53**
Benzo(b)fluoranthene	8	/	14	57%	0.25	:	3.9	0.31	-	4.1	1.14E+00	**0.77**
Benzo(g,h,i)perylene	6	/	14	43%	0.25	:	3.9	0.11	-	2.5	5.83E-01	**0.11**
Benzo(k)fluoranthene	8	/	14	57%	0.25	:	3.9	0.31	-	3.5	1.05E+00	**0.69**
bis(2-EthylHexyl)phthalate	7	/	14	50%	0.25	:	5.3	0.46	-	5.5	2.21E+00	**2**
Chrysene	10	/	14	71%	0.25	:	3.9	0.17	-	4.9	1.29E+00	**0.64**
Fluoranthene	11	/	14	79%	0.25	:	2.2	0.26	-	7.9	1.85E+00	**1.2**
Indeno (1,2,3-cd) pyrene	6	/	14	43%	0.25	:	3.9	0.14	-	2.3	5.75E-01	**0.12**
Phenanthrene	7	/	14	50%	0.25	:	3.9	0.18	-	4.2	9.14E-01	**0.46**
Pyrene	11	/	14	79%	0.25	:	2.2	0.24	-	8.4	1.99E+00	**1**
Polyaromatic Hydrocarbons (mg/Kg)												
Acenaphthylene	2	/	6	33%	0.31	:	1.7	0.092	-	0.21	3.40E-01	
Anthracene	6	/	6	100%		:		0.011	-	0.34	1.62E-01	
Benzo(a)anthracene	6	/	6	100%		:		0.076	-	1.6	7.88E-01	
Benzo(a)pyrene	6	/	6	100%		:		0.11	-	1.2	6.48E-01	
Benzo(b)fluoranthene	6	/	6	100%		:		0.15	-	1.1	7.00E-01	
Benzo(g,h,i)perylene	6	/	6	100%		:		0.087	-	0.76	4.70E-01	
Benzo(k)fluoranthene	6	/	6	100%		:		0.072	-	0.67	3.87E-01	
Chrysene	6	/	6	100%		:		0.18	-	2	1.03E+00	
Dibenzo(a,h)anthracene	6	/	6	100%		:		0.15	-	0.96	5.62E-01	
Fluoranthene	6	/	6	100%		:		0.23	-	4.4	1.89E+00	
Fluorene	5	/	6	83%	0.14	:	0.14	0.0032	-	0.071	4.59E-02	
Indeno (1,2,3-cd) pyrene	6	/	6	100%		:		0.097	-	0.71	4.75E-01	
Phenanthrene	6	/	6	100%		:		0.074	-	1.4	6.31E-01	
Pyrene	6	/	6	100%		:		0.21	-	3	1.44E+00	
Pesticides/PCBs (mg/Kg)												
Delta-BHC	1	/	11	9%	0.003	:	0.065	0.005	-	0.005	9.50E-03	
Dieldrin	2	/	11	18%	0.003	:	0.023	0.152	-	0.272	4.36E-02	
Gamma-Chlordane	1	/	1	100%		:		0.0036	-	0.0036	3.60E-03	
Herbicides (mg/Kg)												
Chloramben	6	/	6	100%		:		0.015	-	0.27	7.67E-02	
MCPA	2	/	7	29%	0.00733	:	19	18	-	95	2.01E+01	

Table 4.2-6
Summary of Sediment Analytical Data for Current Conditions - OU2

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Percent Detected	Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Maximum Background Detected Concentration
Inorganics (mg/Kg)												
Aluminum, Total	13	/	13	100%		:		3050	-	46700	1.19E+04	**20400**
Antimony, Total	3	/	14	21%	0.65	:	8.6	2.81	-	18	3.92E+00	ND
Arsenic, Total	14	/	14	100%		:		1.9	-	119	3.49E+01	**44**
Barium, Total	13	/	13	100%		:		5.4	-	130	3.85E+01	**106**
Beryllium, Total	7	/	13	54%	0.186	:	0.86	0.185	-	4.57	9.75E-01	ND
Cadmium, Total	6	/	13	46%	0.17	:	0.84	0.09	-	2.2	5.10E-01	ND
Calcium, Total	13	/	13	100%		:		341	-	5800	2.37E+03	**4100**
Chromium, Total	14	/	14	100%		:		10	-	3120	6.35E+02	**24.4**
Cobalt, Total	13	/	13	100%		:		1.6	-	59.3	1.44E+01	**23.3**
Copper, Total	13	/	13	100%		:		4.2	-	270	5.84E+01	**58.3**
Hexavalent Chromium, Total	1	/	10	10%	1.2	:	6.7	57.8	-	57.8	7.49E+00	**1.2**
Iron, Total	13	/	13	100%		:		2810	-	84400	2.48E+04	**34100**
Lead, Total	14	/	14	100%		:		3	-	210	6.27E+01	**147**
Magnesium, Total	13	/	13	100%		:		285	-	2800	1.47E+03	3900
Manganese, Total	13	/	13	100%		:		25.5	-	3100	6.89E+02	**776**
Mercury, Total	7	/	11	64%	0.061	:	0.13	0.157	-	0.636	2.61E-01	**0.54**
Nickel, Total	12	/	13	92%	8.4	:	8.4	3.16	-	89	1.90E+01	**21.4**
Potassium, Total	6	/	13	46%	260	:	1700	176	-	1930	6.49E+02	**980**
Sodium, Total	4	/	13	31%	130	:	860	87	-	958	2.92E+02	**332**
Thallium, Total	2	/	14	14%	0.65	:	4.3	1.56	-	2	1.27E+00	3.6
Trivalent Chromium, Total	4	/	4	100%		:		9.9	-	1260	3.73E+02	
Vanadium, Total	13	/	13	100%		:		4.5	-	63.4	2.31E+01	**32**
Zinc, Total	13	/	13	100%		:		10.6	-	820	1.59E+02	**379**
Bicarbonate alkalinity as CaCO3	3	/	3	100%		:		2.2	-	16.3	8.30E+00	
Chloride	4	/	4	100%		:		11	-	182	7.33E+01	
Cyanide	1	/	10	10%	0.71	:	3.7	4.7	-	4.7	1.15E+00	
Nitrate as N	3	/	3	100%		:		3	-	15	9.00E+00	
Nitrogen, Ammonia	20	/	28	71%	10	:	75	11.7	-	700	1.95E+02	897
Nitrogen, Total Kjeldahl as N	8	/	9	89%	26.7	:	26.7	520	-	13600	4.38E+03	
Orthophosphate as P	2	/	3	67%	7	:	7	1	-	2	2.17E+00	
pH **(pH units)**	1	/	1	100%		:		6.26	-	6.26	6.26E+00	
Phosphate, Total as P	3	/	3	100%		:		110	-	610	3.10E+02	
Sulfate as SO4	4	/	4	100%		:		22	-	94	4.93E+01	
Total Alkalinity as CaCO3	3	/	3	100%		:		2.2	-	16.3	8.30E+00	
Total Organic Carbon (TOC)	17	/	17	100%		:		8500	-	513000	2.05E+05	570000

BOLD maximum concentration is greater than that background concentration

Prepared/Date: KJC 6/29/07

mg/Kg = milligrams per kilogram

Checked/Date: MH 8/17/07

Table 4.2-7
Summary of Sediment Analytical Data for Current Conditions - East Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Sediment Background
Volatile Organics (mg/Kg)						
Acetone	9 / 9	100%	:	0.18 - 3.3	9.97E-01	**0.19**
Carbon Disulfide	1 / 9	11%	0.003 : 0.1	0.0078 - 0.0078	1.28E-02	ND
cis-1,2-Dichloroethene	3 / 9	33%	0.0029 : 0.021	0.011 - 0.036	1.05E-02	
Trichloroethene (TCE)	4 / 9	44%	0.004 : 0.021	0.0038 - 0.043	9.09E-03	ND
Semivolatile Organics (mg/Kg)						
Acenaphthylene	1 / 10	10%	0.2 : 3.9	0.32 - 0.32	5.77E-01	**0.078**
Anthracene	2 / 10	20%	0.25 : 3.9	0.13 - 0.28	5.76E-01	**0.088**
Benzo(a)anthracene	4 / 10	40%	0.25 : 3.9	0.31 - 2.8	9.11E-01	**0.42**
Benzo(a)pyrene	4 / 10	40%	0.25 : 3.9	0.26 - 3.1	8.76E-01	**0.53**
Benzo(b)fluoranthene	5 / 10	50%	0.25 : 3.9	0.31 - 4.1	1.09E+00	**0.77**
Benzo(g,h,i)perylene	3 / 10	30%	0.25 : 3.9	0.15 - 2.5	6.88E-01	**0.11**
Benzo(k)fluoranthene	5 / 10	50%	0.25 : 3.9	0.31 - 2.9	9.78E-01	**0.69**
bis(2-EthylHexyl)phthalate	6 / 10	60%	0.25 : 5.3	1.3 - 5.5	2.92E+00	**2**
Chrysene	7 / 10	70%	0.25 : 3.9	0.17 - 4.9	1.28E+00	**0.64**
Fluoranthene	8 / 10	80%	0.25 : 2.2	0.26 - 7.9	1.82E+00	**1.2**
Indeno (1,2,3-cd) pyrene	3 / 10	30%	0.25 : 3.9	0.14 - 2.3	6.72E-01	**0.12**
Phenanthrene	4 / 10	40%	0.25 : 3.9	0.29 - 4.2	1.01E+00	**0.46**
Pyrene	8 / 10	80%	0.25 : 2.2	0.24 - 8.4	2.05E+00	**1**
Polyaromatic Hydrocarbons (mg/Kg)						
Acenaphthylene	2 / 6	33%	0.31 : 1.7	0.092 - 0.21	3.40E-01	**0.078**
Anthracene	6 / 6	100%	:	0.011 - 0.34	1.62E-01	**0.088**
Benzo(a)anthracene	6 / 6	100%	:	0.076 - 1.6	7.88E-01	**0.42**
Benzo(a)pyrene	6 / 6	100%	:	0.11 - 1.2	6.48E-01	**0.53**
Benzo(b)fluoranthene	6 / 6	100%	:	0.15 - 1.1	7.00E-01	**0.77**
Benzo(g,h,i)perylene	6 / 6	100%	:	0.087 - 0.76	4.70E-01	**0.11**
Benzo(k)fluoranthene	6 / 6	100%	:	0.072 - 0.67	3.87E-01	0.69
Chrysene	6 / 6	100%	:	0.18 - 2	1.03E+00	**0.64**
Dibenzo(a,h)anthracene	6 / 6	100%	:	0.15 - 0.96	5.62E-01	ND
Fluoranthene	6 / 6	100%	:	0.23 - 4.4	1.89E+00	**1.2**
Fluorene	5 / 6	83%	0.14 : 0.14	0.0032 - 0.071	4.59E-02	ND
Indeno (1,2,3-cd) pyrene	6 / 6	100%	:	0.097 - 0.71	4.75E-01	**0.12**
Phenanthrene	6 / 6	100%	:	0.074 - 1.4	6.31E-01	**0.46**
Pyrene	6 / 6	100%	:	0.21 - 3	1.44E+00	**1**
Pesticides/PCBs (mg/Kg)						
Delta-BHC	1 / 10	10%	0.003 : 0.065	0.005 - 0.005	9.91E-03	ND
Dieldrin	2 / 10	20%	0.003 : 0.023	0.152 - 0.272	4.69E-02	**0.027**
Herbicides (mg/Kg)						
Chloramben	6 / 6	100%	:	0.015 - 0.27	7.67E-02	

Table 4.2-7
Summary of Sediment Analytical Data for Current Conditions - East Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Sediment Background
MCPA	2 / 7	29%	0.00733 : 19	18 - 95	2.01E+01	
Inorganics (mg/Kg)						
Aluminum, Total	9 / 9	100%	:	3050 - 30800	1.03E+04	**20400**
Antimony, Total	3 / 10	30%	0.65 : 8.6	2.81 - 18	5.21E+00	ND
Arsenic, Total	10 / 10	100%	:	6.32 - 119	4.65E+01	**44**
Barium, Total	9 / 9	100%	:	5.92 - 130	4.70E+01	**106**
Beryllium, Total	4 / 9	44%	0.34 : 0.86	0.3 - 4.57	1.22E+00	ND
Cadmium, Total	5 / 9	56%	0.17 : 0.84	0.09 - 2.2	6.61E-01	ND
Calcium, Total	9 / 9	100%	:	762 - 5800	2.58E+03	**4100**
Chromium, Total	10 / 10	100%	:	10 - 3120	7.88E+02	**24.4**
Cobalt, Total	9 / 9	100%	:	2.87 - 59.3	1.95E+01	**23.3**
Copper, Total	9 / 9	100%	:	7 - 270	7.08E+01	**58.3**
Hexavalent Chromium, Total	1 / 10	10%	1.2 : 6.7	57.8 - 57.8	7.49E+00	**1.2**
Iron, Total	9 / 9	100%	:	5400 - 84400	3.35E+04	**34100**
Lead, Total	10 / 10	100%	:	4.68 - 210	8.08E+01	**147**
Magnesium, Total	9 / 9	100%	:	285 - 2800	1.42E+03	3900
Manganese, Total	9 / 9	100%	:	69.3 - 3100	9.67E+02	**776**
Mercury, Total	7 / 10	70%	0.061 : 0.084	0.157 - 0.636	2.81E-01	**0.54**
Nickel, Total	8 / 9	89%	8.4 : 8.4	3.16 - 89	2.26E+01	**21.4**
Potassium, Total	2 / 9	22%	260 : 1700	519 - 896	5.96E+02	980
Sodium, Total	1 / 9	11%	130 : 860	291 - 291	2.70E+02	332
Thallium, Total	2 / 10	20%	0.65 : 4.3	1.56 - 2	1.47E+00	3.6
Trivalent Chromium, Total	4 / 4	100%	:	9.9 - 1260	3.73E+02	
Vanadium, Total	9 / 9	100%	:	4.71 - 63.4	2.55E+01	**32**
Zinc, Total	9 / 9	100%	:	20.2 - 820	2.17E+02	**379**
Bicarbonate alkalinity as CaCO3	3 / 3	100%	:	2.2 - 16.3	8.30E+00	
Chloride	4 / 4	100%	:	11 - 182	7.33E+01	
Cyanide	1 / 10	10%	0.71 : 3.7	4.7 - 4.7	1.15E+00	
Nitrate as N	3 / 3	100%	:	3 - 15	9.00E+00	
Nitrogen, Ammonia	10 / 10	100%	:	17 - 494	1.86E+02	897
Nitrogen, Total Kjeldahl as N	8 / 9	89%	26.7 : 26.7	520 - 13600	4.38E+03	
Orthophosphate as P	2 / 3	67%	7 : 7	1 - 2	2.17E+00	
pH	1 / 1	100%	:	6.26 - 6.26	6.26E+00	
Phosphate, Total as P	3 / 3	100%	:	110 - 610	3.10E+02	
Sulfate as SO4	4 / 4	100%	:	22 - 94	4.93E+01	
Total Alkalinity as CaCO3	3 / 3	100%	:	2.2 - 16.3	8.30E+00	

BOLD maximum concentration is greater than that background concentration

Prepared/Date: KJC 7/31/07
Checked/Date: MH 8/17/07

mg/Kg = milligrams per kilogram

Table 4.2-8
Summary of Sediment Analytical Data - Off-Property West Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Percent Detected	Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Sediment Background
Volatile Organics (mg/Kg)												
2,4,4-Trimethyl-1-pentene	1	/	3	33%	0.28	:	0.37	15	-	15	5.11E+00	ND
Semivolatile Organics (mg/Kg)												
Acenaphthylene	1	/	4	25%	0.44	:	1.5	0.021	-	0.021	3.20E-01	0.078
Anthracene	1	/	4	25%	0.44	:	1.5	0.028	-	0.028	3.22E-01	0.088
Benzo(a)anthracene	3	/	4	75%	0.44	:	0.44	0.26	-	1.2	5.18E-01	**0.42**
Benzo(a)pyrene	3	/	4	75%	0.44	:	0.44	0.36	-	2.1	7.98E-01	**0.53**
Benzo(b)fluoranthene	3	/	4	75%	0.44	:	0.44	0.52	-	3.6	1.28E+00	**0.77**
Benzo(g,h,i)perylene	3	/	4	75%	0.44	:	0.44	0.11	-	0.77	3.23E-01	**0.11**
Benzo(k)fluoranthene	3	/	4	75%	0.44	:	0.44	0.41	-	3.5	1.24E+00	**0.69**
bis(2-EthylHexyl)phthalate	1	/	4	25%	0.44	:	1.5	0.46	-	0.46	4.30E-01	2
Chrysene	3	/	4	75%	0.44	:	0.44	0.4	-	3.8	1.32E+00	**0.64**
Fluoranthene	3	/	4	75%	0.44	:	0.44	0.72	-	5.5	1.94E+00	**1.2**
Indeno (1,2,3-cd) pyrene	3	/	4	75%	0.44	:	0.44	0.14	-	0.77	3.33E-01	**0.12**
Phenanthrene	3	/	4	75%	0.44	:	0.44	0.18	-	1.9	6.78E-01	**0.46**
Pyrene	3	/	4	75%	0.44	:	0.44	0.56	-	5.4	1.85E+00	**1**
Pesticides (mg/Kg)												
Gamma-Chlordane	1	/	1	100%		:		0.0036	-	0.0036	3.60E-03	0.0053

Table 4.2-8
Summary of Sediment Analytical Data - Off-Property West Ditch

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Percent Detected	Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Sediment Background
Inorganics (mg/Kg)												
Aluminum, Total	4	/	4	100%		:		3950	-	46700	1.55E+04	**20400**
Arsenic, Total	4	/	4	100%		:		1.9	-	15.2	6.08E+00	44
Barium, Total	4	/	4	100%		:		5.4	-	31.1	1.93E+01	106
Beryllium, Total	3	/	4	75%	0.186	:	0.186	0.185	-	1.15	4.32E-01	ND
Cadmium, Total	1	/	4	25%	0.186	:	0.554	0.184	-	0.184	1.69E-01	ND
Calcium, Total	4	/	4	100%		:		341	-	5050	1.88E+03	**4100**
Chromium, Total	4	/	4	100%		:		51.7	-	663	2.53E+02	**24.4**
Cobalt, Total	4	/	4	100%		:		1.6	-	4.58	2.81E+00	23.3
Copper, Total	4	/	4	100%		:		4.2	-	98.7	3.05E+01	**58.3**
Iron, Total	4	/	4	100%		:		2810	-	9650	5.29E+03	34100
Lead, Total	4	/	4	100%		:		3	-	47.8	1.75E+01	147
Magnesium, Total	4	/	4	100%		:		561	-	2760	1.59E+03	3900
Manganese, Total	4	/	4	100%		:		25.5	-	122	6.39E+01	776
Nickel, Total	4	/	4	100%		:		4.2	-	24.3	1.08E+01	**21.4**
Potassium, Total	4	/	4	100%		:		176	-	1930	7.66E+02	**980**
Sodium, Total	3	/	4	75%	140	:	140	87	-	958	3.43E+02	**332**
Vanadium, Total	4	/	4	100%		:		4.5	-	38.3	1.78E+01	**32**
Zinc, Total	4	/	4	100%		:		10.6	-	38.1	2.75E+01	379
Nitrogen, Ammonia	1	/	1	100%		:		11.7	-	11.7	1.17E+01	897

BOLD maximum concentration is greater than that background concentration

mg/Kg = milligrams per kilogram

Prepared/Date: KJC 7/31/07
Checked/Date: MH 8/17/07

Table 4.2-9
Summary of Sediment Analytical Data for Current Conditions - Maple Meadow Brook Wetland Area

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Percent Detected	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Sediment Background
Inorganics (mg/Kg)						
Nitrogen, Ammonia	9 / 17	53%	10 : 75	44 - 700	2.11E+02	897
Total Organic Carbon (TOC)	17 / 17	100%	:	8500 - 513000	2.05E+05	570000

mg/Kg = milligrams per kilogram

Prepared/Date: KJC 7/31/07
Checked/Date: MH 8/17/07

Table 4.3-1
Summary of Groundwater Monitoring WellsDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Zone II	Ipswich	Aberjona	Overburden	Bedrock	DAPL Well	Containment Area	Private Well	Town Well
56/58 Butters Row	X	X		X				X	
ALTRON B1	X	X		X					
ALTRON B3		X		X					
AN-1			X	X					
AN-2			X	X					
B-03	X		X	X					
B-05-R	X		X	X					
B-07-A	X		X	X					
B-10	X		X	X					
B-17	X		X	X					
BR-1			X	X			X		
BUTTERS ROW 1	X	X		X					X
BUTTERS ROW 2	X	X		X					X
BUTTERS ROW PLANT RAW	X	X		X					X
CHESTNUT ST 1	X	X		X					X
CHESTNUT ST 1A/2	X	X		X					X
E-10			X	X					
ECS-2			X	X					
ECS-6			X	X					
GT-4D			X	X			X		
GT-4S			X	X			X		
GT-5			X	X			X		
GT-6D			X	X			X		
GT-6S			X	X			X		
GT-7			X	X			X		
GT-9D			X	X			X		
GT-9S			X	X			X		
GW-1	X		X	X					
GW-3D			X	X					
GW-3S			X	X					
GW-4			X	X					
GW-4D			X	X					
GW-5			X	X					
GW-6D			X	X					
GW-6S			X	X					
GW-7			X	X			X		
GW-8			X	X					
GW-10D			X	X					
GW-10S			X	X					
GW-11			X	X					
GW-12			X	X					
GW-13	X		X	X					
GW-14	X		X	X					
GW-15			X	X					
GW-16	X		X	X					

Table 4.3-1
Summary of Groundwater Monitoring WellsDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Zone II	Ipswich	Aberjona	Overburden	Bedrock	DAPL Well	Containment Area	Private Well	Town Well
GW-27S			X	X			X		
GW-28D			X	X					
GW-28S			X	X					
GW-29D			X	X					
GW-29S			X	X					
GW-30DR			X	X		X	X		
GW-30S			X	X					
GW-31D	X		X	X					
GW-31S	X		X	X					
GW-32D	X		X	X					
GW-32S	X		X	X					
GW-33D			X	X					
GW-33S			X	X					
GW-34D			X	X					
GW-34S			X	X					
GW-34SR			X	X					
GW-35D			X	X		X	X		
GW-35S			X	X			X		
GW-36			X	X		X			
GW-37			X	X		X			
GW-38			X	X		X			
GW-39			X	X					
GW-40D			X	X					
GW-40S			X	X					
GW-42D			X	X		X			
GW-42S			X	X					
GW-43D			X	X		X			
GW-43S			X	X					
GW-44D	X	X		X		X			
GW-44S	X	X		X					
GW-45D		X		X		X			
GW-45S		X		X					
GW-46D			X	X					
GW-47	X	X		X					
GW-48D	X		X	X					
GW-48S	X		X	X					
GW-49D			X	X					
GW-50D			X	X					
GW-50S			X	X					
GW-51D			X	X					
GW-51S			X	X					
GW-52D			X	X					
GW-52S			X	X					
GW-53D			X	X					
GW-53S			X	X					
GW-54D			X	X					
GW-54S			X	X					
GW-55D			X	X					
GW-55S			X	X					
GW-56D			X	X					
GW-56S			X	X					
GW-57D	X	X		X					
GW-58D	X	X		X					
GW-58S	X	X		X					
GW-59D	X	X		X		X			
GW-59S	X	X		X					
GW-60D	X	X		X					
GW-60S	X	X		X					
GW-61BR	X	X			X				
GW-61D	X	X		X					

Table 4.3-1
Summary of Groundwater Monitoring WellsDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Zone II	Ipswich	Aberjona	Overburden	Bedrock	DAPL Well	Containment Area	Private Well	Town Well
GW-61S	X	X		X					
GW-62BR	X	X			X				
GW-62BRD	X	X			X				
GW-62D	X	X		X					
GW-62M	X	X		X					
GW-62S	X	X		X					
GW-63D	X	X		X					
GW-63S	X	X		X					
GW-64D	X	X		X					
GW-64S	X	X		X					
GW-65BR	X	X			X				
GW-65D	X	X		X					
GW-65S	X	X		X					
GW-66D	X	X		X					
GW-66S	X	X		X					
GW-67D	X	X		X					
GW-67S	X	X		X					
GW-68BR			X		X				
GW-68D			X	X					
GW-69D		X		X					
GW-69S		X		X					
GW-70D	X	X		X		X			
GW-70S	X	X		X					
GW-71D	X	X		X					
GW-71S	X	X		X					
GW-72D			X	X					
GW-73D	X	X		X					
GW-73S	X	X		X					
GW-74D			X	X					
GW-74S			X	X					
GW-75D			X	X					
GW-75S			X	X					
GW-76S			X	X					
GW-77S			X	X					
GW-78S			X	X					
GW-79S			X	X					
GW-80BR			X		X				
GW-80D			X	X					
GW-80S			X	X					
GW-81BR			X		X				
GW-81D			X	X					
GW-82D	X	X		X					
GW-82S	X	X		X					
GW-83D	X	X		X		X			
GW-83M	X	X		X					
GW-83S	X	X		X					
GW-84D	X	X		X					
GW-84M	X	X		X					
GW-84S	X	X		X					
GW-85D	X	X		X					
GW-85M	X	X		X					
GW-86D	X	X		X					
GW-86M	X	X		X					
GW-86S	X	X		X					
GW-87D	X	X		X					
GW-88D	X	X		X					
GW-88M	X	X		X					
GW-88S	X	X		X					
GW-98			X	X					
GW-100	X		X	X					

Table 4.3-1
Summary of Groundwater Monitoring WellsDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Zone II	Ipswich	Aberjona	Overburden	Bedrock	DAPL Well	Containment Area	Private Well	Town Well
GW-101	X		X	X					
GW-102	X		X	X					
GW-103BR	X	X			X				
GW-103D	X	X		X					
GW-201S			X	X					
GW-202D			X	X					
GW-202S			X	X					
GW-301			X	X					
GW-302			X	X					
GW-303			X	X					
GW-304			X	X					
GW-305			X	X					
GW-306			X	X					
GW-307			X	X					
GW-308			X	X					
GW-CA1			X	X					
GW-CA2			X	X					
GW-LPB-11			X	X					
LPB-40			X	X					
LPB-44			X	X					
LPB-47			X	X					
IW-1	X		X	X					
IW-2	X		X	X					
IW-3	X		X	X					
IW-4	X		X	X					
IW-6	X		X	X					
IW-10	X		X	X					
IW-11	X		X	X					
IW-12	X		X	X					
IW-13	X		X	X					
M-14/L-2B	X	X			X			X	
M-15/L-2C	X	X			X			X	
M-24/L-33A		X		X				X	
M-24/L-54			X		X			X	
M-24/L-63			X		X			X	
M-24/L-64			X		X			X	
M-24/L-65			X		X			X	
M-24/L-66			X		X			X	
M-24/L-72A		X			X			X	
M-24/L-74		X		X				X	
M-24/L-87A			X		X			X	
M-24/L-94			X		X			X	
M-24/L-116			X		X			X	
M-24/L-117			X		X			X	
M-25/L-03	X	X		X				X	
M-25/L-04	X	X		X				X	
M-25/L-05	X	X		X				X	
M-25/L-06	X	X		X				X	
M-25/L-07	X	X		X				X	
M-25/L-08-IN	X	X		X				X	
M-25/L-08-OUT	X	X		X				X	
M-38/L-1	X	X			X			X	
MB-1	X	X		X					
MB-2	X	X		X					
MB-3	X	X		X					
MP-1 #01			X	X		X	X		
MP-1 #02			X	X		X	X		
MP-1 #03			X	X		X	X		
MP-1 #04			X	X		X	X		
MP-1 #05			X	X			X		

