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# FIVE-YEAR REVIEW REPORT

## Fourth Five-Year Review Report

For the

## McKin Company Superfund Site

Gray

Cumberland County, Maine

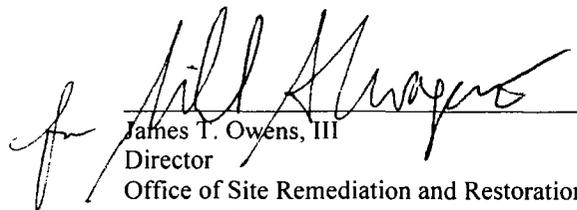
September 2008

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9-30-08

# Five-Year Review Report

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## List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
DNAPL	Dense, Non-Aqueous Phase Liquids
FYR	Five-Year Review
GETS	Groundwater extraction and treatment system
IC	Institutional control
ICZ	Institutional control zone
LTMP	Long-Term Monitoring Plan
MCL	Maximum Contaminant Level
MEDEP	Maine Department of Environmental Protection
MEG	Maine Maximum Exposure Guideline
Mg/kg	Milligrams per Kilogram
MW	Monitoring well
NCP	National Contingency Plan
NPL	National Priorities List
OU	Operable Unit
PPB	Parts Per Billion
PPM	Parts Per Million
PCE	Tetrachloroethylene
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SP	Settling Parties
SWQC	State Water Quality Criteria
TCA	1,1,1-trichloroethane
TCE	Trichloroethylene
VOC	Volatile Organic Compound
µg/L	Micrograms per Liter

## Executive Summary

A five-year review was performed for the McKin Site in Gray, Maine. The five-year review is required by CERCLA when hazardous waste is left onsite above levels that allow for unlimited use and unrestricted exposure. The purpose of the five-year review is to assess whether the remedy selected for the Site remains protective of human health and the environment. This is the fourth five-year review for the Site.

The Site was operated as a collection and transfer station and disposal facility for waste oil and industrial process waste from 1965-1977. In 1978, sixteen private wells were capped due to VOC contamination, and the town's public water system was extended to East Gray. Between 1979 and 1983, MEDEP conducted a removal of liquid wastes, drums, solid materials and soil. A Record of Decision (ROD) was signed in 1985 that included components for the contaminated soil on the McKin property and for the contaminated groundwater. The remedy included thermal treatment of soils, drum disposal, construction of a groundwater extraction, treatment and surface water discharge system (GETS), groundwater monitoring, and site closure activities. In 1987, the Settling Parties submitted a site remediation and closure report to EPA and MEDEP that summarized the soil remedy and site closure. The on-site component of the remedial action was completed with the submittal of these reports.

The GETS was constructed in 1990, and operated until October 1995 when EPA and MEDEP agreed to a shutdown of the system while a technical impracticability evaluation was performed. The agencies and the Settling Parties were unable to reach a consensus regarding groundwater restoration, so in 1997, the parties entered into a mediation process. This process was expanded to include the Town of Gray, Gray Water District, a community group funded by EPA, and other interested parties. The result was an Amended ROD in 2001 that modified the groundwater remedy to waive groundwater cleanup standards, require institutional controls on properties within a defined area impacted by the groundwater (Institutional Control Zone), increased long-term monitoring with a contingency response for surface water, and actions to address contamination as it reaches surface water in the Boiling Springs area. This amendment was made with the understanding of all the parties that the timeframe to meet drinking water standards in groundwater through natural processes was estimated to be up to fifty years.

The institutional controls included a town ordinance to prevent use of the groundwater within the Institutional Control Zone, restrictive covenants for nineteen sub-dividable properties, conservation easements for two properties to protect against future development along reaches of Collyer Brook, and a restrictive covenant on the McKin property. Additionally there were two separate agreements between the Settling Parties and the Town of Gray and the Gray Water District that required payment by the Settling Parties to these parties for expansion of the public water system and reimbursement for the Town's involvement in the mediation process and development of the town ordinance. The long-term monitoring included additional monitoring, increased surface water monitoring in 2009 and 2013, installation of wells along the interpreted perimeter of the plume, data evaluation to confirm decreasing contaminant concentrations, and a refinement of the estimated timeframe to meet federal and state standards. The modified remedy also included an engineered cover for the Boiling Springs area, an area within the Royal River floodplain where contaminated groundwater discharged to the ground surface as springs. The engineered cover was completed in September 2000.