Table 4.3-1
Summary of Groundwater Monitoring WellsDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Zone II	Ipswich	Aberjona	Overburden	Bedrock	DAPL Well	Containment Area	Private Well	Town Well
MP-1 #06			X	X			X		
MP-1 #07			X	X			X		
MP-1 #08			X	X			X		
MP-1 #10			X	X			X		
MP-1 #11			X	X			X		
MP-1 #12			X	X			X		
MP-1 #13			X	X			X		
MP-1 #14			X	X			X		
MP-1 #16			X	X			X		
MP-1 #17			X	X			X		
MP-1 #18			X	X			X		
MP-2 #01			X	X		X			
MP-2 #02			X	X		X			
MP-2 #03			X	X		X			
MP-2 #04			X	X		X			
MP-2 #06			X	X		X			
MP-2 #07			X	X		X			
MP-2 #08			X	X		X			
MP-2 #09			X	X		X			
MP-2 #10			X	X					
MP-2 #11			X	X					
MP-2 #12			X	X					
MP-2 #13			X	X					
MP-2 #14			X	X					
MP-2 #15			X	X					
MP-2 #16			X	X					
MP-2 #17			X	X					
MP-3 #01	X	X		X		X			
MP-3 #02	X	X		X		X			
MP-3 #03	X	X		X		X			
MP-3 #04	X	X		X		X			
MP-3 #05	X	X		X					
MP-3 #06	X	X		X					
MP-3 #07	X	X		X					
MP-3 #08	X	X		X					
MP-3 #09	X	X		X					
MP-3 #10	X	X		X					
MP-3 #11	X	X		X					
MP-3 #12	X	X		X					
MP-3 #13	X	X		X					
MP-3 #14	X	X		X					
MP-3 #15	X	X		X					
MP-3 #16	X	X		X					
MP-3 #17	X	X		X					
MP-3 #18	X	X		X					
MP-3 #19	X	X		X					
MP-3 #20	X	X		X					
MP-3 #21	X	X		X					
MP-4 #01	X	X		X		X			
MP-4 #02	X	X		X		X			
MP-4 #03	X	X		X		X			
MP-4 #05	X	X		X		X			
MP-4 #08	X	X		X		X			
MP-4 #09	X	X		X		X			
MP-4 #10	X	X		X					
MP-4 #11	X	X		X					
MP-4 #12	X	X		X					
MP-4 #13	X	X		X					
MP-4 #14	X	X		X					
MP-5	X	X		X					

Table 4.3-1
Summary of Groundwater Monitoring WellsDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Zone II	Ipswich	Aberjona	Overburden	Bedrock	DAPL Well	Containment Area	Private Well	Town Well
MP-5 #03	X	X		X					
MP-5 #05	X	X		X					
MP-5 #06	X	X		X					
MP-5 #08	X	X		X					
MP-5 #09	X	X		X					
MP-5 #11	X	X		X					
MP-5 #12	X	X		X					
MP-5 #15	X	X		X					
MW-203D	X	X		X					
MW-203S	X	X		X					
MW-204D	X	X		X					
MW-204M	X	X		X					
MW-204S	X	X		X					
MW-206D	X	X		X					
MW-206S	X	X		X					
P5	X		X	X					
PZ-16RR			X	X					
PZ-17RR			X	X					
PZ-18R			X	X					
PZ-20			X	X					
PZ-21			X	X					
PZ-22			X	X					
PZ-23			X	X					
PZ-24			X	X			X		
PZ-25			X	X					
PZ-W1			X	X					
PZ-W2			X	X					
PZ-W3			X	X					
SB-1	X	X		X					
SB-2	X	X		X					
SB-3	X	X		X					
SB-4	X	X		X					
SB-5	X	X		X					
SB-6	X	X		X					
SL-1D			X	X					
SL-1S			X	X					
SL-2			X	X					
SL-3			X	X					
SL-5			X	X					
SL-6			X	X					
SL-6D			X	X					
SL-7			X	X					
SL-8			X	X					
SVEMW-9	X		X	X					
TOWN PARK	X	X		X					X
W-10			X	X					

Prepared/Date: KJC 08/15/07Checked/

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)	Federal MCL (mg/L)		Massachusetts MCL (mg/L)		Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
Volatile Organics (mg/L)									
1,1,1-Trichloroethane (TCA)		0.2		0.2				3.2	nc
1,1-Dichloroethane						0.07		0.81	nc
1,1-Dichloroethene		0.007		0.007				0.34	nc
1,2,4-Trichlorobenzene		0.07		0.07				0.0072	nc
1,2,4-Trimethylbenzene			NA					0.012	nc
1,2-Dichlorobenzene		0.6		0.6				0.37	nc
1,2-Dichloroethane		0.005		0.005				0.00012	ca*
1,2-Dichloroethene (total)									
1,3,5-Trimethylbenzene			NA					0.012	nc
1,3-Dichlorobenzene			NA					0.18	nc
1,4-Dichlorobenzene		0.075		0.005				0.0005	ca
2,4,4-Trimethyl-1-pentene									
2,4,4-Trimethyl-2-Pentene									
2-Butanone (MEK)			NA			4		7	nc
2-Chlorotoluene			NA					0.12	nc
2-Hexanone									
4-Chlorotoluene			NA						
4-Methyl-2-Pentanone (MIBK)						0.35		2	nc
Acetone						6.3		5.5	nc
Benzene		0.005		0.005				0.00035	ca
Bromodichloromethane		0.08						0.00018	ca
Bromoform		0.08						0.0085	ca*
Bromomethane (Methyl Bromide)			NA			0.01		0.0087	nc
Carbon Disulfide								1	nc
Carbon Tetrachloride		0.005		0.005				0.00017	ca*
Chlorobenzene		0.1		0.1				0.11	nc
Chloroethane								0.0046	ca
Chloroform		0.08				0.07		0.00017	ca
Chloromethane (Methyl Chloride)			NA					0.16	nc
cis-1,2-Dichloroethene		0.07		0.07				0.061	nc
Dibromochloromethane		0.08						0.00013	ca
Dibromomethane								0.061	nc
Dichlorodifluoromethane			NA			1.4		0.39	nc
Diethyl ether								1.2	nc
Ethylbenzene		0.7		0.7				1.3	nc
Formaldehyde			NA					5.5	nc
Isopropyl Benzene			NA					0.66	nc

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)		Federal MCL (mg/L)		Massachusetts MCL (mg/L)		Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
m,p-Xylene										
Methylene Chloride			0.005		0.005				0.0043	ca
Methyl-t-butyl ether (MTBE)							0.07	0.02	0.011	ca
o-Xylene			10							
p-Isopropyl Toluene										
Styrene			0.1		0.1				1.6	nc
t-Butylbenzene									0.24	nc
Tetrachloroethene (PCE)			0.005		0.005				0.0001	ca
Tetrahydrofuran							1.3		0.0016	ca
Toluene			1		1				0.72	nc
trans-1,2-Dichloroethene			0.1		0.1				0.12	nc
Trichloroethene (TCE)			0.005		0.005				0.000028	ca
Vinyl Chloride			0.002		0.002				0.00002	ca
Xylenes, Total			10		10				0.21	nc
Hydrazine (mg/L)										
Hydrazine									0.000022	ca
Monomethylhydrazine (MMH)									0.000022	ca
Unsymmetrical dimethylhydrazine (UDMH)									0.000022	ca
Semivolatile Organics (mg/L)										
1,2,4-Trichlorobenzene			0.07		0.07				0.0072	nc
1,2-Dichlorobenzene			0.6		0.6				0.37	nc
1,2-Diphenylhydrazine									0.000084	ca
1,3-Dichlorobenzene				NA					0.18	nc
1,4-Dichlorobenzene			0.075		0.005				0.0005	ca
2,4-Dichlorophenol				NA					0.11	nc
2,4-Dimethylphenol									0.73	nc
2,4-Dinitrophenol									0.073	nc
2,6-Dinitrotoluene				NA					0.036	nc
2-Chlorophenol				NA					0.03	nc
2-Methylnaphthalene									0.0062	nc
2-Methylphenol (o-Cresol)									1.8	nc
2-Nitrophenol										
3&4-Methylphenol										
4-Bromophenyl-phenylether										
4-Chloro-3-methylphenol										
4-Chloroaniline									0.15	nc
4-Chlorophenyl-phenylether										

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)		Federal MCL (mg/L)		Massachusetts MCL (mg/L)		Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
4-Methylphenol (p-Cresol)									0.18	nc
4-Nitrophenol			NA							
Aniline									0.012	ca*
Benzoic Acid									150	nc
Benzyl Alcohol									11	nc
bis(2-EthylHexyl)phthalate		0.006		0.006					0.0048	ca
Butylbenzylphthalate			NA						7.3	nc
Dibenzofuran									0.012	nc
Diethylphthalate			NA						29	nc
Dimethylphthalate			NA						360	nc
Di-n-butylphthalate			NA						3.6	nc
Di-n-octylphthalate									1.5	nc
Isophorone			NA						0.071	ca
Naphthalene			NA				0.14		0.0062	nc
Nitrobenzene									0.0034	nc
N-Nitrosodiphenylamine									0.014	ca*
N-Nitrosodimethylamine							0.00001		0.0000013	ca
Phenol			NA						11	nc
Phenolics, Total Recoverable										
Pyrene			NA						0.18	nc
Semivolatile Organics by Low Level (mg/L)										
2-Nitrophenol										
3&4-Methylphenol										
bis(2-EthylHexyl)phthalate		0.006		0.006					0.0048	ca
Butylbenzylphthalate			NA						7.3	nc
Di-n-butylphthalate			NA						3.6	nc
Phenol			NA						11	nc
Polyaromatic Hydrocarbons (mg/L)										
1-Methylnaphthalene										
2-Methylnaphthalene									0.0062	nc
Acenaphthene			NA						0.37	nc
Acenaphthylene									0.18	nc
Anthracene			NA						1.8	nc
Benzo(a)anthracene			NA						0.000092	ca
Benzo(a)pyrene		0.0002		0.0002					0.0000092	ca
Benzo(b)fluoranthene			NA						0.000092	ca
Benzo(g,h,i)perylene			NA						0.18	nc
Benzo(k)fluoranthene			NA						0.00092	ca

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)	Federal MCL (mg/L)		Massachusetts MCL (mg/L)		Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
Chrysene			NA					0.0092	ca
Dibenzo(a,h)anthracene								0.0000092	ca
Fluoranthene								1.5	nc
Fluorene			NA					0.24	nc
Indeno (1,2,3-cd) pyrene			NA					0.000092	ca
Naphthalene			NA			0.14		0.0062	nc
Phenanthrene			NA					0.18	nc
Pyrene			NA					0.18	nc
Pesticides/PCBs (mg/L)									
4,4'-DDD								0.00028	ca
4,4'-DDE								0.0002	ca
4,4'-DDT								0.0002	ca*
Aldrin			NA					0.000004	ca
Alpha-BHC								0.000011	ca
Beta-BHC								0.000037	ca
Delta-BHC								0.000011	ca
Dieldrin			NA					0.0000042	ca
Endosulfan I									
Endosulfan II									
Endosulfan Sulfate									
Endrin		0.002		0.002				0.011	nc
Endrin Aldehyde									
Endrin Ketone									
Gamma-BHC (Lindane)		0.0002		0.0002				0.000052	ca
Gamma-Chlordane								0.00019	ca*
Heptachlor		0.0004		0.0004				0.000015	ca
Heptachlor Epoxide		0.0002		0.0002				0.0000074	ca*
Methoxychlor		0.04		0.04				0.18	nc
PCB-1016		0.0005		0.0005				0.00096	ca**
PCB-1254		0.0005		0.0005				0.000034	ca*
Herbicides (mg/L)									
2,4,5-T			NA					0.36	nc
2,4,5-TP		0.05		0.05				0.29	nc
2,4-D		0.07		0.07				0.36	nc
2,4-DB								0.29	nc
2,4-DB								0.29	nc
Dalapon		0.2		0.2				1.1	nc
Dicamba			NA					1.1	nc

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)		Federal MCL (mg/L)		Massachusetts MCL (mg/L)		Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
Dinoseb		0.007		0.007					0.036	nc
MCPA			NA						0.018	nc
MCPP									0.036	nc
Pentachlorophenol		0.001		0.001					0.00056	ca
Picloram		0.5		0.5					2.6	nc
Opex/Kempore (mg/L)										
Kempore (Azodicarbonamide)										
OPEX										
Metals, Total (mg/L)										
Aluminum, Total	7.15							0.05	36	nc
Antimony, Total	0.0173	0.006		0.006					0.015	nc
Arsenic, Total	0.00505	0.01		0.01					0.000045	ca
Barium, Total	0.0239	2		2					2.6	nc
Beryllium, Total	0.001	0.004		0.004					0.073	nc
Boron, Total			NA						7.3	nc
Cadmium, Total	0.005	0.005		0.005					0.018	nc
Calcium, Total	162									
Chromium, Total	0.019	0.1		0.1						
Cobalt, Total	0.0478								0.73	nc
Copper, Total	0.0401		TT**	1.3	TT			1	1.5	nc
Hexavalent Chromium, Total									0.11	nc
Iron, Total	30.7							0.3	11	nc
Lead, Total	0.0034		TT**	0.015	TT					
Lithium, Total									0.73	nc
Magnesium, Total	25.3									
Manganese, Total	2.61		NA					0.05	0.88	nc
Mercury, Total	0.0002	0.002		0.002						
Molybdenum, Total			NA						0.18	nc
Nickel, Total	0.0719		NA				0.1		0.73	nc
Potassium, Total	7.22									
Selenium, Total	0.002	0.05		0.05					0.18	nc
Silicon, Total										
Silver, Total	0.571		NA					0.1	0.18	nc
Sodium, Total	105						20			
Strontium, Total			NA						22	nc
Thallium, Total	0.004	0.002		0.002					0.0024	nc
Trivalent Chromium, Total									55	nc
Uranium				0.03			0.02		0.0073	nc

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)	Federal MCL (mg/L)		Massachusetts MCL (mg/L)		Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
Vanadium, Total	0.006							0.036	nc
Zinc, Total	0.027		NA				5	11	nc
Metals, Filtered (mg/L)									
Aluminum, Filtered	5.01						0.05	36	nc
Antimony, Filtered	0.0187	0.006		0.006				0.015	nc
Arsenic, Filtered	0.0034	0.01		0.01				0.000045	ca
Barium, Filtered	0.0222	2		2				2.6	nc
Beryllium, Filtered		0.004		0.004				0.073	nc
Boron, Filtered			NA					7.3	nc
Cadmium, Filtered	0.005	0.005		0.005				0.018	nc
Calcium, Filtered	156								
Chromium, Filtered	0.0098	0.1		0.1					
Cobalt, Filtered	0.007							0.73	nc
Copper, Filtered	0.0115		TT**	1.3	TT		1	1.5	nc
Hexavalent Chromium, Filtered								0.11	nc
Iron, Filtered	0.151						0.3	11	nc
Lead, Filtered	0.002		TT**	0.015	TT				
Lithium, Filtered								0.73	nc
Magnesium, Filtered	24.6								
Manganese, Filtered	1.485		NA				0.05	0.88	nc
Mercury, Filtered		0.002		0.002					
Molybdenum, Filtered			NA					0.18	nc
Nickel, Filtered	0.02		NA			0.1		0.73	nc
Potassium, Filtered	6.44								
Selenium, Filtered	0.003	0.05		0.05				0.18	nc
Silicon, Filtered									
Silver, Filtered	0.0084		NA				0.1	0.18	nc
Sodium, Filtered	123					20			
Strontium, Filtered			NA					22	nc
Thallium, Filtered	0.004	0.002		0.002				0.0024	nc
Trivalent Chromium, Filtered								55	nc
Vanadium, Filtered	0.006							0.036	nc
Zinc, Filtered	0.02675		NA				5	11	nc
Inorganics (mg/L)									
Chloride	232						250		
Color, Apparent **(Color Units)**							15		
Color, True **(Color Units)**							15		
Cyanide		0.2		0.2				0.73	nc

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)		Federal MCL (mg/L)		Massachusetts MCL (mg/L)		Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
Fluoride			4		4			2	2.2	nc
Nitrate & Nitrite as N			10							
Nitrate as N			10		10					
Nitrite as N			1		1					
Nitrogen, Ammonia				NA						
Nitrogen, Total Kjeldahl as N										
pH **(pH units)**								6.5		
Phosphate, Total as P										
Phosphorous				NA					0.00073	nc
Residual Chlorine			4		4	MRDL				
Sulfate as SO4	48.76							250		
Sulfide										
Total Dissolved Solids (TDS)								500		
Turbidity **(NTU)**										
Coliform (/100 mL)										
Total Coliform Bacteria										
VPH (mg/L)										
Benzene			0.005		0.005				0.00035	ca
Ethylbenzene			0.7		0.7				1.3	nc
Methyl-t-butyl ether (MTBE)							0.07	0.02	0.011	ca
Naphthalene				NA			0.14		0.0062	nc
o-Xylene			10							
Toluene			1		1				0.72	nc
Xylenes, Total			10		10				0.21	nc
C5-C8 Aliphatics (FID)							0.3			
C5-C8 Aliphatics, Unadjusted										
C9-C10 Aromatics (PID)							0.2			
C9-C12 Aliphatics (FID)							0.7			
C9-C12 Aliphatics, Unadjusted										
VPH Concentration (Total)										
EPH (mg/L)										
2-Methylnaphthalene									0.0062	nc
Acenaphthylene									0.18	nc
Benzo(a)anthracene				NA					0.000092	ca
Benzo(g,h,i)perylene				NA					0.18	nc
Fluorene				NA					0.24	nc
Naphthalene				NA			0.14		0.0062	nc
C11-C22 Aromatics (FID)							0.2			

Table 4.3-2
Screening Criteria and Background ValuesDraft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)
C11-C22 Aromatics, Unadjusted						
C19-C36 Aliphatics (PID)				14		
C9-C18 Aliphatics (FID)				0.7		
EPH Concentration (Total)						

Prepared/Date: KJC 08/16/07Checked/Date: PHT 10/01/07

Roux Associates, Inc.; Environmental Science and Engineering, Inc.; PTI Environmental Services. 1991. Ground-water/Surface Water Investigation
Plan Phase I Remedial Investigation Final Report. Prepared for: Industri-Plex Site Remedial Trust. June 7.USEPA, Office of Water. 2006. 2006 Edition of the Drinking Water Standards and Health Advisories. EPA 8
NA - Not Available
SDWR - Secondary Drinking Water Regulation
TT - Treatment TechniqueMADEP, Office of Research and Standards. 2007. Standards and Guidelines for Contaminants in Massachusetts Drinking Waters. S
MRDL - Maximum Residual Disinfectant Level
TT - Treatment TechniqueUSEPA, Region IX. 2004. Region 9 Preliminary Remediation Goal (PRG) Table. October 20.
nc - Noncancer PRG
nc** - Noncancer PRG where Noncancer PRG is more stringent than Cancer PRG
ca - Cancer PRG
ca* - Cancer PRG where Noncancer PRG < 100 x Cancer PRG
ca** - Cancer PRG where Noncancer PRG < 10 x Cancer PRG
mg/L- milligrams/Liter
ug/L- micrograms/Liter
umhos/cm- micromhos/ centimeter

Table 4-3-3
Containment Area Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples
Volatile Organics (mg/L)				
1,1,1-Trichloroethane (TCA)	1 / 15	0.0005 : 0.005	0.004 - 0.004	0.002233333
1,2,4-Trichlorobenzene	1 / 7	0.0005 : 0.01	0.015 - 0.015	0.004571429
1,2-Dichloroethane	4 / 15	0.0005 : 0.005	0.005 - 0.015	0.00377
2,4,4-Trimethyl-1-pentene	11 / 23	0.0005 : 0.01	0.013 - 0.32	0.048456522
2,4,4-Trimethyl-2-Pentene	9 / 23	0.0005 : 0.01	0.006 - 0.19	0.021569565
2-Butanone (MEK)	1 / 12	0.01 : 0.015	0.005 - 0.005	0.005416667
Acetone	2 / 12	0.01 : 0.015	0.058 - 0.22	0.027541667
Benzene	0 / 15	0.0005 : 0.005		0.002133333
Bromodichloromethane	4 / 15	0.0005 : 0.005	0.0044 - 0.043	0.006843333
Bromoform	5 / 15	0.0005 : 0.005	0.008 - 0.75	0.069716667
Carbon Disulfide	2 / 12	0.005 : 0.01	0.009 - 0.01	0.003875
Carbon Tetrachloride	1 / 15	0.0005 : 0.005	0.016 - 0.016	0.003033333
Chloroform	5 / 15	0.0005 : 0.005	0.005 - 0.033	0.007983333
Chloromethane (Methyl Chloride)	1 / 15	0.0005 : 0.01	0.002 - 0.002	0.003933333
Dibromochloromethane	4 / 15	0.0005 : 0.005	0.012 - 0.17	0.016883333
Formaldehyde	3 / 6	0.05 : 0.05	0.15 - 0.28	0.110833333
Methylene Chloride	3 / 15	0.0005 : 0.01	0.003 - 0.012	0.003506667
Toluene	4 / 15	0.0005 : 0.005	0.007 - 0.027	0.005483333
Trichloroethene (TCE)	1 / 15	0.0005 : 0.005	0.003 - 0.003	0.002166667
Semivolatile Organics (mg/L)				
2,4-Dichlorophenol	1 / 15	0.001 : 0.012	0.001 - 0.001	0.003733333
2-Chlorophenol	1 / 15	0.001 : 0.012	0.01 - 0.01	0.004666667
2-Methylphenol (o-Cresol)	2 / 15	0.001 : 0.012	0.016 - 0.02	0.006033333
2-Nitrophenol	5 / 15	0.001 : 0.011	0.001 - 0.19	0.025066667
4-Bromophenyl-phenylether	2 / 15	0.002 : 0.012	0.005 - 0.022	0.0053
4-Chloro-3-methylphenol	2 / 15	0.001 : 0.012	0.002 - 0.006	0.004233333
4-Methylphenol (p-Cresol)	2 / 15	0.003 : 0.012	0.023 - 0.052	0.008766667
4-Nitrophenol	3 / 15	0.01 : 0.058	0.003 - 0.33	0.0484
Benzoic Acid	2 / 15	0.005 : 0.14	0.014 - 0.024	0.024566667
Benzyl Alcohol	2 / 15	0.005 : 0.012	0.002 - 0.005	0.004266667
bis(2-EthylHexyl)phthalate	12 / 23	0.002 : 0.012	0.002 - 0.19	0.020847826
Dibenzofuran	1 / 15	0.001 : 0.012	0.002 - 0.002	0.003833333
Diethylphthalate	1 / 23	0.002 : 0.012	0.001 - 0.001	0.00423913
Di-n-butylphthalate	1 / 23	0.002 : 0.1	0.001 - 0.001	0.006173913
Isophorone	1 / 15	0.001 : 0.012	0.008 - 0.008	0.004266667
Naphthalene	3 / 15	0.001 : 0.012	0.001 - 0.088	0.014966667
N-Nitrosodimethylamine	8 / 13	0.01 : 0.01	0.000045 - 0.004	0.002885
N-Nitrosodiphenylamine	6 / 23	0.001 : 0.012	0.001 - 0.51	0.026934783
Phenol	3 / 15	0.001 : 0.012	0.38 - 1	0.162166667

Table 4-3-3
Containment Area Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples
Polyaromatic Hydrocarbons (mg/L)										
Acenaphthylene	2	/	3	0.00082	:	0.00082	0.00077	-	0.0109	0.004026667
Naphthalene	1	/	3	0.00078	:	0.00082	0.0009	-	0.0009	0.000566667
Phenanthrene	1	/	3	0.000044	:	0.000047	0.00011	-	0.00011	5.18333E-05
Pesticides/PCBs (mg/L)										
4,4'-DDT	1	/	12	0.0000038	:	0.001	0.0000057	-	0.0000057	0.000113967
Aldrin	2	/	12	0.0000019	:	0.0005	0.0000129	-	0.000065	6.11542E-05
Alpha-BHC	5	/	12	0.0000019	:	0.0005	0.000064	-	0.0003	0.000107496
Beta-BHC	4	/	12	0.0000019	:	0.0005	0.0000145	-	0.000062	6.67042E-05
Delta-BHC	2	/	12	0.0000055	:	0.0005	0.000071	-	0.00014	7.13417E-05
Dieldrin	1	/	12	0.0000038	:	0.001	0.0000041	-	0.0000041	0.000113833
Endosulfan I	1	/	12	0.0000019	:	0.0005	0.000054	-	0.000054	5.92458E-05
Endosulfan II	1	/	12	0.0000038	:	0.001	0.0000085	-	0.0000085	0.0001142
Endosulfan Sulfate	1	/	12	0.0000038	:	0.001	0.00011	-	0.00011	0.000118654
Endrin	2	/	12	0.0000038	:	0.001	0.000007	-	0.000047	0.000117158
Endrin Aldehyde	0	/	12	0.0000038	:	0.001				0.000113654
Endrin Ketone	0	/	12	0.0000038	:	0.001				0.000113654
Gamma-BHC (Lindane)	2	/	12	0.00001	:	0.0005	0.0000156	-	0.0000345	6.08417E-05
Gamma-Chlordane	1	/	12	0.0000019	:	0.005	0.0000029	-	0.0000029	0.000563238
Heptachlor	1	/	12	0.0000019	:	0.0005	0.0000246	-	0.0000246	5.87958E-05
Heptachlor Epoxide	3	/	12	0.0000019	:	0.0005	0.000051	-	0.000068	6.54958E-05
Organophosphorus Pesticides (mg/L)										
Kempore (Azodicarbonamide)	1	/	9	0.2	:	4	3.8	-	3.8	1.666666667
OPEX	1	/	9	0.02	:	0.11	0.27	-	0.27	0.068888889
Herbicides (mg/L)										
2,4,5-T	3	/	3				0.0000143	-	0.0000356	2.48333E-05
2,4,5-TP	3	/	3				0.0000303	-	0.000259	0.0001531
2,4-D	1	/	3	0.000095	:	0.000095	0.000108	-	0.000108	6.76667E-05
2,4-DB	1	/	3	0.000095	:	0.000097	0.00038	-	0.00038	0.000158667
Dicamba	1	/	3	0.000057	:	0.000058	0.000201	-	0.000201	8.61667E-05
Dinoseb	1	/	3	0.000048	:	0.000048	0.000081	-	0.000081	0.000043
MCPA	1	/	3	0.048	:	0.049	0.094	-	0.094	0.0475
MCPP	1	/	3	0.048	:	0.049	0.34	-	0.34	0.1295
Pentachlorophenol	1	/	3	0.00001	:	0.00001	0.0001	-	0.0001	3.66667E-05
Picloram	2	/	3	0.001	:	0.001	0.00072	-	0.05	0.017073333
Metals, Total (mg/L)										
Aluminum, Total	6	/	10	0.1	:	0.1	5.94	-	2560	504.074
Antimony, Total	3	/	9	0.005	:	0.05	0.102	-	7.28	1.077722222
Arsenic, Total	2	/	10	0.02	:	0.5	0.087	-	1.11	0.1687
Barium, Total	3	/	10	0.02	:	0.5	0.051	-	0.11	0.0911

Table 4-3-3
Containment Area Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples
Beryllium, Total	5 / 9	0.002 : 0.015	0.003 - 0.184	0.0425
Cadmium, Total	6 / 10	0.002 : 0.002	0.009 - 0.17	0.0358
Calcium, Total	9 / 9		121 - 506	332.3333333
Chromium, Total	13 / 17	0.01 : 0.015	0.015 - 2340	347.3005294
Cobalt, Total	6 / 9	0.02 : 0.02	0.042 - 12.2	2.498555556
Copper, Total	7 / 9	0.02 : 0.02	0.033 - 12.9	2.937333333
Hexavalent Chromium, Total	1 / 15	0.005 : 0.5	60 - 60	4.035333333
Iron, Total	8 / 9	0.1 : 0.1	0.412 - 678	123.9957778
Lead, Total	0 / 10	0.01 : 0.25		0.0445
Magnesium, Total	9 / 9		4.62 - 1930	456.9677778
Manganese, Total	9 / 9		0.454 - 291	60.74644444
Mercury, Total	5 / 10	0.0002 : 0.0002	0.00024 - 0.00296	0.000532
Nickel, Total	7 / 9	0.02 : 0.02	0.031 - 10.1	2.14
Potassium, Total	3 / 9	4 : 20	6.4 - 72.8	14.8
Selenium, Total	0 / 10	0.02 : 0.5		0.08275
Silver, Total	0 / 10	0.01 : 0.25		0.03475
Sodium, Total	9 / 9		63.4 - 24600	3736.822222
Trivalent Chromium, Total	6 / 6		0.008 - 1900	316.7025
Vanadium, Total	4 / 9	0.02 : 0.05	0.044 - 1.59	0.257555556
Zinc, Total	6 / 9	0.1 : 0.1	0.155 - 20.6	4.278333333
Metals, Filtered (mg/L)				
Aluminum, Filtered	35 / 88	0.05 : 0.2	0.05 - 13000	291.7974489
Antimony, Filtered	9 / 37	0.0019 : 0.1	0.0036 - 16	0.635758108
Arsenic, Filtered	8 / 35	0.0011 : 0.5	0.0078 - 0.99	0.066981429
Barium, Filtered	19 / 37	0.01 : 0.25	0.007 - 0.3	0.056140541
Beryllium, Filtered	11 / 37	0.0019 : 0.015	0.007 - 0.2	0.028794595
Boron, Filtered	2 / 3	0.013 : 0.013	0.013 - 0.052	0.023833333
Cadmium, Filtered	11 / 37	0.00081 : 0.01	0.0087 - 0.207	0.029378649
Calcium, Filtered	51 / 51		84 - 651	309.8823529
Chromium, Filtered	68 / 96	0.01 : 0.03	0.0028 - 2220	138.9053094
Cobalt, Filtered	14 / 37	0.0017 : 0.05	0.0025 - 9.8	1.482158108
Copper, Filtered	14 / 38	0.0029 : 0.025	0.0628 - 9.4	1.291044737
Hexavalent Chromium, Filtered	7 / 28	0.003 : 0.05	0.0057 - 0.698	0.069935714
Iron, Filtered	34 / 51	0.011 : 0.1	0.095 - 3500	447.8081471
Lead, Filtered	4 / 37	0.00078 : 0.25	0.013 - 0.34	0.02064
Magnesium, Filtered	44 / 51	0.05 : 5	1 - 2600	277.1595098
Manganese, Filtered	40 / 41	0.01 : 0.01	0.0996 - 250	37.27774634
Mercury, Filtered	5 / 34	0.0001 : 0.0005	0.00028 - 0.003	0.000339412
Molybdenum, Filtered	3 / 3		0.0024 - 0.0298	0.0123
Nickel, Filtered	17 / 37	0.02 : 0.04	0.0019 - 8.6	1.383835135

Table 4-3-3
Containment Area Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples
Potassium, Filtered	28 / 43	1 : 25	1.2 - 340	17.46627907
Selenium, Filtered	2 / 37	0.005 : 0.5	0.0021 - 0.0048	0.019375676
Silver, Filtered	3 / 37	0.0017 : 0.25	0.0308 - 0.064	0.018432432
Sodium, Filtered	55 / 55		3.7 - 24000	3212.245818
Strontium, Filtered	3 / 3		0.128 - 3.55	1.403333333
Thallium, Filtered	2 / 34	0.005 : 0.25	0.33 - 0.4	0.030514706
Trivalent Chromium, Filtered	1 / 5	0.04 : 11.13	11.13 - 11.13	3.355
Vanadium, Filtered	8 / 37	0.0019 : 0.1	0.002 - 1.8	0.199294595
Zinc, Filtered	25 / 37	0.025 : 0.05	0.0052 - 19	3.122332432
Inorganics (mg/L)				
Acidity as CaCO3	1 / 1		2117 - 2117	2117
Bicarbonate alkalinity as CaCO3	48 / 63	1 : 5	10 - 370	147.6428571
Carbonate Alkalinity as CaCO3	1 / 57	1 : 5	1.5 - 1.5	1.096491228
Chemical Oxygen Demand (COD)	2 / 3	20 : 20	44 - 1900	651.3333333
Chloramine	0 / 1	0.1 : 0.1		0.05
Chloride	107 / 108	3 : 3	1 - 28800	1573.957407
Color, Apparent **(color units)**	1 / 3	5 : 5	3000 - 3000	1001.666667
Fluoride	1 / 3	0.5 : 0.5	53 - 53	17.83333333
Nitrate & Nitrite as N	14 / 16	1 : 1	2 - 13.8	5.839375
Nitrate as N	33 / 39	0.05 : 50	0.076 - 14	4.941820513
Nitrite as N	13 / 38	0.01 : 10	0.011 - 0.54	0.422342105
Nitrogen, Ammonia	105 / 108	0.1 : 0.5	0.54 - 9700	556.2287037
Nitrogen, Total Kjeldahl as N	3 / 3		1.2 - 12000	4008.4
Odor **(TON)**	3 / 3		1 - 4	2
Orthophosphate as P	2 / 3	0.1 : 0.1	0.41 - 2.9	1.12
pH **(pH units)**	65 / 65		3.57 - 7.88	6.135384615
Phosphate, Total as P	3 / 3		0.24 - 3.9	1.513333333
Specific Conductance **(umhos/cm)**	64 / 64		257 - 746000	28612.15625
Specific Gravity **(g/mL)**	12 / 12		0.955 - 1.11	1.022083333
Specific Gravity **(ratio)**	7 / 7		0.96 - 1.205	1.071571429
Sulfate as SO4	108 / 108		70 - 89000	6529.972222
Total Alkalinity as CaCO3	5 / 9	1 : 1	50 - 370	88.77777778
Total Dissolved Solids (TDS)	17 / 17		490 - 140000	29225.88235
Total Organic Carbon (TOC)	10 / 10		6.1 - 3300	800.61
Total Suspended Solids	2 / 4	5 : 5	20 - 95700	23931.25
Turbidity **(NTU)**	3 / 3		0.16 - 0.22	0.183333333
Field Measurements (mg/L)				
Alkalinity	3 / 5	1 : 1	236 - 955	339.4
Dissolved Oxygen	18 / 18		0.5 - 9.49	4.061666667
Nitrogen, Ammonia	13 / 13		50 - 90	66.53846154

Table 4-3-3
Containment Area Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples
Oxidation Reduction Potential **(mv)**	13 / 13		-62 - 136	54.15384615
pH **(pH units)**	44 / 44		3.76 - 13.31	6.2925
Specific Conductance **(umhos/cm)**	29 / 29		1110 - 69700	17912.75862
Specific Gravity **(g/mL)**	17 / 17		1.005 - 1.11	1.037352941
Temperature **(°C)**	17 / 17		6.8 - 15	9.829411765
Total Dissolved Solids (TDS)	2 / 2		8560 - 100000	54280
Viscosity **(cpoise)**	1 / 1		1.75 - 1.75	1.75
VPH (mg/L)				
C5-C8 Aliphatics (FID)	1 / 3	0.05 : 2.5	0.084 - 0.084	0.453
C5-C8 Aliphatics, Unadjusted	1 / 3	0.05 : 2.5	0.085 - 0.085	0.453333333
EPH (mg/L)				

mg/L- milligrams/Liter
◦F- degrees Fahrenheit
(mv)- milivollts
g/ml- grams/milliliter
◦C- degrees centigradeumhos/cm- micromhos/ centimeter

Prepared/Date: KJC 08/15/07
Checked/Date: PHT 10/01/07

Table 4.3-4
DAPL Source Area Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples
Volatile Organics (mg/L)										
1,1,1-Trichloroethane (TCA)	2	/	15	0.0025	:	0.05	0.004	-	0.008	0.005216667
1,1-Dichloroethane	1	/	15	0.0025	:	0.05	0.005	-	0.005	0.004916667
1,2-Dichloroethane	9	/	15	0.005	:	0.05	0.003	-	0.025	0.00952
1,2-Dichloroethene (total)	1	/	14	0.005	:	0.05	0.002	-	0.002	0.004071429
2,4,4-Trimethyl-1-pentene	6	/	17	0.0025	:	0.025	0.0038	-	0.049	0.007626471
2,4,4-Trimethyl-2-Pentene	4	/	17	0.001	:	0.025	0.0014	-	0.013	0.004179412
2-Butanone (MEK)	5	/	14	0.01	:	0.2	0.003	-	0.052	0.019321429
4-Methyl-2-Pentanone (MIBK)	3	/	14	0.01	:	0.2	0.003	-	0.004	0.014107143
Acetone	8	/	14	0.01	:	0.3	0.018	-	0.7	0.139892857
Benzene	4	/	15	0.0025	:	0.05	0.002	-	0.011	0.00535
Bromodichloromethane	8	/	15	0.005	:	0.05	0.002	-	0.043	0.010693333
Bromoform	12	/	15	0.005	:	0.005	0.004	-	0.75	0.116633333
Carbon Disulfide	9	/	14	0.005	:	0.1	0.003	-	0.015	0.011321429
Carbon Tetrachloride	1	/	15	0.0025	:	0.05	0.016	-	0.016	0.00565
Chlorobenzene	1	/	15	0.0025	:	0.05	0.001	-	0.001	0.00465
Chloroform	14	/	15	0.005	:	0.005	0.006	-	0.079	0.034166667
Chloromethane (Methyl Chloride)	5	/	15	0.0025	:	0.1	0.001	-	0.007	0.00875
Dibromochloromethane	9	/	15	0.005	:	0.05	0.003	-	0.17	0.0287
Ethylbenzene	5	/	15	0.0025	:	0.05	0.002	-	0.007	0.00525
Formaldehyde	11	/	16	0.05	:	0.1	0.064	-	3.7	0.770125
Methylene Chloride	5	/	15	0.005	:	0.1	0.003	-	0.02	0.010133333
Monomethylhydrazine (MMH)	1	/	7	0.01	:	10	0.002	-	0.002	1.574571429
Tetrachloroethene (PCE)	1	/	15	0.0025	:	0.05	0.002	-	0.002	0.004716667
Toluene	13	/	15	0.005	:	0.005	0.008	-	0.17	0.050133333
Trichloroethene (TCE)	7	/	15	0.0025	:	0.05	0.003	-	0.091	0.01165
Unsymmetrical dimethylhydrazine (UDMH)	1	/	7	0.01	:	2	0.035	-	0.035	0.436428571
Xylenes, Total	4	/	14	0.005	:	0.05	0.004	-	0.01	0.006357143
Semivolatile Organics (mg/L)										
1,2-Dichlorobenzene	3	/	15	0.001	:	0.1	0.0003	-	0.001	0.007753333
1,3-Dichlorobenzene	1	/	15	0.001	:	0.1	0.003	-	0.003	0.0085
1,4-Dichlorobenzene	2	/	15	0.001	:	0.1	0.001	-	0.002	0.008066667
2,4-Dichlorophenol	6	/	15	0.001	:	0.1	0.001	-	0.003	0.0073
2,4-Dimethylphenol	1	/	15	0.001	:	0.1	0.001	-	0.001	0.0084
2-Chlorophenol	3	/	15	0.005	:	0.1	0.001	-	0.01	0.008833333
2-Methylnaphthalene	1	/	15	0.001	:	0.1	0.001	-	0.001	0.008366667
2-Methylphenol (o-Cresol)	9	/	15	0.004	:	0.1	0.002	-	0.02	0.011133333
2-Nitrophenol	9	/	15	0.001	:	0.1	0.001	-	0.21	0.062366667
4-Bromophenyl-phenylether	2	/	15	0.002	:	0.1	0.005	-	0.022	0.0098
4-Chloro-3-methylphenol	2	/	15	0.006	:	0.1	0.002	-	0.006	0.009133333
4-Methylphenol (p-Cresol)	9	/	15	0.004	:	0.1	0.002	-	0.081	0.026466667
4-Nitrophenol	9	/	15	0.01	:	0.52	0.003	-	0.33	0.117566667
Benzoic Acid	5	/	15	0.05	:	0.52	0.004	-	0.041	0.048
Benzyl Alcohol	8	/	15	0.005	:	0.1	0.002	-	0.006	0.0083
bis(2-EthylHexyl)phthalate	3	/	15	0.004	:	0.1	0.0002	-	0.012	0.00888
Dibenzofuran	1	/	15	0.001	:	0.1	0.002	-	0.002	0.0084
Diethylphthalate	1	/	15	0.002	:	0.1	0.0004	-	0.0004	0.008293333
Dimethylphthalate	1	/	15	0.002	:	0.1	0.0004	-	0.0004	0.008326667
Di-n-butylphthalate	1	/	15	0.002	:	0.1	0.0003	-	0.0003	0.008253333
Di-n-octylphthalate	1	/	16	0.001	:	0.1	0.001	-	0.001	0.00790625
Isophorone	1	/	15	0.001	:	0.1	0.008	-	0.008	0.008833333
Naphthalene	10	/	15	0.004	:	0.1	0.0004	-	0.088	0.025826667
N-Nitrosodimethylamine	22	/	28	0.01	:	0.01	0.00012	-	0.025	0.007529286
N-Nitrosodiphenylamine	1	/	16	0.001	:	0.1	0.46	-	0.46	0.03684375
Phenol	13	/	15	0.01	:	0.01	0.022	-	1.2	0.466333333
Polyaromatic Hydrocarbons (mg/L)										
Acenaphthylene	1	/	1				0.00077	-	0.00077	0.00077
Naphthalene	1	/	1				0.0009	-	0.0009	0.0009

Table 4.3-4
DAPL Source Area Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples
Pesticides/PCBs (mg/L)										
Alpha-BHC	11	/	14	0.00005	:	0.00005	0.000059	-	0.0003	0.000106643
Beta-BHC	3	/	14	0.00001	:	0.00005	0.000059	-	0.000097	3.37857E-05
Endosulfan I	1	/	14	0.00001	:	0.00005	0.000052	-	0.000052	0.0000255
Endosulfan Sulfate	1	/	14	0.00002	:	0.0001	0.00011	-	0.00011	5.14286E-05
Endrin	1	/	14	0.0001	:	0.0001	0.000047	-	0.000047	4.97857E-05
Gamma-BHC (Lindane)	3	/	14	0.00001	:	0.00005	0.000085	-	0.00011	3.85714E-05
Heptachlor Epoxide	1	/	14	0.00001	:	0.00005	0.000051	-	0.000051	2.54286E-05
Organophosphorus Pesticides (mg/L)										
Kempore (Azodicarbonamide)	1	/	6	3.6	:	4	3.8	-	3.8	2.166666667
OPEX	1	/	6	0.11	:	0.11	0.27	-	0.27	0.090833333
Herbicides (mg/L)										
2,4,5-T	1	/	1				0.0000356	-	0.0000356	0.0000356
2,4,5-TP	1	/	1				0.000259	-	0.000259	0.000259
Dicamba	1	/	1				0.000201	-	0.000201	0.000201
MCPA	1	/	1				0.094	-	0.094	0.094
MCPP	1	/	1				0.34	-	0.34	0.34
Pentachlorophenol	1	/	1				0.0001	-	0.0001	0.0001
Picloram	1	/	1				0.05	-	0.05	0.05
Metals, Total (mg/L)										
Aluminum, Total	19	/	21	1	:	1	5.98	-	2560	991.4890476
Antimony, Total	11	/	18	0.02	:	0.25	0.022	-	23.2	4.084222222
Arsenic, Total	4	/	22	0.02	:	10	0.03	-	1.16	0.596181818
Barium, Total	5	/	22	0.02	:	1	0.036	-	0.14	0.164227273
Beryllium, Total	15	/	18	0.002	:	0.02	0.002	-	0.324	0.102277778
Cadmium, Total	15	/	19	0.02	:	0.1	0.002	-	0.19	0.060157895
Calcium, Total	21	/	21				107	-	632	385.3809524
Chromium, Total	26	/	28	0.1	:	0.1	0.074	-	2940	784.6333571
Cobalt, Total	16	/	18	0.2	:	0.2	0.221	-	12.4	4.390444444
Copper, Total	15	/	18	0.02	:	0.2	0.029	-	15.3	5.098944444
Hexavalent Chromium, Total	1	/	19	0.005	:	0.5	0.1	-	0.1	0.111842105
Iron, Total	21	/	21				9.59	-	3600	901.9138095
Lead, Total	5	/	22	0.01	:	0.5	0.028	-	0.17	0.10325
Lithium, Total	1	/	1				2.71	-	2.71	2.71
Magnesium, Total	21	/	21				31.3	-	1930	682.3
Manganese, Total	23	/	23				11.1	-	580	177.9652174
Mercury, Total	9	/	19	0.0002	:	0.0002	0.00024	-	0.00296	0.000427368
Nickel, Total	16	/	18	0.2	:	0.2	0.171	-	10.1	3.706222222
Potassium, Total	9	/	21	4	:	1000	4.69	-	110	124.3328571
Silicon, Total	4	/	4				37	-	100	63
Silver, Total	1	/	19	0.01	:	0.5	0.05	-	0.05	0.086710526
Sodium, Total	23	/	23				291	-	24600	8494.608696
Trivalent Chromium, Total	1	/	1				1900	-	1900	1900
Vanadium, Total	5	/	18	0.02	:	1	0.075	-	1.59	0.371888889
Zinc, Total	16	/	18	1	:	1	0.21	-	20.6	7.464611111
Metals, Filtered (mg/L)										
Aluminum, Filtered	59	/	63	0.1	:	1	0.16	-	13000	888.241746
Antimony, Filtered	19	/	49	0.005	:	0.2	0.0084	-	16	1.406793878
Arsenic, Filtered	19	/	48	0.01	:	2.5	0.013	-	0.99	0.22721875
Barium, Filtered	19	/	51	0.01	:	0.5	0.0089	-	0.051	0.063992157
Beryllium, Filtered	40	/	51	0.002	:	0.02	0.0093	-	0.42	0.08857451
Cadmium, Filtered	41	/	51	0.005	:	0.05	0.0046	-	0.207	0.058886275
Calcium, Filtered	75	/	75				2.9	-	600	351.412
Chromium, Filtered	72	/	77	0.1	:	0.25	0.016	-	3300	543.4291948
Cobalt, Filtered	48	/	51	0.01	:	0.2	0.17	-	14	3.803529412
Copper, Filtered	41	/	51	0.02	:	0.2	0.021	-	17	3.386617647
Hexavalent Chromium, Filtered	21	/	43	0.005	:	1.6	0.0057	-	55	2.463725581
Iron, Filtered	77	/	77				2.6	-	3500	1213.864935
Lead, Filtered	17	/	48	0.003	:	0.5	0.0084	-	0.86	0.080735417
Lithium, Filtered	2	/	2				0.088	-	3.9	1.994
Magnesium, Filtered	75	/	75				14	-	2600	648.72

Table 4.3-4
DAPL Source Area Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples
Manganese, Filtered	62	/	62				12	-	620	141.8725806
Mercury, Filtered	12	/	43	0.0002	:	0.0002	0.00022	-	0.003	0.000324186
Molybdenum, Filtered	1	/	1				0.0298	-	0.0298	0.0298
Nickel, Filtered	48	/	51	0.02	:	0.2	0.058	-	10	3.370156863
Potassium, Filtered	44	/	63	1	:	1000	3.1	-	800	82.60793651
Selenium, Filtered	1	/	48	0.005	:	1	0.019	-	0.019	0.07925
Silicon, Filtered	5	/	5				39	-	87	64
Silver, Filtered	4	/	51	0.005	:	0.25	0.0308	-	0.064	0.047005882
Sodium, Filtered	81	/	81				62	-	65000	8435.185185
Strontium, Filtered	1	/	1				3.55	-	3.55	3.55
Thallium, Filtered	6	/	47	0.005	:	1	0.051	-	0.4	0.09087234
Trivalent Chromium, Filtered	5	/	7	0.05	:	320	11.13	-	2600	807.3078571
Vanadium, Filtered	21	/	51	0.0019	:	0.25	0.013	-	1.8	0.287538235
Zinc, Filtered	47	/	51	0.05	:	1	0.15	-	19	6.463431373
Inorganics (mg/L)										
Acidity as CaCO3	1	/	1				200	-	200	200
Bicarbonate alkalinity as CaCO3	25	/	72	1	:	20	24	-	690	86.38888889
Carbonate as C (Total)	2	/	2				124	-	164	144
Chemical Oxygen Demand (COD)	1	/	1				1900	-	1900	1900
Chloride	100	/	100				110	-	28800	7491.28
CO2 as C	3	/	3				104	-	164	130.6666667
Color, Apparent **(color units)**	1	/	1				3000	-	3000	3000
Color, True **(color units)**	4	/	4				100	-	650	375
Cyanide	2	/	7	0.01	:	0.02	0.026	-	0.034	0.012857143
Dissolved Organic Carbon (DOC)	5	/	5				430	-	2700	1574
Fluoride	1	/	1				53	-	53	53
Nitrate & Nitrite as N	14	/	17	3.4	:	3.4	1.89	-	23.1	7.558235294
Nitrate as N	41	/	63	0.05	:	50	0.15	-	25.8	6.593571429
Nitrite as N	10	/	63	0.01	:	10	0.011	-	14	0.775857143
Nitrogen, Ammonia	104	/	104				1.4	-	12000	2112.608077
Nitrogen, Total Kjeldahl as N	1	/	1				12000	-	12000	12000
Odor **(TON)**	1	/	1				4	-	4	4
Orthophosphate as P	6	/	6				0.26	-	2.9	1.026666667
pH **(pH units)**	59	/	59				3.44	-	9.2	4.652881356
Phosphate, Total as P	1	/	3	5	:	10	3.9	-	3.9	3.8
Phosphorous	5	/	5				3	-	31	12.38
Specific Conductance **(umhos/cm)**	59	/	59				3760	-	746000	139966.1017
Specific Gravity **(g/mL)**	25	/	25				1	-	1.11	1.04184
Specific Gravity **(ratio)**	17	/	17				0.999	-	1.205	1.077270588
Sulfate as SO4	104	/	104				140	-	95000	25661.63462
Sulfide	1	/	5	1	:	4	2	-	2	1.3
Total Alkalinity as CaCO3	11	/	26	1	:	1	124	-	583	118.7115385
Total Dissolved Solids (TDS)	30	/	30				1920	-	140000	48292.33333
Total Organic Carbon (TOC)	20	/	20				18	-	3300	1035.4
Total Suspended Solids	2	/	2				20	-	95700	47860
Turbidity **(NTU)**	2	/	2				0.16	-	15	7.58
Field Measurements (mg/L)										
Acidity as CaCO3	2	/	2				10400	-	24100	17250
Alkalinity	1	/	2	1	:	1	160	-	160	80.25
Dissolved Oxygen	6	/	6				0.1	-	27.5	5.5
Eh	5	/	5				395	-	461	428.6
pH **(pH units)**	29	/	29				3.56	-	6.25	4.419655172
Specific Conductance **(umhos/cm)**	20	/	20				1810	-	69700	53185.5
Specific Gravity **(g/mL)**	28	/	28				1.01	-	1.115	1.061607143
Temperature **(°C)**	21	/	21				7.9	-	16.2	10.80952381
Total Dissolved Solids (TDS)	8	/	8				240	-	100000	56842.5
Viscosity **(cpoise)**	6	/	6				1.44	-	1.75	1.63
TPH (mg/L)										
NAPHTHA	2	/	2				0.15	-	0.95	0.55
Unmatched	2	/	2				0.15	-	0.95	0.55

Prepared/Date:
Checked/Date: KJC 08/15/07
PHT 10/01/07

mg/L- milligrams/Liter
◦F- degrees Fahrenheit
(mv)- milivollts
g/ml- grams/milliliter
◦C- degrees centigradeumhos/cm- micromhos/ centimeter