As noted in the previous five-year review, the Town of Gray adopted a Groundwater Ordinance on January 22, 2002, nineteen property owners signed restrictive covenants for their properties, and two property owners signed conservation easements for their properties that border Collyer Brook. Surface

water and groundwater monitoring is being conducted by the Settling Parties in accordance with the long-term monitoring plan.

According to data reviewed, observations from the site inspection, and interviews, the remedies have generally been implemented in accordance with the requirements of the 1985 ROD and 2001 Amended ROD. The source control portion of the remedy is complete. Implementation of institutional controls has thus far ensured the integrity of the remedial measures conducted at the Site, and prevented exposure to site contaminants contained in groundwater. All homes within the Institutional Control Zone are supplied with water from the Gray Water District. Groundwater and surface water monitoring continue in accordance with the long-term monitoring plan as specified in the Amended ROD. Also, in 2009 and 2013 additional surface water monitoring is to be conducted at two locations in the Royal River. Regression analysis of groundwater data through 2007 indicates the drinking water standards may be attained more quickly than was originally calculated during the mediation process.

Two components of the 2001 remedy have yet to be implemented according to the approved schedule: a new series of wells (900-series wells) originally required to provide assurance regarding the lateral extent of the groundwater contamination have not been installed and institutional controls on the McKin property.

Additionally, since the 2001 Amended ROD, EPA issued a draft guidance dealing with the vapor intrusion pathway. EPA is in the midst of investigating the nature and extent of this exposure pathway. The preliminary data does not allow for eliminating this pathway and further work is planned.

#### Five-Year Review Protectiveness Statement

The on-site remedy (OU1) at the McKin Company Superfund Site currently protects human health and the environment because the soil remediation is complete and the Town of Gray ordinance and other institutional controls prohibit the use of groundwater. However, in order for the remedy to be protective in the long-term, institutional controls are needed on the McKin property. In addition, the approved site closure activities (decommissioning of monitoring wells, infiltration galleries, decontamination pad and removal of all equipment) to prevent accidental exposure to the groundwater need to be implemented.

The off-site groundwater remedy (OU2) at the McKin Company Superfund Site currently protects human health and the environment because the Town of Gray ordinance prohibits the use of groundwater and other institutional controls are in place. The remedy will remain protective as long as the institutional controls are monitored, maintained, and if necessary, enforced. Without the installation of the 900-series wells that would provide bedrock data, it is expected that the institutional controls will need to remain in place beyond the predicted attainment of federal and state drinking water standards for the overburden groundwater by 2036.

No remedy has been selected to address the vapor intrusion pathway, and thus, a protectiveness determination for this pathway cannot be made until further information is obtained.

The remedial actions at OU1 are protective; however, because a protectiveness determination cannot be made at this time for OU2, the protectiveness of human health for the entire site is deferred. The following actions need to be taken to ensure protectiveness: complete the second phase of the vapor intrusion investigation; determine whether further investigation is necessary, and then perform a final risk assessment of the vapor intrusion data. It is expected that the second phase activities will be completed by the end of 2008, and any further investigation and risk assessment by summer 2009.

# Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): McKin Company		
EPA ID (from WasteLAN): MED980524078		
Region: 1	State: ME	City/County: Cumberland
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: 3/24/1992	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Authors' names: Marisa Guarinello and Terry Connelly		
Author title: Environmental Specialist and RPM	Author affiliation: U.S. EPA- Region 1	
Review period:** 5/2/2008 to 9/30/2008		
Date(s) of site inspection: 6/26/ and 9/4/2008		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input checked="" type="checkbox"/> Other (specify) :4 <sup>th</sup>		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Actual RA Start at OU# _____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 09/22/2003		
Due date (five years after triggering action date): 9/22/2008		

\* ["OU" refers to operable unit.]

## **Five-Year Review Summary Form cont'd.**

### **Issues:**

Vapor intrusion studies have identified vapor intrusion into residential homes as a probable source of exposure to site-related contaminants.

Restrictive covenant has not been obtained for the McKin property.

Installation of the 900-series wells has not occurred because access has not been secured.

Implemented ICs do not have formal compliance monitoring program

### **Recommendations and Follow-up Actions:**

Determine appropriate response action for vapor intrusion pathway.

Investigate other options for institutional controls on the McKin property.

Determine whether 900-series wells are still necessary, and if so, develop new strategy to address access issues.

Determine appropriate response action for IC compliance monitoring program

### **Protectiveness Statement(s):**

The on-site remedy (OU1) at the McKin Company Superfund Site currently protects human health and the environment because the soil remediation is complete and the Town of Gray ordinance and other institutional controls prohibit the use of groundwater. However, in order for the remedy to be protective in the long-term, institutional controls are needed on the McKin property. In addition, the approved site closure activities (decommissioning of monitoring wells, infiltration galleries, decontamination pad and removal of all equipment) to prevent accidental exposure to the groundwater need to be implemented.

The off-site groundwater remedy (OU2) at the McKin Company Superfund Site currently protects human health and the environment because the Town of Gray ordinance prohibits the use of groundwater and other institutional controls are in place. The remedy will remain protective as long as the institutional controls are monitored, maintained, and if necessary, enforced. Without the installation of the 900-series wells that would provide bedrock data, it is expected that the institutional controls will need to remain in place beyond the predicted attainment of federal and state drinking water standards for the overburden groundwater by 2036.

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The remedial actions at OU1 are protective; however, because a protectiveness determination cannot be made at this time for OU2, the protectiveness of human health for the entire site is deferred. The following actions need to be taken to ensure protectiveness: complete the second phase of the vapor intrusion investigation; determine whether further investigation is necessary, and then perform a final risk assessment of the vapor intrusion data. It is expected that the second phase activities will be completed by the end of 2008, and any further investigation and risk assessment by summer 2009.

### **Other Comments:**

When describing the remedy, the 1985 ROD used the terms "on-site" to refer to the soil contamination on the McKin property and "off-site" to refer to the groundwater contamination. This usage is contrary to CERCLA's usage of "site" that refers to the entire area where contamination has come to be located and not just the original release or discharge property. For consistency, the terms on-site and off-site have continued to be used for this site and administratively, EPA has managed this site as having two operable units.

# Five-Year Review Report

## 1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA)-Region 1 conducted the fourth five-year review (FYR) of the McKin Company Superfund Site (Site) in Gray, Maine. The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of these reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

EPA is preparing this Five-Year Review Report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

This review was conducted from May through September 2008. The FYR included consultation with the Maine Department of Environmental Protection (MEDEP), the Settling Parties (SP) consultant, the Town of Gray, and the Gray Water District. This report documents the results of the review.

The Site achieved the construction completion milestone with the signing of the Preliminary Close-Out Report on March 24, 1992. The triggering action for this review is the date of the previous FYR, September 22, 2003. This statutory review is required because hazardous substances, pollutants, or contaminants remain on-site above levels that allow for unlimited use and unrestricted exposure.

## 2.0 SITE CHRONOLOGY

### Chronology of Site Events

Event	Date
The McKin Company began operations to store and dispose of liquid wastes	1965
The facility was expanded. An asphalt-lined lagoon and incinerator were added	1972
East Gray residents reported odors in well water and discoloration of laundry.	1973-1974
EPA confirmed contamination had impacted private wells	1977
Town of Gray ordered the McKin Company to cease operations and issued an Emergency Health Ordinance placing a moratorium on new construction near the Site.	1977
Residents were connected to the extended public water system	1978
MEDEP removed 33,500 gallons of wastes and 165 drums of oils and chemicals	1979-1980
MEDEP cleaned and removed the remaining above ground tanks	1983
EPA and MEDEP signed a Cooperative Agreement designating the Site as a state-lead cleanup	1983
Interim Remedial Measure activities began, with MEDEP oversight	August 1983
Site listed on EPA's National Priority List	September 1, 1983
Remedial Investigation and Feasibility Study Report (RI/FS) completed by Potentially Responsible Parties (PRPs)	July 1985
Record of Decision (ROD) signed	July 22, 1985
EPA issued an Administrative Order with two PRPs to conduct a soil aeration pilot study.	August 1985
MEDEP designated the Site an State Uncontrolled Hazardous Substance Site	November 1985