Table 4.3-5
Zone II Ipswich River Watershed Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average Concentration (mg/L)	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region III RBC PRG Tap Water (mg/L)	
Volatile Organics (mg/L)											
1,1-Dichloroethane	2 / 92	0.00011 : 0.02	0.00016 - 0.00099	0.001690163				0.07		0.81	nc
1,1-Dichloroethene	1 / 89	0.0001 : 0.02	0.013 - 0.013	0.001748146		0.007	0.007			0.34	nc
1,2,4-Trichlorobenzene	1 / 40	0.00006 : 0.005	0.026 - 0.026	0.00128975		0.07	0.07			0.0072	nc
1,2,4-Trimethylbenzene	1 / 42	0.00008 : 0.005	0.007 - 0.007	0.000746905		NA				0.012	nc
1,2-Dichlorobenzene	2 / 45	0.0001 : 0.005	0.0042 - 0.025	0.001441111		0.6	0.6			0.37	nc
1,2-Dichloroethane	9 / 92	0.0001 : 0.02	0.00055 - 0.012	0.001950707		0.005	0.005			0.00012	ca*
1,2-Dichloroethene (total)	14 / 50	0.005 : 0.005	0.002 - 0.43	0.02506							
1,4-Dichlorobenzene	4 / 45	0.0001 : 0.005	0.00019 - 0.0019	0.000853556		0.075	0.005			0.0005	ca
2,4,4-Trimethyl-1-pentene	3 / 101	0.0005 : 0.02	0.002 - 0.004	0.002148515							
2,4,4-Trimethyl-2-Pentene	1 / 101	0.0005 : 0.02	0.002 - 0.002	0.002084158							
2-Chlorotoluene	1 / 39	0.00011 : 0.005	0.024 - 0.024	0.001273462		NA				0.12	nc
2-Hexanone	2 / 80	0.005 : 0.05	0.057 - 0.11	0.00905625							
4-Chlorotoluene	1 / 41	0.0001 : 0.005	0.0015 - 0.0015	0.000679268		NA					
4-Methyl-2-Pentanone (MIBK)	1 / 80	0.005 : 0.05	0.003 - 0.003	0.0072875				0.35		2	nc
Acetone	4 / 80	0.005 : 0.25	0.003 - 0.009	0.013575				6.3		5.5	nc
Benzene	8 / 92	0.00008 : 0.02	0.001 - 0.007	0.001745707		0.005	0.005			0.00035	ca
Bromodichloromethane	1 / 92	0.0002 : 0.02	0.009 - 0.009	0.001775707		0.08				0.00018	ca
Carbon Disulfide	3 / 74	0.0005 : 0.05	0.00084 - 0.008	0.004325541						1	nc
Chlorobenzene	6 / 92	0.00005 : 0.02	0.00013 - 0.0027	0.001718207		0.1	0.1			0.11	nc
Chloroform	8 / 92	0.00016 : 0.02	0.0026 - 0.064	0.003044565		0.08		0.07		0.00017	ca
Chloromethane (Methyl Chloride)	1 / 89	0.00018 : 0.04	0.00095 - 0.00095	0.003443483		NA				0.16	nc
cis-1,2-Dichloroethene	16 / 46	0.0005 : 0.005	0.00021 - 0.36	0.016186087		0.07	0.07			0.061	nc
Dibromochloromethane	1 / 91	0.00016 : 0.02	0.0034 - 0.0034	0.001727198		0.08				0.00013	ca
Diethyl ether	1 / 16	0.001 : 0.01	0.0006 - 0.0006	0.0009125						1.2	nc
Ethylbenzene	4 / 89	0.0001 : 0.02	0.002 - 0.013	0.001925843		0.7	0.7			1.3	nc
Formaldehyde	4 / 70	0.05 : 0.1	0.089 - 0.51	0.038414286		NA				5.5	nc
m,p-Xylene	2 / 35	0.00022 : 0.002	0.0034 - 0.035	0.001513714			10				
Methylene Chloride	21 / 92	0.001 : 0.033	0.00044 - 0.048	0.003171957		0.005	0.005			0.0043	ca
Methyl-t-butyl ether (MTBE)	28 / 40	0.001 : 0.005	0.00091 - 0.042	0.01059275				0.07	0.02	0.011	ca
o-Xylene	2 / 35	0.00016 : 0.001	0.0011 - 0.011	0.000745429		10	10				
Styrene	1 / 89	0.00012 : 0.02	0.0024 - 0.0024	0.001759326		0.1	0.1			1.6	nc
tert-Amyl methyl ether (TAME)	1 / 16	0.005 : 0.025	0.0025 - 0.0025	0.003125				0.09			
Tetrachloroethene (PCE)	9 / 89	0.00004 : 0.02	0.00016 - 0.004	0.001762022		0.005	0.005			0.0001	ca
Toluene	11 / 89	0.00013 : 0.02	0.001 - 0.17	0.005697697		1	1			0.72	nc
trans-1,2-Dichloroethene	4 / 42	0.00017 : 0.005	0.00015 - 0.0069	0.000892976		0.1	0.1			0.12	nc
Trichloroethene (TCE)	27 / 92	0.0001 : 0.02	0.00022 - 0.46	0.012538587		0.005	0.005			0.000028	ca
Vinyl Chloride	7 / 92	0.00025 : 0.04	0.00034 - 0.013	0.003414728		0.002	0.002			0.00002	ca
Xylenes, Total	3 / 56	0.001 : 0.02	0.001 - 0.018	0.003191964		10	10			0.21	nc
Hydrazine (mg/L											
)											
Hydrazine	1 / 13	0.01 : 0.2	0.0029 - 0.0029	0.045992308						0.000022	ca
Semivolatile Organics (mg/L)											
1,2,4-Trichlorobenzene	2 / 69	0.0009 : 0.2	0.0007 - 0.001	0.005955072		0.07	0.07			0.0072	nc
1,2-Dichlorobenzene	1 / 69	0.0009 : 0.2	0.016 - 0.016	0.006234783		0.6	0.6			0.37	nc
1,3-Dichlorobenzene	1 / 72	0.0009 : 0.2	0.001 - 0.001	0.005975		NA				0.18	nc
2,4-Dichlorophenol	1 / 68	0.0009 : 0.2	0.001 - 0.001	0.006098529		NA				0.11	nc
2-Chlorophenol	1 / 69	0.0009 : 0.2	0.001 - 0.001	0.006082609		NA				0.03	nc
3&4-Methylphenol	1 / 10	0.005 : 0.01	0.0058 - 0.0058	0.00483							
Benzoic Acid	2 / 55	0.005 : 1	0.0074 - 0.0099	0.031796364						150	nc
bis(2-EthylHexyl)phthalate	14 / 72	0.0006 : 0.2	0.0002 - 0.014	0.005625694		0.006	0.006			0.0048	ca
Diethylphthalate	8 / 72	0.002 : 0.2	0.0002 - 0.001	0.00563125		NA				29	nc
Di-n-butylphthalate	14 / 69	0.002 : 0.2	0.0002 - 0.0009	0.005235507		NA				3.6	nc
Naphthalene	4 / 72	0.0009 : 0.2	0.00026 - 0.002	0.005633611		NA		0.14		0.0062	nc
N-Nitrosodimethylamine	79 / 138	0.000002 : 0.01	0.0000026 - 0.011	0.001181629				0.00001		0.0000013	ca

Table 4.3-5
Zone II Ipswich River Watershed Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region III RBC PRG Tap Water (mg/L)
Phenol	2 / 72	0.0009 : 0.01	0.005 - 1	0.018593056		NA				11 nc

Table 4.3-5
Zone II Ipswich River Watershed Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region 9 PRG Tap Water (mg/L)	
Pyrene	1 / 69	0.0001 : 0.2	0.0005 - 0.0005	0.005757246		NA				0.18	nc
Polyaromatic Hydrocarbons (mg/L)											
Acenaphthylene	1 / 11	0.0001 : 0.001	0.0026 - 0.0026	0.000587727						0.18	nc
Anthracene	2 / 11	0.000028 : 0.001	0.00004 - 0.00015	0.000300364		NA				1.8	nc
Chrysene	1 / 11	0.000057 : 0.001	0.00009 - 0.00009	0.000295182		NA				0.0092	ca
Pesticides/PCBs (mg/L)											
Endrin Aldehyde	2 / 36	0.0000038 : 0.0001	0.0001 - 0.00014	4.98819E-05							
Herbicides (mg/L)											
2,4,5-T	1 / 3	0.0000097 : 0.0000098	0.00001 - 0.00001	6.58333E-06		NA				0.36	nc
Dalapon	1 / 6	0.00024 : 0.003	0.00037 - 0.00037	0.000451667		0.2	0.2			1.1	nc
Opex/Kempore (mg/L)											
Kempore (Azodicarbonamide)	3 / 17	0.1 : 1	0.91 - 1.1	0.412352941							
Metals, Total (mg/L)											
Aluminum, Total	16 / 45	0.019 : 0.2	0.0475 - 191	10.13316889	7.15				0.05	36	nc
Arsenic, Total	8 / 43	0.002 : 0.2	0.005 - 0.025	0.008751163	0.00505	0.01	0.01			0.000045	ca
Barium, Total	31 / 43	0.005 : 0.2	0.005 - 0.399	0.053176744	0.0239	2	2			2.6	nc
Beryllium, Total	3 / 32	0.001 : 0.02	0.00069 - 0.009	0.002423125	0.001	0.004	0.004			0.073	nc
Boron, Total	3 / 3		0.0254 - 0.0314	0.029033333		NA				7.3	nc
Cadmium, Total	4 / 32	0.0009 : 0.02	0.001 - 0.007	0.002076563	0.005	0.005	0.005			0.018	nc
Calcium, Total	93 / 93		5.1 - 510	78.07913978	162						
Chromium, Total	16 / 187	0.0016 : 0.03	0.0009 - 17.9	0.12971016	0.019	0.1	0.1				
Cobalt, Total	11 / 29	0.01 : 0.05	0.00078 - 0.771	0.068309655	0.0478					0.73	nc
Copper, Total	13 / 35	0.0019 : 0.2	0.0029 - 0.45	0.054075714	0.0401	TT**	1.3 TT		1	1.5	nc
Iron, Total	138 / 159	0.03 : 1.5	0.03 - 410	10.06660377	30.7				0.3	11	nc
Lead, Total	4 / 42	0.0019 : 0.1	0.003 - 0.007	0.004465476	0.0034	TT**	0.015 TT				
Magnesium, Total	88 / 90	5 : 5	0.5 - 350	25.87722222	25.3						
Manganese, Total	43 / 43		0.007 - 62.6	5.308069767	2.61	NA			0.05	0.88	nc
Molybdenum, Total	1 / 3	0.0019 : 0.0019	0.0043 - 0.0043	0.002066667		NA				0.18	nc
Nickel, Total	12 / 32	0.0019 : 0.04	0.0021 - 0.839	0.090875	0.0719	NA		0.1		0.73	nc
Potassium, Total	79 / 90	4 : 100	0.74 - 370	12.09466667	7.22						
Selenium, Total	2 / 32	0.0013 : 0.2	0.0033 - 0.01	0.008034375	0.002	0.05	0.05			0.18	nc
Silicon, Total	10 / 10		3.5 - 16	8.429							
Silver, Total	1 / 32	0.0016 : 0.1	0.117 - 0.117	0.009825	0.571	NA			0.1	0.18	nc
Sodium, Total	105 / 105		4.72 - 2100	195.2560952	105			20			
Strontium, Total	4 / 4		0.11 - 1.28	0.416		NA				22	nc
Thallium, Total	1 / 29	0.005 : 0.2	0.03 - 0.03	0.010344828	0.004	0.002	0.002			0.0024	nc
Uranium	2 / 3	0.002 : 0.002	0.003 - 0.004	0.002666667			0.03	0.02		0.0073	nc
Vanadium, Total	3 / 29	0.0015 : 0.2	0.0009 - 0.691	0.036855172	0.006					0.036	nc
Zinc, Total	13 / 35	0.0086 : 0.1	0.029 - 6.7	0.393454286	0.027	NA			5	11	nc
Metals, Filtered (mg/L)											
Aluminum, Filtered	38 / 126	0.05 : 20	0.1 - 230	11.33807937	5.01				0.05	36	nc
Antimony, Filtered	7 / 104	0.003 : 20	0.00061 - 0.25	0.219227981	0.0187	0.006	0.006			0.015	nc
Arsenic, Filtered	12 / 102	0.001 : 1	0.0015 - 0.028	0.025048039	0.0034	0.01	0.01			0.000045	ca
Barium, Filtered	85 / 111	0.01 : 1	0.007 - 0.87	0.081421622	0.0222	2	2			2.6	nc
Beryllium, Filtered	7 / 100	0.001 : 0.2	0.0085 - 0.038	0.007955		0.004	0.004			0.073	nc
Cadmium, Filtered	10 / 104	0.0005 : 0.2	0.0028 - 0.034	0.006902885	0.005	0.005	0.005			0.018	nc
Calcium, Filtered	1229 / 1233	0.1 : 5	0.17 - 600	67.25667478	156						
Chromium, Filtered	49 / 1245	0.001 : 0.5	0.00067 - 33	0.115736112	0.0098	0.1	0.1				
Cobalt, Filtered	23 / 104	0.005 : 1	0.005 - 5.3	0.148572115	0.007					0.73	nc
Copper, Filtered	17 / 104	0.01 : 2	0.006 - 0.66	0.063245192	0.0115	TT**	1.3 TT		1	1.5	nc
Iron, Filtered	1023 / 1224	0.025 : 10	0.03 - 930	12.23948162	0.151				0.3	11	nc

Table 4.3-5
Zone II Ipswich River Watershed Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region III RBC PRG Tap Water (mg/L)	
Lithium, Filtered	1 / 4	0.05 : 0.05	0.0777 - 0.0777	0.038175						0.73	nc
Magnesium, Filtered	1175 / 1213	0.01 : 5	0.025 - 990	20.09128798	20.8		0.015 TT				
Manganese, Filtered	1024 / 1089	0.01 : 0.015	0.00039 - 540	4.028664187	1.485		NA		0.05	0.88	nc
Mercury, Filtered	3 / 94	0.0002 : 0.0005	0.00021 - 0.0023	0.000129362		0.002	0.002				
Nickel, Filtered	21 / 104	0.005 : 2	0.009 - 1.5	0.110942308	0.02		NA	0.1		0.73	nc
Potassium, Filtered	1107 / 1232	0.02 : 50	1 - 270	8.395186688	6.44						
Selenium, Filtered	2 / 101	0.002 : 2	0.005 - 0.006	0.039108911	0.003	0.05	0.05			0.18	nc
Silicon, Filtered	9 / 9		3.1 - 39.3	10.63333333							
Sodium, Filtered	1251 / 1256	5 : 5	2.6 - 6000	143.5818471	123			20			
Thallium, Filtered	1 / 101	0.0013 : 4	2 - 2	0.083709406	0.004	0.002	0.002			0.0024	nc
Trivalent Chromium, Filtered	1 / 9	0.015 : 0.015	0.023 - 0.023	0.009222222						55	nc
Vanadium, Filtered	1 / 103	0.005 : 1	0.012 - 0.012	0.029995146	0.006					0.036	nc
Zinc, Filtered	26 / 104	0.02 : 10	0.02 - 2.6	0.282302885	0.02675		NA		5	11	nc
Inorganics (mg/L											
)											
Alkalinity	20 / 20		19 - 230	80.85							
Bicarbonate alkalinity as CaCO3	1192 / 1221	1 : 20	1 - 740	66.83579034							
Bromide	1 / 1		0.06 - 0.06	0.06							
Bromide, Filtered	2 / 9	0.5 : 100	2 - 8	6.972222222							
Carbonate Alkalinity as CaCO3	12 / 1175	1 : 20	1 - 500	2.731744681							
Carbonate as C (Total)	6 / 6		18 - 171	70							
Chemical Oxygen Demand (COD)	1 / 3	20 : 20	32 - 32	17.33333333							
Chloride	1399 / 1401	1 : 3	3.1 - 4890	181.4372591	232				250		
CO2 as C	3 / 3		7 - 171	70.33333333							
Color, Apparent **(Color Units)**	3 / 3		50 - 70	56.66666667					15		
Dissolved Organic Carbon (DOC)	9 / 9		1.3 - 47	12.39111111							
Dissolved Oxygen	40 / 40		0.6 - 11.2	2.645							
Fluoride	1 / 10	0.2 : 0.5	0.12 - 0.12	0.147		4	4		2	2.2	nc
Gross alpha **(pCi/L)**	3 / 3		8.3 - 19	12.43333333			15 pCi/L				
Gross Beta **(pCi/L)**	3 / 3		6.3 - 41	18.63333333							
Nitrate & Nitrite as N	12 / 19	1 : 1	0.52 - 4.46	1.261578947		10	10				
Nitrate as N	117 / 162	0.05 : 10	0.05 - 13.2	1.058561728		10	10				
Nitrite as N	31 / 155	0.005 : 0.2	0.01 - 13.4	0.151612903		1	1				
Nitrogen, Ammonia	1263 / 1431	0.04 : 0.5	0.042 - 1900	25.74979595			NA				
Nitrogen, Total Kjeldahl as N	10 / 12	0.1 : 0.12	0.27 - 50	5.958333333							
Orthophosphate as P	4 / 12	0.02 : 0.1	0.03 - 0.15	0.038333333							

Table 4.3-5
Zone II Ipswich River Watershed Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region III RBC PRG Tap Water (mg/L)
pH **(pH units)**	1148 / 1148		3.73 - 12.31	6.23945993					6.5	
Phosphate, Total as P	6 / 7	1 : 1	0.12 - 1.5	0.814285714						
Phosphorous	1 / 9	0.1 : 1	1.1 - 1.1	0.216666667		NA				0.00073 nc
Radium 226 **(pCi/L)**	3 / 3		1.1 - 1.6	1.4			5 pCi/L			
Radium 228 **(pCi/L)**	3 / 3		0.3 - 1.1	0.766666667			5 pCi/L			
Radon **(pCi/L)**	3 / 3		1100 - 2300	1766.666667						
Specific Conductance **(umhos/cm)**	1286 / 1286		42 - 19500	1226.309876						
Specific Gravity **(g/mL)**	22 / 22		0.9 - 1.02	0.981727273						
Specific Gravity **(ratio)**	11 / 11		0.965 - 1.12	0.999727273						
Sulfate as SO4	1389 / 1407	1 : 40	1.5 - 22900	350.5781947	48.76				250	
Sulfide	1 / 9	1 : 1	3 - 3	0.777777778						
Total Alkalinity as CaCO3	494 / 498	1 : 1	2.7 - 533	75.91610442						
Total Dissolved Solids (TDS)	59 / 59		88 - 12900	1947.813559					500	
Total Organic Carbon (TOC)	28 / 32	1 : 1	1.2 - 240	19.759375						
Total Suspended Solids	1 / 3	5 : 5	48 - 48	17.66666667						
Turbidity **(NTU)**	15 / 16	0.1 : 0.1	0.12 - 42	7.305625			TT			
Field Measurements (mg/L)										
Alkalinity	9 / 9		25 - 416	104.1111111						
Chloramine	6 / 6		0.01 - 0.12	0.048333333		4	4 MRDL			3.6 nc
Chlorine, Free	2 / 6	0 : 0	0.01 - 0.04	0.008333333						
Chlorine, Total	5 / 6	0 : 0	0.01 - 0.06	0.021666667						
Dissolved Oxygen	30 / 30		0.1 - 10.2	2.14						
Eh **(mv)**	9 / 9		125 - 356	288.4444444						
Hardness as CaCO3	5 / 5		43 - 91	71.2						
pH **(pH units)**	303 / 303		4.26 - 12.34	6.305577558					6.5	
Specific Conductance **(umhos/cm)**	65 / 65		1 - 12200	925.3076923						
Specific Gravity **(g/mL)**	18 / 18		0.99 - 1.03	1.006666667						
Temperature **(°C)**	105 / 105		5 - 16.1	9.974285714						
Total Dissolved Solids (TDS)	30 / 31	58 : 58	96 - 8000	1197.83871					500	
Viscosity **(cpoise)**	9 / 9		1.22 - 3.2	2.455555556						

Table 4.3-5
Zone II Ipswich River Watershed Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region 9 PRG Tap Water (mg/L)	
TPH (mg/L)											
NAPHTHA	1 / 4	0.13 : 0.16	0.14 - 0.14	0.09125							
Unmatched	1 / 4	0.13 : 0.16	0.14 - 0.14	0.09125							
VPH (mg/L)											
Benzene	1 / 9	0.0005 : 0.005	0.0018 - 0.0018	0.001922222		0.005	0.005			0.00035	ca
Methyl-t-butyl ether (MTBE)	2 / 9	0.002 : 0.005	0.0079 - 0.03	0.005822222				0.07	0.02	0.011	ca
C5-C8 Aliphatics (FID)	2 / 13	0.05 : 0.05	0.098 - 0.11	0.037153846				0.3		Prepared/Date: KJC 08/15/07	Checked/
C5-C8 Aliphatics, Unadjusted	1 / 10	0.05 : 0.05	0.098 - 0.098	0.0323							
C9-C10 Aromatics (PID)	1 / 13	0.05 : 0.05	0.067 - 0.067	0.028230769				0.2			
C9-C12 Aliphatics, Unadjusted	1 / 10	0.05 : 0.05	0.072 - 0.072	0.0297							
VPH Concentration (Total)	2 / 10	0.05 : 0.05	0.067 - 0.098	0.0365							
EPH (mg/L)											
C19-C36 Aliphatics (PID)	1 / 10	0.05 : 0.1	0.12 - 0.12	0.0545				14			
EPH Concentration (Total)	1 / 7	0.1 : 0.1	0.12 - 0.12	0.06							

Roux Associates, Inc.; Environmental Science and Engineering, Inc.; PTI Environmental Services. 1991. Ground-water/Surface Water Investigation
Plan Phase I Remedial Investigation Final Report. Prepared for: Industri-Plex Site Remedial Trust. June 7.USEPA, Office of Water. 2006. 2006 Edition of the Drinking Water Standards and Health Advisories. EPA 822-R-06-013. August.
NA - Not Available
SDWR - Secondary Drinking Water Regulation
TT - Treatment TechniqueMADEP, Office of Research and Standards. 2005. Standards and Guidelines for Contaminants in Massachusetts Drinking Waters. S
MRDL - Maximum Residual Disinfectant Level
TT - Treatment TechniqueUSEPA, Region IX. 2004. Region 9 Preliminary Remediation Goal (PRG) Table. October 20.
nc - Noncancer PRG
nc** - Noncancer PRG where Noncancer PRG is more stringent than Cancer PRG
ca - Cancer PRG
ca* - Cancer PRG where Noncancer PRG < 100 x Cancer PRG
ca** - Cancer PRG where Noncancer PRG < 10 x Cancer PRGmg/L- milligrams/Liter
ug/L- micrograms/Liter Established Federal Maximum Contaminant Level (MCL) for drinking water
umhos/cm- micromhos/ centimeter

Table 4.3-6
Town Wells and Raw Water, Butters Row Treatment Plant Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detects	Range of Non Detect Concentrations	Range of Detected Concentrations	Average Of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)	
Volatile Organics (mg/L)											
1,1-Dichloroethane	1 / 7	0.00018 : 0.0005	0.00016 - 0.00016	0.000191429				0.07		0.81	nc
Chlorobenzene	1 / 7	0.0002 : 0.0005	0.00013 - 0.00013	0.000168571		0.1	0.1			0.11	nc
Chloroform	1 / 7	0.00026 : 0.0005	0.0026 - 0.0026	0.000551429		0.08		0.07		0.00017	ca
cis-1,2-Dichloroethene	7 / 7		0.00021 - 0.012	0.004801429		0.07	0.07			0.061	nc
Methylene Chloride	7 / 7		0.00062 - 0.0027	0.001328571		0.005	0.005			0.0043	ca
Methyl-t-butyl ether (MTBE)	4 / 4		0.00091 - 0.0013	0.001085				0.07	0.02	0.011	ca
Tetrachloroethene (PCE)	1 / 5	0.0002 : 0.0005	0.00016 - 0.00016	0.000172		0.005	0.005			0.0001	ca
trans-1,2-Dichloroethene	1 / 7	0.00017 : 0.0005	0.00015 - 0.00015	0.000165		0.1	0.1			0.12	nc
Trichloroethene (TCE)	5 / 7	0.0005 : 0.0005	0.00022 - 0.0027	0.000642857		0.005	0.005			0.000028	ca
Vinyl Chloride	2 / 7	0.0004 : 0.0005	0.00034 - 0.00037	0.000265714		0.002	0.002			0.00002	ca
Semivolatile Organics (mg/L)											
1,3-Dichlorobenzene	1 / 5	0.001 : 0.01	0.001 - 0.001	0.0024		NA				0.18	nc
bis(2-EthylHexyl)phthalate	1 / 5	0.002 : 0.01	0.003 - 0.003	0.003		0.006	0.006			0.0048	ca
Naphthalene	3 / 5	0.001 : 0.001	0.00026 - 0.0012	0.000584		NA		0.14		0.0062	nc
N-Nitrosodimethylamine	4 / 7	0.000002 : 0.000002	0.000032 - 0.000166	4.84286E-05				0.00001		0.0000013	ca
Polyaromatic Hydrocarbons (mg/L)											
Anthracene	2 / 2		0.00004 - 0.00015	0.000095		NA				1.8	nc
Chrysene	1 / 2	0.000057 : 0.000057	0.00009 - 0.00009	0.00005925		NA				0.0092	ca
Herbicides (mg/L)											
2,4,5-T	1 / 2	0.0000098 : 0.0000098	0.00001 - 0.00001	0.00000745		NA				0.36	nc
Metals, Total (mg/L)											
Aluminum, Total	3 / 5	0.1 : 0.1	0.0475 - 0.14	0.06922	7.15				0.05	36	nc
Arsenic, Total	2 / 5	0.005 : 0.005	0.0083 - 0.0107	0.0053	0.00505	0.01	0.01			0.000045	ca
Barium, Total	5 / 5		0.013 - 0.0289	0.02382	0.0239	2	2			2.6	nc
Boron, Total	2 / 2		0.0254 - 0.0314	0.0284		NA				7.3	nc
Calcium, Total	16 / 16		13.3 - 88.3	33.6375	162						
Cobalt, Total	2 / 2		0.0039 - 0.0051	0.0045	0.0478					0.73	nc
Copper, Total	2 / 5	0.025 : 0.025	0.0029 - 0.0063	0.00934	0.0401	TT**	1.3 TT		1	1.5	nc
Iron, Total	16 / 16		0.059 - 6.6	3.6580625	30.7				0.3	11	nc
Magnesium, Total	16 / 16		2.93 - 18.6	6.960625	25.3						
Manganese, Total	5 / 5		0.02 - 1.05	0.518	2.61	NA			0.05	0.88	nc
Molybdenum, Total	1 / 2	0.0019 : 0.0019	0.0043 - 0.0043	0.002625		NA				0.18	nc
Nickel, Total	1 / 2	0.0019 : 0.0019	0.0021 - 0.0021	0.001525	0.0719	NA		0.1		0.73	nc
Potassium, Total	16 / 16		1.9 - 6.7	3.763125	7.22						
Sodium, Total	16 / 16		19.4 - 101	54.6125	105			20			
Strontium, Total	2 / 2		0.11 - 0.134	0.122		NA				22	nc
Uranium	1 / 2	0.002 : 0.002	0.004 - 0.004	0.0025			0.03	0.02		0.0073	nc
Vanadium, Total	1 / 2	0.0015 : 0.0015	0.0029 - 0.0029	0.001825	0.006					0.036	nc
Metals, Filtered (mg/L)											
Antimony, Filtered	2 / 2		0.00061 - 0.0016	0.001105	0.0187	0.006	0.006			0.015	nc
Calcium, Filtered	362 / 362		11 - 60.9	26.04143646	156						
Chromium, Filtered	1 / 367	0.001 : 0.03	0.0072 - 0.0072	0.005014169	0.0098	0.1	0.1				
Iron, Filtered	361 / 362	0.05 : 0.05	0.049 - 12.4	4.567483425	0.151				0.3	11	nc
Magnesium, Filtered	346 / 362	5 : 5	0.64 - 13.7	5.140469613	24.6						
Manganese, Filtered	328 / 328		0.181 - 2.45	0.701676829	1.485	NA			0.05	0.88	nc
Potassium, Filtered	339 / 362	4 : 5	1.34 - 6.9	3.419944751	6.44						
Sodium, Filtered	365 / 365		17.6 - 110	51.43726027	123			20			
Inorganics (mg/L)											
Bicarbonate alkalinity as CaCO3	340 / 340		8 - 103	36.86411765							
Chloride	370 / 370		26 - 170	90.17594595	232				250		
Color, Apparent **(Color Units)**	2 / 2		50 - 50	50					15		
Dissolved Oxygen	13 / 13		0.9 - 4.3	2.230769231							
Gross alpha **(pCi/L)**	2 / 2		8.3 - 10	9.15							
Gross Beta **(pCi/L)**	2 / 2		6.3 - 8.6	7.45							
Nitrate as N	55 / 59	0.05 : 0.05	0.082 - 3.4	0.394762712		10	10				
Nitrite as N	10 / 56	0.01 : 0.01	0.01 - 0.029	0.006964286		1	1				
Nitrogen, Ammonia	357 / 388	0.04 : 0.5	0.044 - 15	2.427819588		NA					
Nitrogen, Total Kjeldahl as N	5 / 5		0.44 - 6	2.478							
Orthophosphate as P	1 / 2	0.1 : 0.1	0.15 - 0.15	0.1							

Table 4.3-6
Town Wells and Raw Water, Butters Row Treatment Plant Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detects	Range of Non Detect Concentrations	Range of Detected Concentrations	Average Of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)
pH **(pH units)**	380 / 380		5.43 - 7.08	6.011815789					6.5	
Phosphate, Total as P	5 / 5		0.12 - 1.5	0.76						
Radium 226 **(pCi/L)**	2 / 2		1.1 - 1.6	1.35						
Radium 228 **(pCi/L)**	2 / 2		0.3 - 0.9	0.6						
Radon **(pCi/L)**	2 / 2		1900 - 2300	2100						
Specific Conductance **(umhos/cm)**	376 / 376		200 - 1150	476.0904255						
Sulfate as SO4	373 / 373		11.9 - 271	53.45951743	48.76				250	
Total Alkalinity as CaCO3	62 / 62		16 - 178	39.17419355						
Total Dissolved Solids (TDS)	2 / 2		310 - 330	320					500	
Total Organic Carbon (TOC)	2 / 2		5.8 - 7.1	6.45						
Turbidity **(NTU)**	2 / 2		0.25 - 0.26	0.255						
Field Measurements (mg/L)										
Chloramine	6 / 6		0.01 - 0.12	0.048333333		4				3.6 nc
Chlorine, Free	2 / 6	0 : 0	0.01 - 0.04	0.008333333						
Chlorine, Total	5 / 6	0 : 0	0.01 - 0.06	0.021666667						
Dissolved Oxygen	5 / 5		1.1 - 5.2	2.5						
Hardness as CaCO3	4 / 4		43 - 91	73.25						
pH **(pH units)**	18 / 18		5.22 - 6.1	5.796666667					6.5	
Specific Conductance **(umhos/cm)**	10 / 10		194 - 832	432						
Temperature **(°C)**	18 / 18		6.4 - 10.9	9.288888889						

Roux Associates, Inc.; Environmental Science and Engineering, Inc.; PTI Environmental Services. 1991. Ground-water/Surface Water Investigation Plan Phase I Remedial Investigation Final Report. Prepared for: Industri-Plex Site Remedial Trust. June 7.

Prepared by: KJC 08/15/07
Checked by: PHT 10/01/07

USEPA, Office of Water. 2006. 2006 Edition of the Drinking Water Standards and Health Advisories. EPA 822-R-06-013. August.

NA - Not Available
SDWR - Secondary Drinking Water Regulation
TT - Treatment Technique

MADEP, Office of Research and Standards. 2005. Standards and Guidelines for Contaminants in Massachusetts Drinking Waters. Spring.

MRDL - Maximum Residual Disinfectant Level
TT - Treatment Technique

USEPA, Region IX. 2004. Region 9 Preliminary Remediation Goal (PRG) Table. October 20.

nc - Noncancer PRG
nc** - Noncancer PRG where Noncancer PRG is more stringent than Cancer PRG
ca - Cancer PRG
ca* - Cancer PRG where Noncancer PRG < 100 x Cancer PRG
ca** - Cancer PRG where Noncancer PRG < 10 x Cancer PRG
mg/L- milligrams/Liter
pCi/L - picocuries/liter
umhos/cm - micromhos/ centimeter

Table 4.3-7
Private Well Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detects	Range of Non Detect Concentrations	Range of Detected Concentrations	Average Of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)
Volatile Organics (mg/L)										
1,4-Dichlorobenzene	1 / 21	0.0001 : 0.001	0.00019 - 0.00019	0.000420952		0.075	0.005			0.0005 ca
Dichlorodifluoromethane	2 / 21	0.00021 : 0.002	0.001 - 0.001	0.000591429		NA		1.4		0.39 nc
Methylene Chloride	4 / 21	0.001 : 0.002	0.00044 - 0.002	0.000715714		0.005	0.005			0.0043 ca
Methyl-t-butyl ether (MTBE)	2 / 8	0.001 : 0.001	0.002 - 0.004	0.001125				0.07	0.02	0.011 ca
Semivolatile Organics (mg/L)										
bis(2-EthylHexyl)phthalate	4 / 21	0.0006 : 0.01	0.0008 - 0.004	0.00237619		0.006	0.006			0.0048 ca
Diethylphthalate	1 / 20	0.005 : 0.01	0.073 - 0.073	0.008275		NA				29 nc
Di-n-butylphthalate	1 / 20	0.005 : 0.01	0.0006 - 0.0006	0.004655		NA				3.6 nc
Herbicides (mg/L)										
2,4-DB	2 / 5	14 : 39	26 - 110	34.1						0.29 nc
Metals, Total (mg/L)										
Aluminum, Total	1 / 16	0.1 : 0.2	0.044 - 0.044	0.087125	7.15				0.05	36 nc
Barium, Total	2 / 16	0.005 : 0.2	0.022 - 0.022	0.04665625	0.0239	2	2			2.6 nc
Calcium, Total	29 / 29		7.53 - 84.3	51.66655172	162					
Copper, Total	7 / 16	0.02 : 0.025	0.019 - 0.133	0.03178125	0.0401	TT**	1.3 TT		1	1.5 nc
Iron, Total	11 / 32	0.03 : 1.5	0.037 - 57	3.50628125	30.7				0.3	11 nc
Lead, Total	3 / 16	0.005 : 0.005	0.003 - 0.0063	0.0029625	0.0034	TT**	0.015 TT			
Magnesium, Total	29 / 29		1.1 - 9.86	5.715172414	25.3					
Manganese, Total	14 / 32	0.01 : 0.01	0.015 - 0.97	0.1116875	2.61	NA			0.05	0.88 nc
Nickel, Total	1 / 16	0.03 : 0.04	0.002 - 0.002	0.015125	0.0719	NA		0.1		0.73 nc
Potassium, Total	25 / 29	0.5 : 2	1.27 - 3.7	2.101724138	7.22					
Sodium, Total	32 / 32		5.56 - 88	24.21	105			20		
Zinc, Total	5 / 16	0.02 : 0.025	0.03 - 0.178	0.0330625	0.027	NA			5	11 nc
Metals, Filtered (mg/L)										
Antimony, Filtered	1 / 6	0.003 : 0.01	0.006 - 0.006	0.002833333	0.0187	0.006	0.006			0.015 nc
Arsenic, Filtered	1 / 6	0.001 : 0.005	0.0015 - 0.0015	0.001	0.0034	0.01	0.01			0.000045 ca
Calcium, Filtered	9 / 9		13 - 72.4	37.53333333	156					
Copper, Filtered	1 / 6	0.01 : 0.01	0.04 - 0.04	0.010833333	0.0115	TT**	1.3 TT		1	1.5 nc
Iron, Filtered	7 / 9	0.05 : 0.05	0.038 - 2.83	0.403222222	0.151				0.3	11 nc
Magnesium, Filtered	9 / 9		1.1 - 14	5.097777778	24.6					
Manganese, Filtered	6 / 9	0.01 : 0.01	0.059 - 0.242	0.078333333	1.485	NA			0.05	0.88 nc
Potassium, Filtered	6 / 9	2 : 2	1.6 - 5.56	2.352222222	6.44					
Selenium, Filtered	1 / 6	0.002 : 0.002	0.0023 - 0.0023	0.001216667	0.003	0.05	0.05			0.18 nc
Sodium, Filtered	9 / 9		9.3 - 89.6	29.86666667	123			20		
Zinc, Filtered	2 / 6	0.025 : 0.05	0.026 - 0.047	0.022583333	0.02675	NA			5	11 nc
Inorganics (mg/L)										
Bicarbonate alkalinity as CaCO3	32 / 33	1 : 1	8 - 143	78.31818182						
Chloride	40 / 41	1 : 1	9.3 - 159	70.9	232				250	
Nitrate as N	32 / 35	0.05 : 0.1	0.053 - 4.41	0.994514286		10	10			
Nitrite as N	1 / 32	0.005 : 0.1	0.039 - 0.039	0.00715625		1	1			
Nitrogen, Ammonia	25 / 41	0.1 : 0.5	0.099 - 7.6	0.366560976		NA				
Nitrogen, Total Kjeldahl as N	4 / 6	0.1 : 0.12	0.27 - 7.6	1.518333333						

Table 4.3-7
Private Well Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detects	Range of Non Detect Concentrations	Range of Detected Concentrations	Average Of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)
pH **(pH units)**	39 / 39		5.68 - 7.95	6.964102564					6.5	
Specific Conductance**(umhos/cm)**	27 / 27		205 - 628	456.4074074						
Sulfate as SO4	40 / 41	2 : 2	13 - 57.1	21.55121951	48.76				250	
Total Alkalinity as CaCO3	18 / 19	1 : 1	20 - 139	61.07894737						
Total Dissolved Solids (TDS)	12 / 12		80 - 463	245.0833333					500	
Total Organic Carbon (TOC)	3 / 6	1 : 1	1.2 - 9.6	2.45						
Coliform (/100 mL)										
Total Coliform Bacteria	1 / 9	1 : 1	2 - 2	0.666666667						
Field Measurements (mg/L)										
pH **(pH units)**	2 / 2		4.51 - 7.44	5.975					6.5	
Specific Conductance**(umhos/cm)**	1 / 1		616 - 616	616						
Temperature **(°C)**	1 / 1		16 - 16	16						
Total Dissolved Solids (TDS)	6 / 6		120 - 150	135					500	

Roux Associates, Inc.; Environmental Science and Engineering, Inc.; PTI Environmental Services. 1991. Ground-water/Surface Water Investigation Plan Phase I Remedial Investigation Final Report. Prepared for: Industri-Plex Site Remedial Trust. June 7.

Prepared by: KJC 08/15/07
Checked by: PHT 10/01/07

USEPA, Office of Water. 2006. 2006 Edition of the Drinking Water Standards and Health Advisories. EPA 822-R-06-013. August.

NA - Not Available
SDWR - Secondary Drinking Water Regulation
TT - Treatment Technique

MADEP, Office of Research and Standards. 2005. Standards and Guidelines for Contaminants in Massachusetts Drinking Waters. Spring.

MRDL - Maximum Residual Disinfectant Level
TT - Treatment Technique

USEPA, Region IX. 2004. Region 9 Preliminary Remediation Goal (PRG) Table. October 20.

nc - Noncancer PRG
nc** - Noncancer PRG where Noncancer PRG is more stringent than Cancer PRG
ca - Cancer PRG
ca* - Cancer PRG where Noncancer PRG < 100 x Cancer PRG
ca** - Cancer PRG where Noncancer PRG < 10 x Cancer PRGmg/L- milligrams/Liter
ug/L- micrograms/Liter umhos/cm- micromhos/ centimeter

Table 4.3-8
Zone II Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Volatile Organics (mg/L ParameterName)	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Weighted (mg/L)	Region IX PRG Tap Water (mg/L)
1,1,1-Trichloroethane (TCA)	1 / 93	0.001 : 1	0.0014 - 0.0014	0.017713978		0.2	0.2			3.2 nc
1,1-Dichloroethane	5 / 93	0.001 : 1	0.0029 - 0.0099	0.017933333				0.07		0.81 nc
1,2,4-Trimethylbenzene	1 / 75	0.001 : 0.5	0.012 - 0.012	0.010246667		NA				0.012 nc
2,4,4-Trimethyl-1-pentene	89 / 132	0.001 : 0.01	0.001 - 67	1.110505303						
2,4,4-Trimethyl-2-Pentene	70 / 132	0.001 : 0.5	0.00066 - 120	1.060153561						
2-Butanone (MEK)	1 / 93	0.01 : 10	0.062 - 0.062	0.168892473		NA		4		7 nc
2-Hexanone	2 / 93	0.01 : 5	0.004 - 2	0.121763441						
Acetone	8 / 93	0.01 : 10	0.026 - 0.48	0.175258065				6.3		5.5 nc
Benzene	2 / 92	0.001 : 1	0.00066 - 0.00073	0.016542283		0.005	0.005			0.00035 ca
Chloroethane	1 / 93	0.002 : 2	0.0041 - 0.0041	0.035431183						0.0046 ca
Chloromethane (Methyl Chloride)	3 / 93	0.002 : 2	0.002 - 0.011	0.035523656		NA				0.16 nc
Ethylbenzene	14 / 93	0.001 : 1	0.0025 - 10	0.146080645		0.7	0.7			1.3 nc
Methylene Chloride	14 / 93	0.001 : 1	0.002 - 0.25	0.02147957		0.005	0.005			0.0043 ca
p-Isopropyl Toluene	3 / 75	0.001 : 0.5	0.0015 - 0.008	0.010234667						
Styrene	1 / 93	0.001 : 1	0.39 - 0.39	0.020553763		0.1	0.1			1.6 nc
t-Butylbenzene	1 / 75	0.001 : 0.5	0.0016 - 0.0016	0.010134667						0.24 nc
Toluene	6 / 92	0.001 : 1	0.001 - 2.9	0.04678913		1	1			0.72 nc
Trichloroethene (TCE)	5 / 93	0.001 : 1	0.001 - 0.005	0.017811828		0.005	0.005			0.000028 ca
Xylenes, Total	3 / 52	0.001 : 1	0.008 - 0.039	0.029730769		10	10			0.21 nc
Semiolatile Organics (mg/L)										
2,6-Dinitrotoluene	1 / 104	0.0095 : 5	0.074 - 0.074	0.089634135		NA				0.036 nc
4-Chloroaniline	1 / 84	0.01 : 10	0.01 - 0.01	0.102672619						0.15 nc
4-Methylphenol (p-Cresol)	1 / 99	0.0095 : 5	0.005 - 0.005	0.064221717						0.18 nc
Benzoic Acid	1 / 103	0.048 : 25	0.003 - 0.003	0.447524272						150 nc
bis(2-EthylHexyl)phthalate	49 / 131	0.006 : 0.3	0.001 - 85	1.783889313		0.006	0.006			0.0048 ca
Diethylphthalate	5 / 105	0.0095 : 5	0.0003 - 0.011	0.087159524		NA				29 nc
Di-n-butylphthalate	4 / 105	0.0095 : 5	0.0004 - 0.012	0.087212857		NA				3.6 nc
N-Nitrosodimethylamine	8 / 11	0.000002 : 0.01	0.0000026 - 0.0012	0.0010907				0.00001		0.0000013 ca
N-Nitrosodiphenylamine	56 / 131	0.0095 : 5	0.0003 - 5.2	0.252564122						0.014 ca*
Phenol	7 / 103	0.0095 : 5	0.004 - 0.084	0.090214078		NA				11 nc
Polyaromatic Hydrocarbons (mg/L)										
1-Methylnaphthalene	14 / 30	0.001 : 0.01	0.002 - 0.082	0.010666667						
2-Methylnaphthalene	5 / 53	0.0002 : 0.01	0.0019 - 0.11	0.003703774						0.0062 nc
Acenaphthene	4 / 59	0.0002 : 0.01	0.003 - 0.006	0.000691525		NA				0.37 nc
Acenaphthylene	18 / 53	0.0002 : 0.01	0.002 - 0.097	0.006811321						0.18 nc
Anthracene	2 / 59	0.0002 : 0.01	0.00061 - 0.003	0.000479831		NA				1.8 nc
Benzo(a)anthracene	3 / 59	0.0002 : 0.01	0.0012 - 0.004	0.000532203		NA				0.000092 ca
Benzo(a)pyrene	3 / 59	0.0002 : 0.01	0.00052 - 0.0023	0.000278305		0.0002	0.0002			0.0000092 ca
Benzo(b)fluoranthene	4 / 59	0.0002 : 0.01	0.0014 - 0.019	0.000823729		NA				0.000092 ca

Table 4.3-8
Zone II Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Weighted (mg/L)	Region IX PRG Tap Water (mg/L)
Benzo(g,h,i)perylene	4 / 59	0.0002 : 0.01	0.00058 - 0.014	0.00072339		NA				0.18 nc
Benzo(k)fluoranthene	2 / 59	0.0002 : 0.01	0.001 - 0.0016	0.000462712		NA				0.00092 ca
Chrysene	2 / 59	0.0002 : 0.01	0.00097 - 0.0014	0.000465593		NA				0.0092 ca
Dibenzo(a,h)anthracene	1 / 59	0.0002 : 0.01	0.0051 - 0.0051	0.000386441						0.0000092 ca
Fluoranthene	8 / 59	0.0002 : 0.01	0.00031 - 0.004	0.000595932						1.5 nc
Fluorene	2 / 59	0.0002 : 0.01	0.00022 - 0.00035	0.000435085		NA				0.24 nc
Indeno (1,2,3-cd) pyrene	3 / 59	0.0002 : 0.01	0.0006 - 0.0024	0.000376271		NA				0.000092 ca
Naphthalene	18 / 57	0.0002 : 0.05	0.001 - 1	0.030336842		NA		0.14		0.0062 nc
Phenanthrene	5 / 59	0.0002 : 0.01	0.00031 - 0.008	0.000579153		NA				0.18 nc
Pyrene	3 / 59	0.0002 : 0.01	0.001 - 0.0017	0.000484746		NA				0.18 nc
Pesticides/PCBs (mg/L)										
Aldrin	1 / 11	0.00005 : 0.00005	0.000077 - 0.000077	2.97273E-05		NA				0.000004 ca
Endrin	1 / 11	0.0001 : 0.0001	0.0000041 - 0.0000041	4.58273E-05		0.002	0.002			0.011 nc
Heptachlor	1 / 11	0.00005 : 0.00005	0.000013 - 0.000013	2.39091E-05		0.0004	0.0004			0.000015 ca
Metals, Total (mg/L)										
Aluminum, Total	2 / 2		0.36 - 33	16.68	7.15				0.05	36 nc
Arsenic, Total	2 / 2		0.035 - 0.084	0.0595	0.00505	0.01	0.01			0.000045 ca
Barium, Total	2 / 2		0.019 - 0.28	0.1495	0.0239	2	2			2.6 nc
Calcium, Total	17 / 18	5 : 5	2.64 - 46	16.78722222	162					
Chromium, Total	1 / 11	0.015 : 0.015	0.15 - 0.15	0.020454545	0.019	0.1	0.1			
Cobalt, Total	1 / 2	0.015 : 0.015	0.089 - 0.089	0.04825	0.0478					0.73 nc
Copper, Total	2 / 2		0.033 - 0.23	0.1315	0.0401	TT**	1.3 TT		1	1.5 nc
Hexavalent Chromium, Total	1 / 4	0.005 : 0.005	0.15 - 0.15	0.039375						0.11 nc
Iron, Total	20 / 24	0.03 : 0.1	0.052 - 69	5.767875	30.7				0.3	11 nc
Lead, Total	1 / 2	0.01 : 0.01	0.051 - 0.051	0.028	0.0034	TT**	0.015 TT			
Magnesium, Total	2 / 2		2.9 - 10	6.45	25.3					
Manganese, Total	18 / 18		0.022 - 2	0.422444444	2.61	NA			0.05	0.88 nc
Mercury, Total	1 / 2	0.0002 : 0.0002	0.0003 - 0.0003	0.0002	0.0002	0.002	0.002			
Nickel, Total	1 / 2	0.04 : 0.04	0.13 - 0.13	0.075	0.0719	NA		0.1		0.73 nc
Potassium, Total	13 / 18	5 : 5	1.2 - 8.1	2.838888889	7.22					
Sodium, Total	17 / 18	5 : 5	3.07 - 133	30.30833333	105			20		
Trivalent Chromium, Total	2 / 4	0.005 : 0.005	0.007 - 0.12	0.033						55 nc
Vanadium, Total	2 / 2	0.025 : 0.025	0.15 - 0.15	0.08125	0.006					0.036 nc
Zinc, Total	2 / 2		0.43 - 22	11.215	0.027	NA			5	11 nc

Table 4.3-8
Zone II Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Secondary MCL (mg/L)	Region IX PRG Tap Water (mg/L)
Metals, Filtered (mg/L)										
Aluminum, Filtered	7 / 12	0.1 : 0.2	0.12 - 1.1	0.3	5.01				0.05	36 nc
Arsenic, Filtered	3 / 9	0.005 : 0.005	0.008 - 0.042	0.009444444	0.0034	0.01	0.01			0.000045 ca
Barium, Filtered	8 / 10	0.01 : 0.01	0.006 - 0.053	0.0217	0.0222	2	2			2.6 nc
Calcium, Filtered	58 / 58		1.4 - 52	18.33706897	156					
Copper, Filtered	1 / 10	0.02 : 0.025	0.028 - 0.028	0.0133	0.0115	TT**	1.3 TT		1	1.5 nc
Hexavalent Chromium, Filtered	1 / 5	0.01 : 0.01	0.01 - 0.01	0.006						0.11 nc
Iron, Filtered	68 / 89	0.01 : 0.1	0.023 - 23	3.376247191	0.151				0.3	11 nc
Magnesium, Filtered	12 / 12		0.26 - 6.3	2.183333333	24.6					
Manganese, Filtered	58 / 58		0.014 - 4.15	0.491051724	1.485	NA			0.05	0.88 nc
Potassium, Filtered	50 / 58	1 : 4	1 - 5.4	2.234482759	6.44					
Sodium, Filtered	58 / 58		2 - 100	20.94155172	123			20		
Vanadium, Filtered	1 / 10	0.01 : 0.025	0.039 - 0.039	0.01215	0.006					0.036 nc
Zinc, Filtered	6 / 10	0.025 : 0.05	0.029 - 0.15	0.04265	0.02675	NA			5	11 nc
Inorganics (mg/L)										
Acidity as CaCO3	1 / 1		100 - 100	100						
Alkalinity	5 / 5		1 - 120	39.2						
Bicarbonate alkalinity as CaCO3	60 / 68	1 : 5	1 - 242	68.09117647						
Carbonate Alkalinity as CaCO3	9 / 73	1 : 5	2 - 640	22.36986301						
Chloride	77 / 77		1.5 - 240	27.96402597	232				250	
Cyanide	1 / 2	0.02 : 0.02	0.024 - 0.024	0.017		0.2	0.2			0.73 nc
Heterotrophic Plate Count **(col/mL)**	5 / 5		31 - 4566	1033						
Nitrate as N	5 / 8	0.05 : 0.05	0.06 - 1.76	0.36975		10	10			
Nitrite as N	1 / 3	0.01 : 0.01	0.051 - 0.051	0.020333333		1	1			
Nitrogen, Ammonia	148 / 164	0.01 : 0.5	0.068 - 96.9	8.573981707		NA				
Nitrogen, Total Kjeldahl as N	1 / 5	1 : 1	37 - 37	7.8						
Orthophosphate as P	8 / 24	0.1 : 0.5	10.6 - 307	36.71875						
pH **(pH units)**	97 / 97		4.23 - 7.54	5.981134021					6.5	
Specific Conductance **(umhos/cm)**	62 / 62		16.2 - 1700	305.4306452						
Sulfate as SO4	73 / 78	0.1 : 10	4.3 - 310	38.89487179	48.76				250	
Total Alkalinity as CaCO3	12 / 12		1.8 - 226	117.3916667						
Total Dissolved Solids (TDS)	61 / 63	50 : 50	26 - 806	161.7936508					500	
Field Measurements (mg/L)										
Alkalinity	4 / 4		17 - 89	40.5						
Dissolved Oxygen	4 / 4		2.8 - 4.5	3.5						
pH **(pH units)**	38 / 38		4.57 - 7.09	5.912105263					6.5	
Specific Conductance **(umhos/cm)**	16 / 16		4.75 - 960	390.455625						
Temperature **(°C)**	18 / 18		10 - 21	14.7						
Total Dissolved Solids (TDS)	1 / 1		389 - 389	389					500	

Table 4.3-8
Zone II Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)	Federal MCL (mg/L)	Massachusetts MCL (mg/L)	Massachusetts Drinking Water Guidelines (mg/L)	Massachusetts Weighted (mg/L)	Region IX PRG Tap Water (mg/L)
TPH (mg/L)										
Fuel Oil #2 (C9-C25)	6 / 55	0.1 : 0.5	6.2 - 14	1.249090909						
Fuel Oil #6 (C9-C36)	3 / 55	0.1 : 10	0.27 - 0.38	1.197454545						
Motor Oil (C14-C36)	1 / 6	0.1 : 0.1	1.2 - 1.2	0.241666667						
Motor Oil (C9-C36)	4 / 49	2 : 10	4 - 10	1.760204082						
Unmatched	13 / 19	2.5 : 2.5	0.63 - 29	5.86						
VPH (mg/L)										
Ethylbenzene	15 / 116	0.005 : 0.125	0.0065 - 1.2	0.025999569		0.7	0.7			1.3 nc
o-Xylene	3 / 21	0.005 : 0.005	0.0063 - 0.012	0.003452381		10	10			
Toluene	17 / 111	0.005 : 0.125	0.0069 - 3.3	0.120752252		1	1			0.72 nc
Xylenes, Total	7 / 108	0.005 : 0.125	0.005 - 0.17	0.007248148		10	10			0.21 nc
C5-C8 Aliphatics (FID)	60 / 116	0.01 : 0.085	0.019 - 16	1.192400862				0.3		
C5-C8 Aliphatics, Unadjusted	34 / 76	0.05 : 0.05	0.05 - 19	1.241815789						
C9-C10 Aromatics (PID)	7 / 116	0.01 : 1.25	0.03 - 1.7	0.062724138				0.2		
C9-C12 Aliphatics (FID)	29 / 116	0.01 : 1.25	0.011 - 1	0.075883621				0.7		
C9-C12 Aliphatics, Unadjusted	22 / 76	0.05 : 0.1	0.056 - 2.9	0.123184211						
VPH Concentration (Total)	60 / 114	0.01 : 0.085	0.011 - 17	1.160741228						
EPH (mg/L)										
2-Methylnaphthalene	1 / 74	0.001 : 10	13 - 13	0.518103378						0.0062 nc
Acenaphthylene	3 / 74	0.001 : 10	0.012 - 0.048	0.410809459						0.18 nc
Benzo(a)anthracene	1 / 74	0.001 : 10	0.14 - 0.14	0.411819595		NA				0.000092 ca
Benzo(g,h,i)perylene	1 / 74	0.001 : 10	0.018 - 0.018	0.410170946		NA				0.18 nc
Fluorene	2 / 74	0.001 : 10	0.013 - 0.016	0.410252027		NA				0.24 nc
Naphthalene	1 / 74	0.001 : 10	0.01 - 0.01	0.410062838		NA		0.14		0.0062 nc
C11-C22 Aromatics (FID)	34 / 74	0.01 : 100	0.059 - 220	7.11197973				0.2		
C11-C22 Aromatics, Unadjusted	16 / 34	0.095 : 100	0.059 - 230	15.33730882						
C19-C36 Aliphatics (PID)	3 / 74	0.01 : 100	0.12 - 0.29	4.09452027				14		
C9-C18 Aliphatics (FID)	9 / 74	0.01 : 100	0.05 - 7	4.200412162				0.7		
EPH Concentration (Total)	35 / 72	0.01 : 100	0.05 - 220	7.4320625						

Roux Associates, Inc.; Environmental Science and Engineering, Inc.; PTI Environmental Services. 1991. Ground-water/Surface Water Investigation Plan Phase I Remedial Investigation Final Report. Prepared for: Industri-Plex Site Remedial Trust. June 7.