### Chronology of Site Events

14 PRPs conduct soil aeration treatment under an Administrative Order. VOC and petroleum-contaminated soils were excavated and treated on-site by soil aeration	July 8, 1986-April 17, 1987
Site demobilization and final closure completed	June 23, 1987
“Soil Remediation and Site Closure Report” submitted by the PRPs	July 1987
Consent Decree signed by EPA, the State and over 320 PRPs entered in U.S. District Court, District of Maine	November 21, 1988
Settling Parties (SP) * submitted work plans for the groundwater cleanup.	December 1988
EPA and MEDEP approve SP “Hydrogeologic Investigation, DEP-8 Study Area Remediation and Pilot-Scale Treatability Study”	December 1989
SP submit “Groundwater Extraction and Treatment System Design Report”	December 1989
EPA issues an Explanation of Significant Differences, changing the method of treated groundwater discharge from surface water discharge to reinjection into the ground	1990
EPA and MEDEP approve the Phase I groundwater extraction and treatment system (GETS) design	June 1990
GETS construction completed	September 30, 1990
EPA certifies the GETS as fully operational	October 10, 1990
Phase I GETS operation official start date following completion of a treatability study	April 15, 1991
First FYR	September 22, 1992
SP submit “Revised Interim Groundwater Extraction and Treatment System Report”	October 1992
SP submit a report concluding that expansion of the GETS to the east side of Mayall Road would not restore the overburden aquifer within 200 years	July 1993
EPA and MEDEP approve a temporary shutdown of the GETS	October 1995
SP submit a Technical Impracticability Evaluation	October 31, 1995

### Chronology of Site Events

SP submit a revised Technical Impracticability Evaluation	March 1996
Mediation process involving EPA, MEDEP, SP, Town of Gray, Gray Water District, citizen groups, and other interested parties occurs to resolve approach to groundwater contamination	June 1997 – November 1999
Focused field investigations by EPA and the SP	Winter/Spring 1998
Second FYR	September 30, 1998
Boiling Springs cover installed by EPA	September 2000
Memorandum of Understanding signed by EPA, MEDEP, SP, Town of Gray, and Gray Water District	November 2000
Amended ROD signed	March 30, 2001
SP submit final Long-Term Monitoring Plan (LTMP) to EPA and MEDEP	April 25, 2001
Amendment to Consent Decree entered into U.S. District Court, New Hampshire	December 7, 2001
GETS permanently shut down	December 7, 2001
Town of Gray Groundwater Ordinance adopted	January 22, 2002
Two conservation easements recorded	January 2002
SP' Project Operations Plan for LTMP approved by the agencies	October 2002
Recorded copies of the 19 Restrictive Covenants received by agencies	June 25, 2003
Third FYR	September 22, 2003
Phase I vapor intrusion study (soil gas, roadways)	June 2006
Phase II vapor intrusion study begun (residential)	June 2008

\* Settling Parties are a subgroup of the PRPs that signed the 1988 Consent Decree and were responsible for the performance of the remedial activities. The remaining PRPs signed the Consent Decree as Premium Settling Entities that completed their involvement with the Site

### **3.0 BACKGROUND**

The McKin Superfund Site is located in Gray, Maine, approximately 15 miles north of Portland, Maine (Figure 1). The McKin property comprises an area of approximately seven acres located on the west side of Mayall Road. The Site is composed of areas both presently and potentially impacted by contamination from the McKin property, and is bounded roughly as follows:

- On the south by Yarmouth Road from Depot Road to Mayall Road and a line from the southern terminus of Mayall Road running east to the Royal River;
- On the east by the Royal River;
- On the north by Collyer Brook; and
- On the west by a line from the intersection of Collyer Brook with Merrill Road and closing at the intersection of Depot Road and Yarmouth Road.