Prepared/Date: KJC 08/15/07
Checked/Date: PHT 10/01/07

USEPA, Office of Water. 2006. 2006 Edition of the Drinking Water Standards and Health Advisories. EPA 822-R-06-013. August.

NA - Not Available

SDWR - Secondary Drinking Water Regulation

TT - Treatment TechniqueMADEP, Office of Research and Standards. 2005. Standards and Guidelines for Contaminants in Massachusetts Drinking Waters. S

MRDL - Maximum Residual Disinfectant Level

TT - Treatment TechniqueUSEPA, Region IX. 2004. Region 9 Preliminary Remediation Goal (PRG) Table. October 20.

nc - Noncancer PRG

nc** - Noncancer PRG where Noncancer PRG is more stringent than Cancer PRG

ca - Cancer PRG

ca* - Cancer PRG where Noncancer PRG < 100 x Cancer PRG

ca** - Cancer PRG where Noncancer PRG < 10 x Cancer PRGmg/L- milligrams/Liter

◦ µg/L- micrograms/Liter ◦ mmhos/cm- millimhos/ centimeter

Table 4.3-9
Bedrock Groundwater Analytical Data Summary

Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples
Volatile Organics (mg/L)				
1,2-Dichloroethane	2 / 21	0.0001 : 0.5	0.001 - 0.004	0.012897619
1,2-Dichloroethene (total)	4 / 8	0.005 : 0.005	0.002 - 1.3	0.1645
2,4,4-Trimethyl-2-Pentene	1 / 21	0.001 : 0.5	0.002 - 0.002	0.013404762
Acetone	1 / 13	0.01 : 25	0.001 - 0.001	0.972769231
Benzene	2 / 21	0.001 : 0.5	0.002 - 0.002	0.013
Carbon Disulfide	1 / 12	0.001 : 10	0.001 - 0.001	0.419583333
Chlorobenzene	1 / 21	0.001 : 0.005	0.8 - 0.8	0.039238095
Chloroethane	1 / 21	0.001 : 0.01	0.68 - 0.68	0.03447619
Chloroform	1 / 21	0.001 : 0.5	0.018 - 0.018	0.013785714
cis-1,2-Dichloroethene	1 / 15	0.00022 : 0.5	0.024 - 0.024	0.018674
Dichlorodifluoromethane	2 / 15	0.00021 : 1	0.001 - 0.001	0.033940333
Ethylbenzene	2 / 21	0.001 : 0.005	0.002 - 0.31	0.015880952
m,p-Xylene	1 / 15	0.00022 : 0.001	0.96 - 0.96	0.064440667
Methylene Chloride	3 / 21	0.001 : 1	0.002 - 0.003	0.026047619
Methyl-t-butyl ether (MTBE)	3 / 8	0.001 : 0.5	0.002 - 0.004	0.03265
Tetrahydrofuran	1 / 5	0.01 : 0.01	26 - 26	5.204
Toluene	4 / 21	0.001 : 0.01	0.001 - 17	0.81297619
trans-1,2-Dichloroethene	1 / 15	0.0002 : 0.5	0.0015 - 0.0015	0.017173333
Trichloroethene (TCE)	4 / 21	0.001 : 0.5	0.004 - 0.081	0.017771429
Xylenes, Total	3 / 8	0.005 : 0.005	0.001 - 1.1	0.1393125
Semivolatile Organics (mg/L)				
1,2-Dichlorobenzene	1 / 20	0.0095 : 0.01	0.079 - 0.079	0.0086875
1,4-Dichlorobenzene	1 / 20	0.0095 : 0.01	0.02 - 0.02	0.0057375
2-Methylphenol (o-Cresol)	1 / 13	0.0095 : 0.01	0.02 - 0.02	0.006134615
3&4-Methylphenol	1 / 5	0.01 : 0.01	0.026 - 0.026	0.0092
4-Methylphenol (p-Cresol)	1 / 9	0.0095 : 0.01	0.07 - 0.07	0.012194444
bis(2-EthylHexyl)phthalate	5 / 21	0.0006 : 0.01	0.0008 - 0.002	0.002702381
Diethylphthalate	2 / 20	0.0095 : 0.01	0.001 - 0.073	0.0081875
Di-n-butylphthalate	2 / 20	0.0095 : 0.01	0.0006 - 0.001	0.0045675
Naphthalene	1 / 20	0.005 : 0.01	0.002 - 0.002	0.0047125
N-Nitrosodimethylamine	4 / 16	0.000002 : 0.01	0.0000048 - 0.00013	0.000640487
Pesticides/PCBs (mg/L)				
Beta-BHC	1 / 16	0.00005 : 0.00005	0.000063 - 0.000063	0.000027375
Heptachlor	1 / 17	0.00004 : 0.00005	0.00005 - 0.00005	2.38235E-05
Metals, Total (mg/L)				
Aluminum, Total	3 / 14	0.1 : 0.2	0.044 - 0.27	0.108142857
Arsenic, Total	2 / 14	0.005 : 0.01	0.005 - 0.012	0.003535714

Table 4.3-9
Bedrock Groundwater Analytical Data Summary

Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples
Barium, Total	4 / 14	0.1 : 0.2	0.019 - 0.21	0.065357143
Calcium, Total	33 / 33		10 - 1000	96.19090909
Chromium, Total	1 / 31	0.005 : 0.03	0.14 - 0.14	0.010645161
Copper, Total	3 / 13	0.02 : 0.025	0.019 - 0.133	0.022730769
Iron, Total	11 / 29	0.03 : 0.05	0.037 - 57	5.032137931
Lead, Total	5 / 14	0.005 : 0.005	0.003 - 0.011	0.003957143
Magnesium, Total	29 / 29		0.5 - 350	18.22103448
Manganese, Total	12 / 29	0.01 : 0.01	0.007 - 45	1.947655172
Nickel, Total	1 / 13	0.03 : 0.04	0.002 - 0.002	0.015153846
Potassium, Total	26 / 29	0.5 : 2	1.27 - 370	16.77793103
Silicon, Total	4 / 4		7.2 - 18	13.3
Sodium, Total	29 / 29		9.26 - 2100	100.9158621
Thallium, Total	1 / 13	0.005 : 0.01	0.012 - 0.012	0.003807692
Zinc, Total	4 / 13	0.02 : 0.025	0.03 - 0.178	0.03
Metals, Filtered (mg/L)				
Aluminum, Filtered	3 / 29	0.05 : 0.1	0.37 - 0.49	0.088103448
Arsenic, Filtered	2 / 12	0.001 : 0.01	0.0015 - 0.01	0.003333333
Barium, Filtered	25 / 25		0.017 - 0.87	0.13376
Calcium, Filtered	81 / 81		15 - 520	119.2654321
Cobalt, Filtered	1 / 12	0.01 : 0.05	0.098 - 0.098	0.017958333
Copper, Filtered	1 / 12	0.01 : 0.025	0.04 - 0.04	0.012291667
Hexavalent Chromium, Filtered	1 / 24	0.005 : 0.005	0.0094 - 0.0094	0.0027875
Iron, Filtered	59 / 89	0.05 : 50	0.038 - 50	5.14811236
Magnesium, Filtered	78 / 89	0.1 : 0.2	0.22 - 323	48.66741573
Manganese, Filtered	70 / 89	0.01 : 0.01	0.035 - 31	4.033460674
Nickel, Filtered	2 / 12	0.005 : 0.04	0.014 - 0.24	0.032208333
Potassium, Filtered	85 / 89	2 : 4	1.5 - 270	32.26865169
Selenium, Filtered	1 / 11	0.002 : 0.025	0.005 - 0.005	0.003318182
Silicon, Filtered	4 / 4		0.00409 - 39.3	16.5760225
Sodium, Filtered	89 / 89		7 - 2180	278.8393258
Zinc, Filtered	2 / 12	0.02 : 0.05	0.02 - 0.042	0.017458333
Inorganics (mg/L)				
Alkalinity	2 / 2		60 - 230	145
Bicarbonate Alkalinity as CaCO3	102 / 108	1 : 5	1 - 740	134.1407407
Bromide, Dissolved	2 / 4	0.5 : 100	0.54 - 3	13.4475
Carbonate Alkalinity as CaCO3	8 / 77	1 : 5	1 - 360	15.18571429
Carbonate as C (Total)	1 / 1		171 - 171	171
Chloride	111 / 111		5.8 - 2800	242.8018018

Table 4.3-9
Bedrock Groundwater Analytical Data Summary

Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Parameter Name	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples
CO2 as C	1	/	1				171	-	171	171
Dissolved Organic Carbon (DOC)	4	/	4				4.32	-	95	34.33
Nitrate as N	32	/	49	0.05	:	0.1	0.058	-	3.9	0.554918367
Nitrite as N	8	/	48	0.005	:	0.1	0.01	-	0.065	0.008833333
Nitrogen, Ammonia	98	/	114	0.1	:	0.5	0.099	-	218	16.39604386
Orthophosphate as P	2	/	4	0.02	:	0.1	0.03	-	0.12	0.0525
pH **(pH units)**	72	/	72				5.68	-	12.31	7.525
Phosphorous	1	/	4	0.1	:	0.1	0.23	-	0.23	0.095
Specific Conductance **(umhos/cm)**	83	/	83				140	-	19100	2132.963855
Specific Gravity **(g/mL)**	8	/	8				0.9	-	1	0.95375
Sulfate as SO4	103	/	110	0.2	:	2	0.33	-	6100	422.5293636
Total Alkalinity as CaCO3	33	/	33				26	-	533	151.4575758
Total Dissolved Solids (TDS)	10	/	10				80	-	356	250.8
Total Organic Carbon (TOC)	1	/	4	1	:	1	9.6	-	9.6	2.775
Turbidity **(NTU)**	17	/	17				0.12	-	110	16.70176471
Field Measurements (mg/L)										
Alkalinity	4	/	4				56	-	416	235
Dissolved Oxygen	3	/	3				0.8	-	9.6	3.933333333
Eh **(mv)**	4	/	4				93	-	335	233.25
pH **(pH units)**	19	/	19				6.31	-	12.34	7.559473684
Specific Conductance **(umhos/cm)**	7	/	7				185	-	12200	2085.714286
Specific Gravity **(g/mL)**	1	/	1				0.99	-	0.99	0.99
Temperature **(°C)**	5	/	5				9.8	-	16	12.8
Total Dissolved Solids (TDS)	4	/	4				180	-	8000	2345.5
Viscosity **(cpoise)**	4	/	4				3	-	3.2	3.05
Coliform (/100 mL)										
Total Coliform Bacteria	1	/	9	1	:	1	2	-	2	0.666666667

mg/L- milligrams/Liter
◦F- degrees Fahrenheit
(mv)- milivollts
g/ml- grams/milliliter
◦C- degrees centigradeumhos/cm- micromhos/ centimeter

Prepared by: KJC 8/15/07
Prepared by: PHT 10/01/07

Table 4.3-10
Outside Zone II, Ipswich River Watershed Grounwater Analytical Data Summary

Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)
Volatile Organics (mg/L)					
1,2-Dichloroethane	1 / 19	0.0001 : 0.005	0.027 - 0.027	0.002115789	
2,4,4-Trimethyl-1-pentene	3 / 35	0.001 : 0.005	0.0013 - 0.004	0.000774286	
Acetone	1 / 15	0.01 : 0.05	0.29 - 0.29	0.031333333	
Bromodichloromethane	1 / 19	0.001 : 0.005	0.008 - 0.008	0.001210526	
Bromoform	1 / 19	0.001 : 0.005	0.065 - 0.065	0.004210526	
Carbon Disulfide	1 / 11	0.001 : 0.02	0.036 - 0.036	0.006409091	
Carbon Tetrachloride	1 / 19	0.001 : 0.005	0.005 - 0.005	0.001052632	
Chloroform	1 / 19	0.001 : 0.005	0.026 - 0.026	0.002157895	
cis-1,2-Dichloroethene	1 / 16	0.00022 : 0.001	0.007 - 0.007	0.000881875	
Dibromochloromethane	1 / 19	0.001 : 0.005	0.017 - 0.017	0.001684211	
Methylene Chloride	2 / 19	0.001 : 0.05	0.002 - 0.002	0.002263158	
Methyl-t-butyl ether (MTBE)	11 / 12	0.001 : 0.001	0.004 - 0.026	0.014533333	
Toluene	1 / 19	0.001 : 0.005	0.076 - 0.076	0.004789474	
Trichloroethene (TCE)	2 / 19	0.001 : 0.005	0.007 - 0.016	0.001973684	
Semivolatile Organics (mg/L)					
1,2,4-Trichlorobenzene	1 / 10	0.01 : 0.01	0.007 - 0.007	0.0052	
2,4-Dichlorophenol	1 / 9	0.01 : 0.01	0.001 - 0.001	0.004555556	
2-Chlorophenol	1 / 10	0.01 : 0.01	0.001 - 0.001	0.0046	
2-Nitrophenol	1 / 10	0.01 : 0.01	0.009 - 0.009	0.0054	
4-Bromophenyl-phenylether	1 / 10	0.01 : 0.01	0.006 - 0.006	0.0051	
4-Chlorophenyl-phenylether	1 / 10	0.01 : 0.01	0.002 - 0.002	0.0047	
4-Nitrophenol	1 / 10	0.025 : 0.05	0.024 - 0.024	0.02115	
Benzyl Alcohol	1 / 6	0.01 : 0.02	0.008 - 0.008	0.006333333	
bis(2-EthylHexyl)phthalate	3 / 10	0.0006 : 0.01	0.0008 - 0.005	0.00279	
Diethylphthalate	1 / 10	0.01 : 0.01	0.001 - 0.001	0.0046	
Di-n-butylphthalate	1 / 10	0.01 : 0.01	0.0006 - 0.0006	0.00456	
Isophorone	1 / 10	0.01 : 0.01	0.003 - 0.003	0.0048	
Naphthalene	1 / 11	0.01 : 0.01	0.003 - 0.003	0.004818182	
N-Nitrosodimethylamine	16 / 21	0.000002 : 0.01	0.0000024 - 0.026	0.001757095	
Pesticides/PCBs (mg/L)					
4,4'-DDD	1 / 9	0.0001 : 0.0001	0.0001 - 0.0001	5.55556E-05	
Alpha-BHC	1 / 9	0.00005 : 0.00005	0.000094 - 0.000094	3.26667E-05	
Beta-BHC	1 / 9	0.00005 : 0.00005	0.00012 - 0.00012	3.55556E-05	
Gamma-BHC (Lindane)	1 / 9	0.00002 : 0.001	0.000058 - 0.000058	7.47778E-05	
Metals, Total (mg/L)					
Aluminum, Total	7 / 12	0.1 : 0.2	0.044 - 1.2	0.261583333	7.15
Antimony, Total	1 / 11	0.005 : 0.05	0.0027 - 0.0027	0.0057	0.0173
Barium, Total	7 / 12	0.1 : 0.2	0.034 - 0.079	0.0565	0.0239
Beryllium, Total	1 / 11	0.001 : 0.005	0.00039 - 0.00039	0.001308182	0.001
Cadmium, Total	3 / 11	0.001 : 0.01	0.001 - 0.0019	0.002545455	0.005
Calcium, Total	19 / 19		15 - 84.3	54.57368421	162
Chromium, Total	5 / 82	0.005 : 0.03	0.0007 - 0.074	0.004897561	0.019
Cobalt, Total	1 / 11	0.01 : 0.05	0.012 - 0.012	0.014727273	0.0478
Copper, Total	7 / 11	0.02 : 0.02	0.019 - 0.17	0.052909091	0.0401
Iron, Total	48 / 82	0.025 : 0.1	0.05 - 57	0.916993902	30.7
Lead, Total	3 / 12	0.005 : 0.01	0.003 - 0.0063	0.003416667	0.0034
Magnesium, Total	19 / 19		2.4 - 9.86	7.165789474	25.3
Manganese, Total	10 / 19	0.01 : 0.01	0.029 - 3.8	0.988578947	2.61
Nickel, Total	7 / 11	0.03 : 0.03	0.002 - 0.22	0.088636364	0.0719
Potassium, Total	18 / 19	2 : 2	2.17 - 6	3.395789474	7.22
Silicon, Total	2 / 2		4.2 - 9.79	6.995	
Sodium, Total	19 / 19		9.26 - 137	52.52421053	105
Strontium, Total	1 / 1		0.15 - 0.15	0.15	
Zinc, Total	3 / 11	0.02 : 0.05	0.017 - 0.178	0.036727273	0.027
Metals, Filltered (mg/L)					
Aluminum, Filtered	13 / 17	0.05 : 0.2	0.1 - 280	16.85676471	5.01
Antimony, Filtered	1 / 17	0.005 : 20	0.006 - 0.006	0.890794118	0.0187
Barium, Filtered	13 / 16	0.1 : 0.2	0.014 - 0.058	0.0518125	0.0222
Beryllium, Filtered	1 / 16	0.001 : 0.01	0.022 - 0.022	0.00275	
Cadmium, Filtered	1 / 17	0.0005 : 0.01	0.0022 - 0.0022	0.001614706	0.005
Calcium, Filtered	17 / 18	5 : 5	16.4 - 240	32.97777778	156
Chromium, Filtered	3 / 14	0.005 : 0.03	0.0051 - 23	2.93215	0.0098
Cobalt, Filtered	2 / 17	0.01 : 0.05	0.008 - 1.3	0.084882353	0.007
Copper, Filtered	14 / 17	0.01 : 0.025	0.026 - 1.8	0.217529412	0.0115
Iron, Filtered	7 / 14	0.05 : 0.1	0.124 - 25	3.547428571	0.151
Lead, Filtered	3 / 17	0.001 : 0.1	0.004 - 0.056	0.011117647	0.002
Magnesium, Filtered	17 / 19	5 : 5	2.6 - 220	15.35736842	24.6
Manganese, Filtered	19 / 19		0.108 - 17	2.723789474	1.485
Nickel, Filtered	10 / 17	0.005 : 0.04	0.007 - 1.1	0.110911765	0.02
Potassium, Filtered	16 / 19	5 : 25	3.3 - 7	4.597894737	6.44
Selenium, Filtered	1 / 17	0.005 : 0.1	0.0023 - 0.0023	0.0069	0.003

Table 4.3-10
Outside Zone II, Ipswich River Watershed Grounwater Analytical Data Summary

Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)
Silicon, Filtered	1 / 1		4.3 - 4.3	4.3	
Sodium, Filtered	19 / 19		13 - 1300	154.9263158	123
Thallium, Filtered	1 / 17	0.0013 : 0.02	0.019 - 0.019	0.005626471	0.004
Zinc, Filtered	5 / 17	0.02 : 0.05	0.02 - 2	0.206588235	0.02675
Inorganics (mg/L)					
Bicarbonate alkalinity as CaCO3	81 / 81		5.2 - 140	31.58641975	
Carbonate as C (Total)	1 / 1		21 - 21	21	
Chloride	89 / 89		28 - 1500	190.4898876	232
CO2 as C	1 / 1		21 - 21	21	
Color, True **(Color Units)**	2 / 8	5 : 5	10 - 650	84.375	
Dissolved Organic Carbon (DOC)	1 / 1		1.2 - 1.2	1.2	
Nitrate as N	15 / 16	0.5 : 0.5	0.21 - 11	2.1255625	
Nitrite as N	2 / 15	0.005 : 1	0.039 - 0.1	0.047766667	
Nitrogen, Ammonia	93 / 97	0.1 : 0.5	0.099 - 2300	62.36596907	
pH **(pH units)**	86 / 86		3.9 - 7.8	5.891162791	
Specific Conductance **(umhos/cm)**	80 / 80		230 - 15000	1104.825	
Sulfate as SO4	97 / 97		12 - 8600	311.3453608	48.76
Total Alkalinity as CaCO3	24 / 24		12 - 107	35.92916667	
Total Dissolved Solids (TDS)	4 / 4		316 - 356	333.25	
Total Organic Carbon (TOC)	1 / 1		1.2 - 1.2	1.2	
Field Measurements (mg/L)					
Alkalinity	1 / 1		1 - 1	1	
Dissolved Oxygen	1 / 1		0.4 - 0.4	0.4	
Eh **(mv)**	1 / 1		362 - 362	362	
Hardness as CaCO3	2 / 2		67 - 92	79.5	
pH **(pH units)**	7 / 7		3.84 - 7.44	5.122857143	
Specific Conductance **(umhos/cm)**	5 / 5		346 - 20600	4562.2	
Specific Gravity **(g/mL)**	1 / 1		1 - 1	1	
Temperature **(°C)**	5 / 5		9.8 - 16	13.56	
Total Dissolved Solids (TDS)	1 / 1		280 - 280	280	
Viscosity **(cpoise)**	1 / 1		3 - 3	3	

Prepared/Date: KJC 08/15/07Checked/Date: PHT 10/01/07

Roux Associates, Inc.; Environmental Science and Engineering, Inc.; PTI Environmental Services. 1991. Ground-water/Surface Water Investigation
Plan Phase I Remedial Investigation Final Report. Prepared for: Industri-Plex Site Remedial Trust. June 7.USEPA, Office of Water. 2006. 2006 Edition of the Drinking Water Standards and Health Ad

NA - Not Available
SDWR - Secondary Drinking Water Regulation
TT - Treatment TechniqueMADEP, Office of Research and Standards. 2005. Standards and Guidelines for Contaminants in Massachusetts Drinking Waters. S
MRDL - Maximum Residual Disinfectant Level
TT - Treatment TechniqueUSEPA, Region IX. 2004. Region 9 Preliminary Remediation Goal (PRG) Table. October 20.
nc - Noncancer PRG
nc** - Noncancer PRG where Noncancer PRG is more stringent than Cancer PRG
ca - Cancer PRG
ca* - Cancer PRG where Noncancer PRG < 100 x Cancer PRG
ca** - Cancer PRG where Noncancer PRG < 10 x Cancer PRGmg/L- milligrams/Liter
[illegible]

Table 4.3-11
Outside Zone II, Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)
Volatile Organics (mg/L)					
1,1-Dichloroethane	4 / 81	0.0005 : 0.5	0.0008 - 0.02	0.0088	
1,2,4-Trichlorobenzene	1 / 22	0.0005 : 0.5	0.001 - 0.001	0.024068182	
1,2,4-Trimethylbenzene	2 / 18	0.0005 : 0.5	0.0006 - 0.007	0.028797222	
1,2-Dichlorobenzene	2 / 18	0.0005 : 0.5	0.0015 - 0.003	0.028736111	
1,2-Dichloroethane	3 / 81	0.0001 : 0.5	0.0006 - 0.004	0.008592593	
1,2-Dichloroethene (total)	6 / 67	0.005 : 0.01	0.006 - 1.3	0.025641791	
1,3,5-Trimethylbenzene	1 / 18	0.0005 : 0.5	0.003 - 0.003	0.028555556	
1,3-Dichlorobenzene	1 / 18	0.0005 : 0.5	0.00055 - 0.00055	0.028530556	
1,4-Dichlorobenzene	3 / 18	0.0005 : 0.5	0.00064 - 0.0031	0.028777222	
2,4,4-Trimethyl-1-pentene	19 / 85	0.0005 : 0.5	0.0047 - 0.97	0.034182941	
2,4,4-Trimethyl-2-Pentene	18 / 85	0.0005 : 0.5	0.0014 - 0.18	0.014462941	
2-Butanone (MEK)	1 / 76	0.01 : 5	1.2 - 1.2	0.088717105	
4-Methyl-2-Pentanone (MIBK)	1 / 76	0.01 : 5	1.4 - 1.4	0.091348684	
Acetone	9 / 76	0.01 : 25	0.001 - 1.4	0.369532895	
Benzene	4 / 81	0.0005 : 0.5	0.0018 - 0.12	0.010125309	
Bromoform	2 / 81	0.0005 : 0.5	0.005 - 0.006	0.008666667	
Carbon Disulfide	2 / 72	0.005 : 10	0.006 - 0.031	0.143847222	
Chlorobenzene	2 / 81	0.0005 : 0.5	0.053 - 0.8	0.016006173	
Chloroethane	2 / 81	0.0005 : 1	0.049 - 0.68	0.01991358	
Chloroform	2 / 81	0.0005 : 0.5	0.0012 - 0.004	0.00862284	
Chloromethane (Methyl Chloride)	2 / 81	0.0005 : 1	0.0008 - 0.0014	0.017159877	
cis-1,2-Dichloroethene	3 / 51	0.0005 : 0.5	0.0005 - 0.001	0.012151961	
Dibromochloromethane	1 / 81	0.0005 : 0.5	0.002 - 0.002	0.00858642	
Dibromomethane	1 / 18	0.0005 : 0.5	0.001 - 0.001	0.028569444	
Dichlorodifluoromethane	2 / 18	0.0005 : 1	0.001 - 0.001	0.056555556	
Ethylbenzene	6 / 81	0.0005 : 0.05	0.0009 - 0.31	0.01363642	
Isopropyl Benzene	1 / 18	0.0005 : 0.5	0.0007 - 0.0007	0.028552778	
m,p-Xylene	5 / 18	0.0005 : 0.01	0.001 - 1.1	0.122925	
Methylene Chloride	2 / 81	0.0005 : 1	0.0008 - 0.003	0.015572222	
o-Xylene	2 / 18	0.0005 : 0.5	0.0005 - 0.016	0.029291667	
p-Isopropyl Toluene	1 / 18	0.0005 : 0.5	0.0011 - 0.0011	0.028561111	
Tetrahydrofuran	3 / 6	0.01 : 0.01	0.13 - 26	7.690833333	
Toluene	8 / 81	0.0005 : 0.05	0.0009 - 17	0.558059877	
Trichloroethene (TCE)	3 / 81	0.0005 : 0.5	0.001 - 0.008	0.00867284	
Vinyl Chloride	1 / 81	0.0005 : 1	0.008 - 0.008	0.017179012	
Xylenes, Total	6 / 71	0.005 : 0.05	0.001 - 2.8	0.08365493	
Hydrazines (mg/L)					
Hydrazine	4 / 24	0.01 : 0.1	0.0027 - 0.18	0.014454167	
Monomethylhydrazine (MMH)	2 / 24	0.01 : 0.02	0.0033 - 0.036	0.006429167	
Semivolatile Organics (mg/L)					
1,2,4-Trichlorobenzene	1 / 97	0.001 : 0.1	0.002 - 0.002	0.005706186	
1,2-Dichlorobenzene	4 / 83	0.001 : 0.1	0.001 - 0.099	0.008036145	
1,3-Dichlorobenzene	1 / 83	0.001 : 0.1	0.001 - 0.001	0.005813253	
1,4-Dichlorobenzene	3 / 83	0.001 : 0.1	0.002 - 0.02	0.005927711	
2,4-Dimethylphenol	2 / 82	0.001 : 0.1	0.004 - 0.006	0.005871951	
2,4-Dinitrophenol	1 / 82	0.005 : 0.52	0.002 - 0.002	0.021707317	
2-Chlorophenol	1 / 82	0.001 : 0.1	0.001 - 0.001	0.005823171	
2-Methylphenol (o-Cresol)	3 / 79	0.001 : 0.1	0.002 - 0.022	0.006272152	
3&4-Methylphenol	2 / 6	0.01 : 0.01	0.026 - 0.026	0.012	
4-Bromophenyl-phenylether	2 / 83	0.002 : 0.1	0.001 - 0.003	0.005861446	
4-Chlorophenyl-phenylether	2 / 83	0.001 : 0.1	0.004 - 0.006	0.005915663	
4-Methylphenol (p-Cresol)	5 / 78	0.003 : 0.1	0.003 - 0.19	0.010570513	
4-Nitrophenol	3 / 82	0.005 : 0.52	0.001 - 0.012	0.024	
Benzoic Acid	2 / 77	0.005 : 0.52	0.002 - 0.031	0.029084416	
bis(2-EthylHexyl)phthalate	7 / 88	0.0006 : 5	0.001 - 0.011	0.033847727	
Butylbenzylphthalate	1 / 87	0.002 : 0.1	0.0091 - 0.0091	0.00592069	
Diethylphthalate	6 / 87	0.002 : 0.1	0.0003 - 0.073	0.006393103	
Di-n-butylphthalate	5 / 87	0.002 : 0.1	0.0002 - 0.003	0.005666667	
Di-n-octylphthalate	1 / 87	0.002 : 0.1	0.018 - 0.018	0.005994253	
Naphthalene	3 / 83	0.001 : 0.1	0.001 - 0.008	0.005795181	
N-Nitrosodimethylamine	54 / 93	0.000002 : 0.01	0.0000022 - 0.0031	0.000763065	
N-Nitrosodiphenylamine	14 / 87	0.001 : 0.012	0.001 - 1	0.030103448	
Phenol	2 / 82	0.001 : 0.1	0.002 - 0.087	0.006835366	
Polyaromatic Hydrocarbons (mg/L)					
Acenaphthylene	2 / 7	0.0001 : 0.001	0.00162 - 0.0338	0.005255	
Anthracene	1 / 7	0.00003 : 0.001	0.00029 - 0.00029	0.000133571	
Benzo(a)anthracene	2 / 7	0.000017 : 0.001	0.000155 - 0.000178	0.000135714	
Benzo(a)pyrene	2 / 7	0.00002 : 0.0002	0.000027 - 0.00007	0.000034	
Benzo(b)fluoranthene	2 / 7	0.000033 : 0.001	0.000039 - 0.00005	0.000103214	
Benzo(k)fluoranthene	1 / 7	0.000026 : 0.001	0.000034 - 0.000034	9.61429E-05	
Chrysene	2 / 7	0.000056 : 0.001	0.00019 - 0.00041	0.0001795	
Fluoranthene	2 / 5	0.000019 : 0.001	0.00042 - 0.0011	0.0004078	
Fluorene	1 / 7	0.0001 : 0.001	0.00068 - 0.00068	0.000217143	
Naphthalene	1 / 5	0.00076 : 0.001	0.0139 - 0.0139	0.003109	
Phenanthrene	2 / 7	0.000044 : 0.001	0.00067 - 0.00295	0.000609143	
Pyrene	2 / 7	0.0001 : 0.001	0.00091 - 0.0013	0.000425714	
Pesticides/PCBs (mg/L)					

Table 4.3-11
Outside Zone II, Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)
4,4'-DDD	1 / 74	0.0000039 : 0.0005	0.0000118 - 0.0000118	0.000047875	
4,4'-DDE	4 / 74	0.00005 : 0.0005	0.0000053 - 0.000124	4.95324E-05	
4,4'-DDT	3 / 74	0.0000039 : 0.0005	0.000022 - 0.00012	4.92831E-05	
Aldrin	3 / 75	0.0000019 : 0.0003	0.000012 - 0.000069	2.77193E-05	
Alpha-BHC	3 / 74	0.0000019 : 0.0003	0.00005 - 0.00032	3.28912E-05	
Beta-BHC	5 / 74	0.000002 : 0.0003	0.0000028 - 0.000123	2.85649E-05	
Delta-BHC	3 / 74	0.0000056 : 0.0003	0.00007 - 0.00009	2.79122E-05	
Endosulfan I	1 / 74	0.0000019 : 0.0003	0.000053 - 0.000053	2.60939E-05	
Endosulfan II	1 / 74	0.0000038 : 0.0005	0.000039 - 0.000039	4.82405E-05	
Endrin	2 / 75	0.0000038 : 0.0005	0.0000066 - 0.000055	4.55393E-05	
Endrin Aldehyde	1 / 73	0.0000039 : 0.0005	0.0000107 - 0.0000107	4.6461E-05	
Endrin Ketone	1 / 66	0.0000038 : 0.0005	0.000022 - 0.000022	4.96947E-05	
Gamma-BHC (Lindane)	4 / 75	0.0000019 : 0.0003	0.0000034 - 0.00011	0.000026138	
Heptachlor	3 / 75	0.0000019 : 0.0003	0.00005 - 0.000089	2.68927E-05	
Heptachlor Epoxide	4 / 75	0.0000019 : 0.0003	0.000052 - 0.00022	2.86927E-05	
Methoxychlor	1 / 75	0.000019 : 0.003	0.0003 - 0.0003	0.000223193	
PCB-1016	1 / 16	0.000096 : 0.005	0.0016 - 0.0016	0.000389313	
PCB-1254	1 / 16	0.000096 : 0.01	0.00364 - 0.00364	0.000810563	
Herbicides (mg/L)					
2,4,5-T	1 / 4	0.0000095 : 0.0000098	0.000065 - 0.000065	1.98625E-05	
2,4-D	1 / 8	0.000095 : 0.01	0.00137 - 0.00137	0.002689313	
Dinoseb	1 / 4	0.000048 : 0.000049	0.000203 - 0.000203	0.000068875	
MCPA	1 / 4	0.048 : 0.049	0.47 - 0.47	0.135625	
MCPP	1 / 4	0.048 : 0.049	0.067 - 0.067	0.034875	
Picloram	3 / 4	0.0001 : 0.0001	0.00069 - 0.041	0.010735	
Opex/Kempore (mg/L)					
Kempore (Azodicarbonamide)	1 / 12	0.2 : 4.5	3.5 - 3.5	1.179166667	
OPEX	1 / 14	0.02 : 0.4	0.046 - 0.046	0.044357143	
Metals, Total (mg/L)					
Aluminum, Total	18 / 34	0.1 : 0.2	0.11 - 55	4.267588235	7.15
Antimony, Total	1 / 23	0.005 : 0.05	0.006 - 0.006	0.006347826	0.0173
Arsenic, Total	6 / 34	0.004 : 0.05	0.0089 - 0.054	0.008467647	0.00505
Barium, Total	28 / 34	0.01 : 0.1	0.0058 - 0.25	0.054194118	0.0239
Cadmium, Total	1 / 30	0.001 : 0.01	0.022 - 0.022	0.00346	0.005
Calcium, Total	39 / 39		3.45 - 1000	84.48948718	162
Chromium, Total	71 / 131	0.0015 : 0.03	0.0058 - 20	0.223320611	0.019
Cobalt, Total	6 / 23	0.02 : 0.05	0.021 - 0.47	0.051	0.0478
Copper, Total	8 / 23	0.02 : 0.025	0.036 - 0.36	0.063913043	0.0401
Hexavalent Chromium, Total	5 / 42	0.005 : 0.015	0.02 - 0.2	0.01327381	
Iron, Total	65 / 80	0.03 : 0.24	0.037 - 440	14.6753125	30.7
Lead, Total	5 / 34	0.0038 : 0.05	0.0056 - 0.4	0.0169	0.0034
Lithium, Total	1 / 1		0.0012 - 0.0012	0.0012	
Magnesium, Total	38 / 38		0.12 - 96	9.506342105	25.3
Manganese, Total	29 / 38	0.01 : 0.01	0.008 - 13	1.541552632	2.61
Mercury, Total	1 / 30	0.0002 : 0.0005	0.00058 - 0.00058	0.000154333	0.002
Nickel, Total	5 / 23	0.02 : 0.04	0.03 - 0.26	0.03973913	0.0719
Potassium, Total	27 / 38	0.5 : 4	0.56 - 35	4.525789474	7.22
Silicon, Total	11 / 11		1.8 - 47	12.20909091	
Sodium, Total	38 / 38		1.8 - 1700	117.4657895	105
Thallium, Total	1 / 22	0.005 : 0.05	0.012 - 0.012	0.008613636	0.004
Trivalent Chromium, Total	16 / 36	0.005 : 0.015	0.006 - 79	2.253333333	
Vanadium, Total	5 / 23	0.02 : 0.05	0.044 - 0.13	0.031065217	0.006
Zinc, Total	8 / 23	0.02 : 0.1	0.03 - 0.39	0.070804348	0.027
Metals, Filtered (mg/L)					
Aluminum, Filtered	225 / 561	0.05 : 0.2	0.05 - 43	0.735623886	5.01
Antimony, Filtered	1 / 125	0.0019 : 0.066	0.065 - 0.065	0.0074504	0.0187
Arsenic, Filtered	10 / 80	0.0011 : 0.05	0.0029 - 0.039	0.00503625	0.0034
Barium, Filtered	78 / 93	0.01 : 0.2	0.009 - 0.083	0.030352688	0.0222
Beryllium, Filtered	3 / 83	0.001 : 0.015	0.0026 - 0.0074	0.003054217	
Boron, Filtered	3 / 4	0.013 : 0.013	0.016 - 0.144	0.049375	
Cadmium, Filtered	6 / 129	0.00081 : 0.01	0.001 - 0.0067	0.001785426	0.005
Calcium, Filtered	168 / 169	5 : 5	1.2 - 500	67.09893491	156
Chromium, Filtered	276 / 618	0.0017 : 0.1	0.0033 - 9	0.049840534	0.0098
Cobalt, Filtered	29 / 125	0.0017 : 0.05	0.0022 - 0.32	0.0213948	0.007
Copper, Filtered	11 / 139	0.0029 : 0.025	0.0188 - 0.2	0.014032374	0.0115
Hexavalent Chromium, Filtered	3 / 53	0.003 : 0.05	0.0082 - 0.01	0.007350943	
Iron as Fe+2	51 / 77	0.2 : 0.2	0.22 - 24	3.229480519	
Iron as Fe+3	51 / 77	0.2 : 0.2	0.22 - 37	3.238571429	
Iron, Filtered	117 / 172	0.011 : 50	0.037 - 380	7.185081395	0.151
Lead, Filtered	8 / 129	0.00078 : 0.025	0.00114 - 0.03	0.004015581	0.002
Magnesium, Filtered	171 / 172	5 : 5	0.19 - 100	7.379069767	24.6
Manganese, Filtered	148 / 160	0.01 : 0.015	0.01 - 15	1.64723625	1.485
Molybdenum, Filtered	3 / 4	0.0018 : 0.0018	0.0022 - 0.0037	0.0026	
Nickel, Filtered	16 / 125	0.0016 : 0.04	0.021 - 0.26	0.0199192	0.02

Table 4.3-11
Outside Zone II, Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection	Range of Nondetect Concentrations	Range of Detected Concentrations	Average of All Samples	Industriplex Background (mg/L)
Potassium, Filtered	126 / 169	0.5 : 5	0.26 - 39	3.744360947	6.44
Selenium, Filtered	2 / 87	0.0012 : 0.25	0.002 - 0.005	0.006032184	0.003

Table 4.3-11
Outside Zone II, Aberjona River Watershed Groundwater Analytical Data Summary

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

ParameterName	Frequency of Detection			Range of Nondetect Concentrations			Range of Detected Concentrations			Average of All Samples	Industriplex Background (mg/L)
Silicon, Filtered	17	/	17				0.00409	-	16	7.509064118	
Sodium, Filtered	175	/	176	1	:	1	2.6	-	1700	85.96931818	123
Strontium, Filtered	4	/	4				0.028	-	0.077	0.05625	
Trivalent Chromium, Filtered	2	/	31	0.01	:	0.71	0.028	-	0.22	0.032758065	
Vanadium, Filtered	6	/	84	0.0019	:	0.05	0.0041	-	0.21	0.014107143	0.006
Zinc, Filtered	34	/	114	0.02	:	0.05	0.022	-	5.77	0.276315789	0.02675
Inorganics (mg/L)											
Acidity as CaCO3	8	/	8				32	-	924	319.25	
Bicarbonate alkalinity as CaCO3	292	/	328	1	:	20	1	-	690	85.6570122	
Bromide, Filtered	5	/	17	0.5	:	20	0.54	-	3	1.340588235	
Carbonate Alkalinity as CaCO3	1	/	297	1	:	20	5	-	5	0.915824916	
Carbonate as C (Total)	9	/	9				11	-	180	48.55555556	
Chemical Oxygen Demand (COD)	8	/	12	15	:	20	22	-	210	40.79166667	
Chloride	614	/	617	1	:	3	1.06	-	1800	81.55567261	232
Color, Apparent **(Color Units)**	3	/	3				30	-	140	66.66666667	
Cyanide	2	/	16	0.01	:	20	0.0216	-	0.053	2.5090375	
Dissolved Organic Carbon (DOC)	17	/	17				1.7	-	95	21.19058824	
Flash Point **(°F)**	3	/	3				200	-	200	200	
Nitrate & Nitrite as N	3	/	9	1	:	1	0.069	-	0.11	0.362555556	
Nitrate as N	118	/	181	0.05	:	1	0.05	-	18	1.405187845	
Nitrite as N	44	/	162	0.005	:	0.5	0.01	-	1	0.040938272	
Nitrogen, Ammonia	616	/	662	0.04	:	0.5	0.086	-	2100	60.99365106	
Nitrogen, Total Kjeldahl as N	3	/	4	1	:	1	1.7	-	230	58.5	
Odor **(TON)**	4	/	4				1	-	4	1.75	
Orthophosphate as P	7	/	20	0.02	:	0.1	0.02	-	0.29	0.0585	
Oxidation Reduction Potential **(mv)**	11	/	11				165	-	350	219.5454545	
pH **(pH units)**	414	/	414				3.2	-	1625	10.05468599	
Phosphate, Total as P	4	/	4				0.4	-	1.1	0.8075	
Phosphorous	3	/	17	0.1	:	1	0.23	-	1.3	0.2	
Specific Conductance **(umhos/cm)**	518	/	518				46.7	-	7860	1328.821815	
Specific Gravity **(g/mL)**	6	/	6				0.94	-	1	0.985	
Specific Gravity **(ratio)**	8	/	8				0.997	-	1	0.998125	
Sulfate as SO4	613	/	619	0.2	:	10	0.33	-	8400	429.8641842	48.76
Sulfide	8	/	17	1	:	1	1	-	6	1.617647059	
Total Alkalinity as CaCO3	49	/	52	1	:	50	2	-	342	84.46153846	
Total Dissolved Solids (TDS)	34	/	36	50	:	50	43	-	3300	464.3472222	
Total Organic Carbon (TOC)	93	/	94	1	:	1	1.6	-	61	9.85	
Turbidity **(NTU)**	9	/	9				0.32	-	110	23.47	
Coliform (/100 mL)											
Total Coliform Bacteria	1	/	4	1	:	1	2	-	2	0.875	
Field Measurements (mg/L)											
Alkalinity	30	/	31	1	:	1	4	-	1133	167.1451613	
Dissolved Oxygen	284	/	284				0.1	-	15.2	5.890176056	
Eh **(mv)**	17	/	17				5	-	436	267.1176471	
Nitrogen, Ammonia	243	/	260	0.1	:	1	1	-	1200	155.4117308	
Oxidation Reduction Potential **(mv)**	260	/	260				-200	-	243	21.61153846	
pH **(pH units)**	553	/	553				3.4	-	9.47	6.309529837	
Specific Conductance **(umhos/cm)**	340	/	340				49	-	27000	2712.120588	
Specific Gravity **(g/mL)**	10	/	10				0.99	-	1.03	1.0055	
Temperature **(°C)**	90	/	90				6.5	-	19	11.10555556	
Total Dissolved Solids (TDS)	25	/	26	120	:	120	38	-	7400	1202.384615	
Viscosity **(cpoise)**	7	/	7				2.8	-	3.5	3.042857143	
VPH (mg/L)											
Benzene	1	/	13	0.0005	:	0.005	0.0021	-	0.0021	0.00195	
C5-C8 Aliphatics (FID)	1	/	14	0.05	:	0.075	0.14	-	0.14	0.035892857	
C5-C8 Aliphatics, Unadjusted	1	/	14	0.05	:	0.075	0.14	-	0.14	0.035892857	
C9-C10 Aromatics (PID)	1	/	14	0.025	:	0.05	0.06	-	0.06	0.024821429	
C9-C12 Aliphatics, Unadjusted	1	/	14	0.025	:	0.05	0.065	-	0.065	0.025178571	
VPH Concentration (Total)	1	/	7	0.05	:	0.05	0.14	-	0.14	0.041428571	Prepared/Date: KJC 08/15/07
EPH (mg/L)											
C11-C22 Aromatics (FID)	3	/	12	0.04	:	0.2	0.079	-	0.48	0.115125	
C11-C22 Aromatics, Unadjusted	3	/	12	0.04	:	0.2	0.079	-	0.48	0.115125	
EPH Concentration (Total)	2	/	5	0.095	:	0.11	0.29	-	0.48	0.1845	

Checked/Date: PHT 10/01/07

Roux Associates, Inc.; Environmental Science and Engineering, Inc.; PTI Environmental Services. 1991. Ground-water/Surface Water Investigation Plan Phase I Remedial Investigation Final Report. Prepared for: Industri-Plex Site Remedial Trust. June 7.mg/L- milligrams/Liter

◦g- [illegible] micromhos/ centimeter

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 1/7/2002	Elevation 2/5/2002	Elevation 2/25/2002	Elevation 3/25/2002	Elevation 4/22/2002	Elevation 5/20/2002	Elevation 6/24/2002
PZ-11	I					**80.86**		**80.86**	**81.21**	80.76
PZ-11	O					**80.74**		**80.66**	**80.94**	80.84
PZ-12	I									80.42
PZ-12	O									80.48
PZ-13	I									80.36
PZ-13	O								80.38	80.36
PZ-14	I					**80.47**				
PZ-14	O					**80.44**				
PZ-18R	I	76.37	77.97	80.43	80.45	80.38	80.42	80.42	80.47	**80.52**
PZ-18R	O	76.37	77.97	80.55	80.58	80.52	80.52	80.44	80.54	**80.40**
PZ-20	I	76.75	77.75							
PZ-20	O	76.75	77.75							
PZ-17R	I	73.72	75.25	**79.00**	**79.12**	**78.90**	**79.10**	79.15	**79.35**	**79.09**
PZ-17R	O	73.72	75.25	**77.88**	**77.94**	**78.10**	**77.92**	79.50	**77.93**	**77.90**
PZ-17RR	I	75.90	76.90							
PZ-17RR	O	75.90	76.90							
PZ-21	I	75.50	76.50							
PZ-21	O	75.50	76.50							
PZ-22	I	74.90	75.90							
PZ-22	O	74.90	75.90							
PZ-16R	I	73.28	74.81	**78.47**	**78.51**	**78.52**	**78.64**			
PZ-16R	O	73.28	74.81	**78.04**	**77.97**	**77.94**	**77.94**		77.95	
PZ-16RR	I	74.90	75.90							
PZ-16RR	O	74.90	75.90							
PZ-23	I	74.20	75.20							
PZ-23	O	74.20	75.20							
PZ-15	I			**75.88**	**75.84**	**75.70**		**75.67**		**75.63**
PZ-15	O			**75.79**	**75.62**	**75.56**	75.72	**75.52**		**75.52**

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 7/22/2002	Elevation 8/12/2002	Elevation 9/9/2002	Elevation 10/7/2002	Elevation 11/4/2002	Elevation 12/9/2002	Elevation 2/3/2003
PZ-11	I			80.31	79.78	78.83	78.71	79.90	**80.51**	80.96
PZ-11	O								**80.42**	81.16
PZ-12	I					79.00	78.93	79.98	80.54	**80.64**
PZ-12	O							79.90	80.63	**80.62**
PZ-13	I			**79.90**	79.47	79.01	78.94	**79.86**	**80.07**	
PZ-13	O			**79.86**				**79.81**	**80.50**	
PZ-14	I					78.98	78.92	80.01	80.56	**80.31**
PZ-14	O							80.06	80.66	**80.27**
PZ-18R	I	76.37	77.97	80.01	79.58	79.36	**79.30**	80.02	**80.62**	**80.73**
PZ-18R	O	76.37	77.97	80.04	79.60	79.38	**79.04**		**80.50**	**80.71**
PZ-20	I	76.75	77.75							
PZ-20	O	76.75	77.75							
PZ-17R	I	73.72	75.25	78.72	78.46	78.06	78.03	78.74	**78.91**	**79.10**
PZ-17R	O	73.72	75.25						**78.80**	**78.35**
PZ-17RR	I	75.90	76.90							
PZ-17RR	O	75.90	76.90							
PZ-21	I	75.50	76.50							
PZ-21	O	75.50	76.50							
PZ-22	I	74.90	75.90							
PZ-22	O	74.90	75.90							
PZ-16R	I	73.28	74.81			76.80	77.19	**78.08**	**78.59**	**78.75**
PZ-16R	O	73.28	74.81	77.73				**77.86**	**78.08**	**78.36**
PZ-16RR	I	74.90	75.90							
PZ-16RR	O	74.90	75.90							
PZ-23	I	74.20	75.20							
PZ-23	O	74.20	75.20							
PZ-15	I				74.23	74.56	74.74	**75.47**	**75.83**	**75.88**
PZ-15	O							**75.42**	75.77	**75.80**

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 5/5/2003	Elevation 8/11/2003	Elevation 10/9/2003	Elevation 10/10/2003	Elevation 11/17/2003	Elevation 2/2/2004	Elevation 5/10/2004
PZ-11	I			**80.99**	**80.93**		80.51	**81.02**		**81.16**
PZ-11	O			**80.92**	**80.91**			**80.99**		**80.86**
PZ-12	I			80.52	80.49	80.04		**80.49**		**80.49**
PZ-12	O			80.54	80.49	80.09		**80.34**		**80.39**
PZ-13	I									
PZ-13	O									
PZ-14	I			80.58	80.53	**80.15**		**80.55**		**80.55**
PZ-14	O			80.59	80.56	**80.11**		**80.52**		**80.51**
PZ-18R	I	76.37	77.97	**80.57**	80.41	80.11		**80.54**	**80.72**	80.43
PZ-18R	O	76.37	77.97	**80.44**	80.64	80.17		**80.51**	**80.67**	80.52
PZ-20	I	76.75	77.75							
PZ-20	O	76.75	77.75							
PZ-17R	I	73.72	75.25	**79.09**	**78.96**	78.72		**78.97**	**79.19**	
PZ-17R	O	73.72	75.25	**78.07**	**78.10**			**78.21**	**78.40**	
PZ-17RR	I	75.90	76.90							
PZ-17RR	O	75.90	76.90							
PZ-21	I	75.50	76.50							
PZ-21	O	75.50	76.50							
PZ-22	I	74.90	75.90							
PZ-22	O	74.90	75.90							
PZ-16R	I	73.28	74.81							
PZ-16R	O	73.28	74.81		78.05	77.87				
PZ-16RR	I	74.90	75.90							
PZ-16RR	O	74.90	75.90							
PZ-23	I	74.20	75.20							
PZ-23	O	74.20	75.20							
PZ-15	I				75.58	75.41		75.74		**75.83**
PZ-15	O							75.78		**75.78**

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 8/9/2004	Elevation 11/1/2004	Elevation 2/1/2005	Elevation 5/16/2005	Elevation 8/8/2005	Elevation 9/19/2005	Elevation 10/26/2005
PZ-11	I			80.59	**80.85**		**81.03**			
PZ-11	O				**80.82**		**80.84**			
PZ-12	I			**80.20**	**80.48**		81.90			
PZ-12	O			**80.18**	**80.39**		81.91			
PZ-13	I									
PZ-13	O									
PZ-14	I			**80.28**	80.50		**80.39**			
PZ-14	O			**80.24**	80.51		**80.38**			
PZ-18R	I	76.37	77.97	80.08	80.52	80.55	**80.51**	**79.84**	79.92	**80.54**
PZ-18R	O	76.37	77.97	80.13	80.52		**80.50**	**79.72**		**80.52**
PZ-20	I	76.75	77.75						79.65	79.92
PZ-20	O	76.75	77.75							80.05
PZ-17R	I	73.72	75.25	78.49						
PZ-17R	O	73.72	75.25							
PZ-17RR	I	75.90	76.90						79.38	**80.03**
PZ-17RR	O	75.90	76.90							**79.52**
PZ-21	I	75.50	76.50						76.87	79.51
PZ-21	O	75.50	76.50							78.71
PZ-22	I	74.90	75.90						76.65	**79.19**
PZ-22	O	74.90	75.90							**78.26**
PZ-16R	I	73.28	74.81							
PZ-16R	O	73.28	74.81							
PZ-16RR	I	74.90	75.90						76.99	78.40
PZ-16RR	O	74.90	75.90							77.48
PZ-23	I	74.20	75.20						76.28	**77.66**
PZ-23	O	74.20	75.20							**77.62**
PZ-15	I			75.41	**75.74**	76.32	**75.88**			
PZ-15	O				**75.62**		**75.73**			

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 11/7/2005	Elevation 11/8/2005	Elevation 11/21/2005	Elevation 11/22/2005	Elevation 12/5/2005	Elevation 12/19/2005	Elevation 1/9/2006
PZ-11	I					**81.24**				
PZ-11	O					**81.16**				
PZ-12	I									
PZ-12	O									
PZ-13	I									
PZ-13	O									
PZ-14	I					80.04				
PZ-14	O					80.02				
PZ-18R	I	76.37	77.97			80.37	80.26	80.39	80.61	
PZ-18R	O	76.37	77.97			80.76	80.37			
PZ-20	I	76.75	77.75	79.82			79.76		79.81	79.85
PZ-20	O	76.75	77.75		80.00		80.05	80.05	80.09	80.05
PZ-17R	I	73.72	75.25							
PZ-17R	O	73.72	75.25							
PZ-17RR	I	75.90	76.90	80.44			**80.35**		**80.21**	**80.19**
PZ-17RR	O	75.90	76.90		79.50		**79.47**	79.45	**79.47**	**79.45**
PZ-21	I	75.50	76.50				**78.94**	**79.42**	**79.15**	
PZ-21	O	75.50	76.50				**78.82**	**78.30**	**78.86**	
PZ-22	I	74.90	75.90				**78.62**		**78.77**	
PZ-22	O	74.90	75.90				**78.20**		**78.25**	
PZ-16R	I	73.28	74.81							
PZ-16R	O	73.28	74.81							
PZ-16RR	I	74.90	75.90	78.20		78.22	78.22	78.34	78.24	78.26
PZ-16RR	O	74.90	75.90		77.45	76.22	77.52	77.60	77.54	77.60
PZ-23	I	74.20	75.20				77.39		77.52	
PZ-23	O	74.20	75.20				77.53		77.54	
PZ-15	I					**75.72**				
PZ-15	O					**75.52**				

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 1/24/2006	Elevation 2/21/2006	Elevation 2/22/2006	Elevation 3/7/2006	Elevation 3/20/2006	Elevation 3/21/2006	Elevation 4/24/2006
PZ-11	I									
PZ-11	O									
PZ-12	I									
PZ-12	O									
PZ-13	I									
PZ-13	O									
PZ-14	I									
PZ-14	O									
PZ-18R	I	76.37	77.97	**80.51**	80.44			80.35		80.37
PZ-18R	O	76.37	77.97	**80.48**						
PZ-20	I	76.75	77.75	79.80	79.73		79.71	79.65		79.81
PZ-20	O	76.75	77.75	80.10						
PZ-17R	I	73.72	75.25							
PZ-17R	O	73.72	75.25							
PZ-17RR	I	75.90	76.90	**80.39**	80.40		80.17	80.19		80.30
PZ-17RR	O	75.90	76.90	**79.42**						
PZ-21	I	75.50	76.50	**78.84**	78.81			78.69		78.99
PZ-21	O	75.50	76.50	**78.78**						
PZ-22	I	74.90	75.90	**78.83**	78.61			78.45		79.03
PZ-22	O	74.90	75.90	**78.20**						
PZ-16R	I	73.28	74.81							
PZ-16R	O	73.28	74.81							
PZ-16RR	I	74.90	75.90	78.42		78.60	78.11	78.04		78.55
PZ-16RR	O	74.90	75.90	77.54						
PZ-23	I	74.20	75.20	77.44		77.34		77.25		77.46
PZ-23	O	74.20	75.20	77.48						
PZ-15	I									
PZ-15	O									

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 4/25/2006	Elevation 5/8/2006	Elevation 5/23/2006	Elevation 5/24/2006	Elevation 6/5/2006	Elevation 6/19/2006	Elevation 6/20/2006
PZ-11	I									
PZ-11	O									
PZ-12	I									
PZ-12	O									
PZ-13	I									
PZ-13	O									
PZ-14	I									
PZ-14	O									
PZ-18R	I	76.37	77.97			**81.03**	81.03		**80.44**	80.44
PZ-18R	O	76.37	77.97			**80.26**			**80.19**	
PZ-20	I	76.75	77.75		79.66	79.99		79.81	79.96	
PZ-20	O	76.75	77.75		79.98	80.18		80.09	80.11	
PZ-17R	I	73.72	75.25							
PZ-17R	O	73.72	75.25							
PZ-17RR	I	75.90	76.90		**80.17**	**80.63**		**80.51**	**80.57**	
PZ-17RR	O	75.90	76.90		**79.57**	**79.88**		**79.85**	**79.83**	
PZ-21	I	75.50	76.50			**79.24**			79.04	
PZ-21	O	75.50	76.50			**79.19**			79.15	
PZ-22	I	74.90	75.90			79.02			78.81	
PZ-22	O	74.90	75.90			78.09			78.06	
PZ-16R	I	73.28	74.81							
PZ-16R	O	73.28	74.81							
PZ-16RR	I	74.90	75.90		78.29	78.41	78.41	78.32	78.24	78.24
PZ-16RR	O	74.90	75.90		78.24	78.19		78.16	78.10	
PZ-23	I	74.20	75.20			77.60			77.49	
PZ-23	O	74.20	75.20			77.81			77.63	
PZ-15	I									
PZ-15	O									

Table 5.4-1
Groundwater and Surface Water Elevations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Location	Inner Or Outer	Bottom Screen (elev)	Top Screen (elev)	Elevation 7/5/2006	Elevation 7/18/2006	Elevation 7/19/2006	Elevation 8/10/2006	Elevation 8/22/2006	Elevation 8/23/2006
PZ-11	I								
PZ-11	O								
PZ-12	I								
PZ-12	O								
PZ-13	I								
PZ-13	O								
PZ-14	I								
PZ-14	O								
PZ-18R	I	76.37	77.97		**80.51**			**80.33**	
PZ-18R	O	76.37	77.97		**80.32**			**80.12**	
PZ-20	I	76.75	77.75	79.89	79.86		79.91	79.74	
PZ-20	O	76.75	77.75	80.06	80.05		80.09	80.00	
PZ-17R	I	73.72	75.25						
PZ-17R	O	73.72	75.25						
PZ-17RR	I	75.90	76.90	**80.36**	**80.40**		**80.14**	**80.14**	
PZ-17RR	O	75.90	76.90	**79.67**	**79.77**		**79.77**	**79.68**	
PZ-21	I	75.50	76.50		78.65			77.85	
PZ-21	O	75.50	76.50		79.14			79.06	
PZ-22	I	74.90	75.90		**78.37**			77.74	
PZ-22	O	74.90	75.90		**78.03**			77.96	
PZ-16R	I	73.28	74.81						
PZ-16R	O	73.28	74.81						
PZ-16RR	I	74.90	75.90	78.08	77.99		77.68	77.63	
PZ-16RR	O	74.90	75.90	78.03	77.99		78.00	77.97	
PZ-23	I	74.20	75.20		77.22			76.87	
PZ-23	O	74.20	75.20		77.51			77.42	
PZ-15	I								
PZ-15	O								

Prepared/Date: BR 8/15/07
Checked/Date: PHT 8/20/07

All water elevations are calculated in feet MSl based on measurement surveyed reference (TOC)
TOC = Top of casing
I= Inside (groundwater elevation)
O= Oustide (surface water elevation)
Bold Values = Upward Vertical head potential between paired data
Non-bold Values=Nuetral or downward vertical head potential between paired data

Table 6.1-1
List of Summarized Human Health Risk Investigations

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, MA

Date	Title	Author
January 1991	Evaluation of the Potential Human Health and Environmental Risks for the Olin Facility	Envirologic Data
September 23, 1993	Public Health Risk Assessment	ABB Environmental Services, Inc.
June 1997	Human Health Risk Characterization (part of Supplemental Phase II Report)	ABB Environmental Services, Inc.
April 5, 2000	Focused Risk Assessment Report, Volumes 1 & 2	HLA
October 4, 2004	Focused Site Characterization and Focused Risk Assessment	MACTEC
November 1994	Imminent Hazard Evaluation (related to buried drums)	ABB Environmental Services, Inc.
October 11, 2001	Lake Poly Update to the Focused Risk Assessment Report	Harding ESE
May 18, 1992	Public Health Risk Assessment for White Floc and Surface Water	ABB Environmental Services, Inc.
December 4, 2001	Human Health Imminent Hazard Evaluation for IRA Status Report No. 2 for the South Ditch/Former Weir	Harding ESE
June 14, 2005	Update to the Environmental and Human Health Risk Assessments for the South Ditch	MACTEC
August 28, 2001	Assessment of human health risk for off-gassing of air sparging/soil vapor extraction system at 51 Eames Street Site	Harding ESE
November 16, 2005	Assessment of human health risk for off-gassing of air sparging/soil vapor extraction system at 51 Eames Street Site	MACTEC
June 29, 1993	Public Health Risk Assessment for the East Ditch	ABB Environmental Services, Inc.
October 10, 2003	Update to the 1997 ecological and human health risk assessments for the Off-Property West Ditch Study Area	MACTEC
January 1991	Evaluation of the Potential Human Health and Environmental Risks for the Olin Facility - Groundwater	Envirologic Data
September 23, 1993	Public Health Risk Assessment - Groundwater	ABB Environmental Services, Inc.
June 1997	Human Health Risk Characterization (part of Supplemental Phase II Report) - Groundwater	ABB Environmental Services, Inc.
April 5, 2000	Focused Risk Assessment Report, Volumes 1 & 2 - Groundwater	HLA
June 12, 2002	Altron/Sanmina Wells Risk Assessment	Harding ESE
November 18, 2002	Preliminary Human Health Risk Assessment for NDMA in Groundwater	MACTEC
July 9, 2003	Risk Assessment Screening - 4 Jewel Drive	MACTEC
August 8, 2003	Risk Assessment Screening - Rutland Property	MACTEC
October 10, 2003	Update to the 1997 ecological and human health risk assessments for the Off-Property West Ditch Study Area - Groundwater	MACTEC
August 3, 2004	Preliminary Human Health Risk Assessment, Sanmina Corporation Facility	MACTEC
October 4, 2004	Focused Site Characterization and Focused Risk Assessment - Groundwater	MACTEC
August 8, 2005	Information Package - NDMA in Groundwater, Vapor Migration, DAPL Evaluation - 8 Jewel Drive Property	MACTEC

Prepared/Date: MH 9/27/2007
Checked/Date: BJR 9/27/2007

Table 6.2-1
Risk Matrix: Summary of Ecological Risk Evaluations Performed for the 51 Eames Street Site

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Document Title	Assessment Endpoint	Measurement Endpoint	Exposure Area	Data Type							Important Soil OHMPCs	Important Surface Water OHMPCs	Important Sediment OHMPCs	Major Risk Conclusions	No Significant Risk?	Do Site Conditions Meet ASAS?
				Medium and Data Range	Chemical	Soil/ Sediment Toxicity Testing	Tissue	Macro invertebrate Survey	Habitat Survey	Background/ Reference/Local Conditions						
1991 Human Health and Environmental Risk Evaluation	Sustainability (survival, growth, reproduction) of local populations of aquatic organisms (e.g. aquatic plants, macroinvertebrates, fish) in surface water.	Comparison of concentrations OHMPCs in surface water to freshwater ambient water quality criteria (AWQC).	East Ditch	Surface Water (1988-1989)	X				X	X	--	Ammonia	--	No incremental risk above background.	Yes	N/A
			South Ditch		X				X	X	--	Ammonia, sulfate	--	Risk from ammonia above background	Yes	N/A
			West Ditch (On-Property)		X				X	X	--	Chloride	--	No incremental risk above background.	Yes	N/A
1993 Screening Level Environmental Risk Assessment	Survival, growth, and reproduction of terrestrial receptors (ex. small mammals, birds, reptiles).	Comparison of concentrations of qualitatively selected soil OHMPCs to literature-based acute and chronic effects concentrations.	General Facility Terrestrial Habitat	Soil (1991)	X				X		BEHP, DDE, Endosulfan II, a-chlordane, Cr	--	--	No soil benchmarks were identified. Qualitative evaluation speculated that pesticide, BEHP and Cr were important; risk from these chemicals quantitatively analyzed in subsequent risk assessments.	N/A (Qualitative Evaluation)	N/A
	Survival, growth, and reproduction of benthic receptors (ex. benthic macroinvertebrates).	Comparison of EPCs to sediment screening values indicative of potential effects. Calculate HQs based on maximum and average (arithmetic mean) concentrations for each exposure area. Sum all HQs to derive a total HI.	East Ditch Near Site	Surface Water (1992-1993)	X						--	Endrin aldehyde, ammonia	Endrin aldehyde	Natural physical factors including low flow, low dissolved oxygen, and seasonally elevated water temperature, and scarcity of aquatic vegetation development of a diverse aquatic community and is not expected.	No	No
	Survival, growth, and reproduction of semi-aquatic receptors (ex. amphibians, waterfowl).	Comparison of concentrations of qualitatively selected surface water and sediment OHMPCs to literature-based acute and chronic effects concentrations.	East Ditch Downstream		X						--	Ammonia	Pesticides, As, Cd, Cr, Cu, Pb	Off-site migration of surface water and sediment OHMPCs may have occurred.	No	No
	Survival, growth, and reproduction of terrestrial receptors (ex. small mammals, birds, reptiles).	Comparison of concentrations of qualitatively selected soil OHMPCs to literature-based acute and chronic effects concentrations.	South Ditch		X						--	Al, Ammonia	Pesticides, Cr	Sediment HQs generally one order of magnitude higher than surface water HQs.	No	No
			Central Pond		X						--	Ammonia	Cr		No	No
			On-Property West Ditch		X						--		Pesticides, Cr	There is another potential source of chemicals to the East Ditch in addition to the facility.	No	No
			Off-Property West Ditch		X						--	Pesticides, Al, Cr, Hg, ammonia			No	No
			Ephemeral (Unnamed) Drainage		X							Al, Pb, Hg	Dieldrin		No	No
1997 Stage II ERC	Reduction in resident terrestrial invertebrate population size.	Use subchronic toxicity tests with growth and mortality endpoints to measure impacts to earthworms in study area and reference soil samples.	On-Facility Terrestrial Habitat	Soil (1991; 1996-1997)	X	X	X		X	X	None	--	--	No statistically significant mortality in soil samples versus reference. No significant risk of harm to terrestrial receptors though food chain ingestion or indirect effects form reduced prey abundance.	Yes	No
		Using toxicity test results, run a population model to determine if adverse effects might result in more than a 25% decrease in earthworm abundance.	On-Property West Ditch	Surface Water (1992; 1995-1996); Sediment (1992; 1995; 1997)	X	X	X		X	X	--	Al, Cr, Cr (VI), Fe, ammonia	--	No Significant Risk of Harm from surface water and sediment to semi-aquatic receptors (green heron).	No	No
		Compare of soil EPCs to published earthworm TRVs.	Off-Property West Ditch		X	X	X		X	X	--	Zn	--	Potential risk to amphibians due primarily to di-n-octyl-phthalate, chromium, and ammonia in surface water.	No	No
	Reduction in resident amphibian population size.	Use FETAX tests with mortality and malformation to measure impacts to amphibians (green frog, *Rana clamitans*) in study area and reference sediment samples.	South Ditch		X	X	X		X	X	--	Ammonia, di-n-octylphthalate, Cr, Cr (VI)	--	FETAX tests demonstrated some toxicity versus reference at the On-Property West Ditch.	No	No
		Perform dilution study to derive LC-50, EC-50, IC-50, IC-25, and ANOEC to develop concentration-response curves.	Central Pond		X	X	X		X	X	--	Al	--	Amphibian population model predicted a greater than 25% reduction only at On-Property West Ditch.	No	No
		Using toxicity test results, run a population model to determine if adverse effects might result in more than a 25% decrease in green frog abundance.	Ephemeral Drainage		X				X	X	--	Di-n-octylphthalate, Cr	--	No fish species observed.	No	No
		Compare surface water EPCs to published amphibian TRVs.														
	Reduction in semi-aquatic receptor subpopulation size.	Quantify the average daily exposures to OHMPC in green heron (*Butorides striatus*) through food chain modeling using measured prey tissue concentrations (i.e. small mammal, crayfish, and frog) and compare modeled exposures to published values indicative of potential impairment using HQs and HIs.														
		Use frog population model to determine if decrease in prey abundance (greater than 50%) might indirectly affect semi-aquatic receptor populations.														
	Reduction in terrestrial bird subpopulation size.	Quantify the average daily exposure to OHMPC in woodcock (*Scolopax minor*) through food chain modeling using measured prey tissue concentrations (i.e. plant and earthworms) and compare modeled exposures to published TRVs indicative of potential impairment using HQs and HIs.														
		Use earthworm population model to determine if decreases in prey abundance (greater than 50%) might indirectly affect terrestrial bird populations.														
	Reduction in mammal subpopulation size.	Quantify the average daily exposure to OHMPC in red fox (*Vulpes vulpes* , through food chain modeling using measured prey tissue concentrations (small mammal, bird, plant, earthworm, and amphibian) and compare modeled exposures to published TRVs indicative of potential impairment using HQs and HIs.														

Table 6.2-1
Risk Matrix: Summary of Ecological Risk Evaluations Performed for the 51 Eames Street Site

Draft Focused Remedial Investigation Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Document Title	Assessment Endpoint	Measurement Endpoint	Exposure Area	Data Type							Important Soil OHMPCs	Important Surface Water OHMPCs	Important Sediment OHMPCs	Major Risk Conclusions	No Significant Risk?	Do Site Conditions Meet ASAS?
				Medium and Data Range	Chemical	Soil/ Sediment Toxicity Testing	Tissue	Macro invertebrate Survey	Habitat Survey	Background/ Reference/Local Conditions						
2000 Focused Risk Assessment	Reduction in green heron subpopulation size from food chai exposure and decreased prey abundance.	Estimated by comparing published avian ingestion toxicity data to predicted dietar exposures based on measured prey (i.e. small mammal, crayfish and frog) tissue concentrations.	Terrestrial Habitat (after proposed construction of a warehouse)	Soil	X						Cr	--	--	No risk form soil for fox. Al was the only soil analyte with an HQ>1 (1.4) In woodcock Cr HQ >1 based on comparison to benchmark, but toxicity tests showed no mortality.	Yes	Yes
		Based on frog population modeling and measured laboratory toxicity tests.	South Ditch	Sediment (1992; 1995; 1997)	X						--	--	None	HIs for green heron in South Ditch and Ephemeral Drainage <1.	Yes	Yes
	Reduction in woodcock subpopulation size from food chain exposure and reduction in woodcock subpopulation size from decreased prey abundance.	Estimated by comparing published avian ingestion toxicity data to predicted dietar exposures based on measured prey (i.e., earthworms) tissue concentrations.	Ephemeral Drainage		X						--	--	None		Yes	Yes
		Based on earthworm (*Eisenia foetida*) population modeling and measured laboratory toxicity tests.														
	Reduction in red fox subpopulation size.	Estimated by comparing published mammalian ingestion toxicity data to predicted dietary exposures based on measured prey (i.e., small mammals) tissue concentrations.														
September 1998 Imminent Hazard Evaluation	Imminent Hazard Analysis.	Evaluation of whether there was readily apparent of impacts to ecological receptors due to flocculent in the South Ditch.	South Ditch	Surface Water; Sediment					X		--	--	--	No visible sings of biological stress. OHMPCs associated with floc is unlikely to produce an immediate or acute adverse impact to freshwater organisms under any circumstance.	No Imminent Hazard	N/A
December 2000 Imminent Hazard Evaluation	Imminent Hazard Analysis.	Evaluation of whether there was readily apparent of impacts from ammonia and chromium to ecological receptors following a release of shallow groundwater to South Ditch	South Ditch	Surface Water; Sediment					X		--	--	--	No visible signs of biological stress.	No Imminent Hazard	N/A
	Imminent Hazard Analysis.	Evaluation of whether there was readily apparent of impacts to ecological receptors in East Ditch.	East Ditch	Surface Water; Sediment	X				X		--	--	--	No visible signs of biological stress. No adverse impacts to potential fish populations in East Ditch.	No Imminent Hazard	N/A
December 2001 Imminent Hazard Evaluation	Imminent Hazard Analysis.	Evaluation of whether there was readily apparent to ecological receptors following a release of shallow groundwater to South Ditch	South Ditch	Surface Water					X		--	--	--	No visible signs of biological stress. No observed fish kills because fish do not inhabit South Ditch.	No Imminent Hazard	N/A
2005 Updated Risk Assessment	Imminent Hazard Analysis.	Evaluation of whether increasing ammonia concentrations were posing an imminer hazard.	South Ditch	Surface Water (2003 -2005)	X				X (Weekly inspections from 1997-2005)		--	--	--	No readily apparent harm. No fish kills observed; no fish have ever been observed in South Ditch.	No Imminent Hazard	N/A
2005 Updated Risk Assessment	Substantial Hazard Analysis.	N/A	South Ditch								--	--	--	No substantial hazard exists because interim and permanent measures have been implemented to mitigate potential effects, as required by the MCP.	No Substantial Hazard	N/A
2005 Updated Risk Assessment	Protection and maintenance of aquatic life.	Comparison of maximum and average exposure point concentrations (EPCs) in surface water to screening benchmarks.	South Ditch	Surface Water (2003-2005); Sediment 2003-2004)	X						--	Al, Cr, ammonia, chloride, sulfate	Fe, Zn	Low to moderate risk to aquatic receptors from surface water concentrations of ammonia, and low risk from Cr and Al. Concentrations of Fe and Zn in sediment were higher than concentrations in FETAX tests form the 1997 Stage II ERC, so no risk conclusions could be made regarding zinc and iron. The risk evaluation for semi-aquatic wildlife was inconclusive.	Yes	No
	Protection and maintenance of amphibian populations.	Comparison of maximum and average surface water EPCs to amphibian toxicity reference values (TRVs).														
		Comparison of maximum sediment EPCs to sediment concentrations associated with no significant toxicity in the 1997 Stage II ERC FETAX assay.														
	Protection and maintenance of semi-aquatic wildlife.	Qualitatively evaluated by comparing maximum and average EPCs to sediment concentrations evaluated in the South Ditch as part of the 1997 Stage II ERC associated with no significant risk of harm to wildlife.														
2004 Focused ERC	Protection and maintenance of aquatic invertebrate communities.	Compare OHMPC exposure point concentrations (EPCs) to screening benchmarks for surface water and sediment .	East Ditch	Surface Water and Sediment (2003-2004)	X			X (2003)		X	--	Ammonia	None	No significant risk to macroinvertebrate community, amphibian population, or wildlife. Ammonia concentrations above AWQC; AWQC is based on cold water species and the exposure area is not suitable for sensitive (i.e. cold-water) species so risks to fish are overestimated. ASAS exceeded.	Yes	No
		Conduct quantitative benthic community survey .														
	Protection and maintenance of amphibian population.	Compare OHMPC EPCs to screening benchmarks for surface water and sediment.	New Boston Street Drainway		X						--	None	None		Yes	No
		Compare sediment concentrations to effects concentrations derived using 1997 ERC FETAX studies (mortality or developmental effects).														
		Qualitative amphibian survey (site vs. background).														
	Protection and maintenance of fish and aquatic plant populations .	Qualitatively evaluated by comparing average detected concentrations of OHMPC in sediment and surface water to screening benchmarks.														
	Protection and maintenance of wildlife populations.	Qualitatively evaluated by comparing the sediment chemistry in the Lower NBSD to sediment chemistry in the South Ditch where results of the 1997 ERC supported a conclusion of no significant risk to wildlife.														
Phase II Focused Environmental Risk Characterization Addendum August 5, 2005	Protection of aquatic receptors.	Compare exposure point concentrations (EPCs) to surface water screening benchmarks.	New Boston Street Drainway	Surface Water (2004-2005)	X					X	--	None	--	Concentrations of ammonia similar to background. PAH concentrations suggest there are other sources to the NBSD in addition to the Facility. Conclusions consistent with the 2004 Focused ERC, therefore a condition of no significant risk exists.	Yes	No
	Protection of amphibian population.	Compare EPCs to surface water screening benchmarks.														

Table 6.2-1
Risk Matrix: Summary of Ecological Risk Evaluations Performed for the 51 Eames Street Site

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2003 Off-Property West Ditch Update	Protection of the aquatic community (pants, invertebrates).	Compare surface water EPCs to AWQC.	Off-Property West Ditch	Surface water (2002-2003); Sediment (2003); Groundwater (1986-2000)	X						--	Al, Cu, Pb, Fe, Zn, ammonia, alkalinity	None	NDMA below water quality criterion. Maximum surface water concentrations of copper and zinc above AWQC. Sulfate above UCLs in shallow groundwater. Al, Ca, Cr, Co, Cu, Fe, Mn, Mg, Ni, Si, Na, ammonia, chloride, and sulfate in deep groundwater above UCLs.	Yes	No
		Compare surface water EPCs to published amphibian TRVs.														
		Compare sediment EPCs from Off Property West Ditch samples collected in 2003 to sediment EPCs evaluated in the 1997 ERC which showed no significant risk of harm.														
		Compare shallow groundwater concentrations of aluminum, ammonia, calcium, chloride, iron, magnesium, manganese, sodium, and sulfate to the default UCL of mg/L which was promulgated in 1999.														
		Compare concentrations of OHMPC detected in deep groundwater to UCLs.														
	Reduction in resident amphibian population size.	Compare surface water EPCs to AWQC.														
		Compare surface water EPCs to published amphibian TRVs.														
		Compare sediment EPCs from Off Property West Ditch samples collected in 2003 to sediment EPCs evaluated in the 1997 ERC which showed no significant risk of harm.														
		Compare shallow groundwater concentrations of aluminum, ammonia, calcium, chloride, iron, magnesium, manganese, sodium, and sulfate to the default UCL of mg/L which was promulgated in 1999.														
	Reduction in semi-aquatic receptor subpopulation size.	Compare sediment EPCs from Off Property West Ditch samples collected in 2003 to sediment EPCs evaluated in the 1997 ERC food chain models which showed no significant risk of harm to green heron (*Butorides striatus*).														
2002 Stage I ERC for Maple Meadow Brook	Sustainability (survival, growth, reproduction) of local populations of benthic macroinvertebrates in sediment.	Comparison of sediment concentrations to sediment quality benchmarks.	Maple Meadow Brook	Surface Water (2001-2002); Sediment (2001-2002), Groundwater (1992-2002)	X	X			X		--	--	--	No OHMPCs in surface water or sediment posed risk to aquatic organisms. No hotspots identified in shallow wells (<60 feet bgs). Six deep (greater than 60 feet bgs) groundwater hotspots were identified in deep wells; OHMPCs include: Ca, Fe, Ni, Mg, Mn, Si, K, Na, ammonia, chloride sulfate,	Yes (Surface water and sediment) No (groundwater)	Yes No
	Sustainability (survival, growth, reproduction) of local populations of aquatic organisms (e.g. aquatic plants, macroinvertebrates, fish) in surface water.	Comparison of surface water concentrations to surface water quality benchmarks.														
		Comparison of shallow groundwater concentrations to groundwater UCLs and surface water criteria.														
		Identification of groundwater hot-spots at all well depths and comparison of concentrations to UCLs.														

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