Based on observed contaminant distribution, the Site also extends north of Collyer Brook at its confluence with Royal River, and east just beyond the Royal River at the river bend due east of the McKin property. In total, it is estimated that the Site consists of approximately 660 acres of residential, farm and wooded properties (Figure 2).

#### **3.1 Physical Characteristics**

The topography of the McKin property has been modified by past excavations; the fenced enclosure was formerly a gravel pit with steep slopes on the west, south, and north sides. At-grade access to the property is from Mayall Road. The topography at the Site ranges from 300 feet above mean sea level (MSL) at the McKin property to approximately 90 feet MSL at the floodplain of the Royal River, a horizontal distance of about 3,700 feet. The topography west of the McKin property, in the Depot Road vicinity is relatively flat. East of Mayall Road, the land slopes downward to the floodplain of the Royal River. Flooding of this area occurs in winter, early spring, and summer months following periods of heavy rainfall. Wetland areas are interspersed in the floodplain in eroded channels and depressions. The land surface is dissected by a number of small unnamed streams, and associated gullies. The resulting topography is frequently very steep, and access can be difficult.

The geology of the Site reflects both the topography of the bedrock and the deposition of marine and glacial materials. The former McKin facility is situated on a relative bedrock high point, with bedrock sloping downward both to the north (toward Collyer Brook) and to the east (toward Royal River). Bedrock at the Site is identified as granite of the Sebago Pluton. The bedrock is encountered at a depth of 50 to 100 feet below the ground surface at the eastern edge of the glaciomarine delta and almost 200 feet below the ground surface near the Royal River. A single bedrock outcrop has been identified approximately 800 feet southeast of the former McKin facility, in the bed of an unnamed tributary to the Royal River. Core samples indicate that bedrock is generally fractured, but competent (unweathered). A bedrock trough runs from the junction of Mayall and Depot Roads southeasterly toward the Royal River. A second trough, a former river bed, is located just west of the Royal River, trends in a southerly direction. TCE concentrations in certain monitoring wells (e.g. GWD-2) suggest groundwater from the McKin property is transported via bedrock fractures in the east-northeast direction.

The surficial material overlying the bedrock include glacial till, fine-grain sand, silt, and clay (Presumpscot Formation), and sand and gravel units. These glaciomarine materials thicken from the McKin property toward the Royal River and Collyer Brook. Beneath the McKin property, the sand and gravel directly overlie the bedrock and is approximately 60-100 feet thick. East of Mayall Road, there is a relatively thin layer of glacial till between the bedrock and the sand and gravel and the Presumpscot overlies the sand and gravel. Alluvial deposits (water-borne) occur farther east, along the floodplain of the Royal River, Collyer Brook, and the unnamed tributary that enters the Royal River upstream of the railroad trestle. The alluvial deposits consist of silt, sand, gravel, and widely disseminated organic matter.

Contaminated groundwater discharges to the Royal River along a 500-700 feet reach of the floodplain between Boiling Springs and the railroad trestle in a fairly level area extending 50-70 feet back from the banks of the river. Water level data show a drop in groundwater elevation of about 200 feet from the McKin facility to the Royal River floodplain. Groundwater is recharged by infiltration of precipitation above an elevation of 240 feet and by leakage from the Presumpscot Formation. The direction of groundwater flow is generally from west to east toward the Royal River. Vertical upward gradients along the Royal River, and the presence of contaminants in the river that are the same as those in the groundwater plume, indicate groundwater from the Site discharges to the Royal River.

### **3.2 Land and Resource Use**

The McKin Company property encompasses approximately seven acres; approximately 4.5 acres are cleared, and the remainder is wooded. The property is located in the eastern, rural part of Gray. Properties contiguous to the McKin property include residential areas, wooded areas, and farmland. The nearest residences are immediately north and west of the McKin property; the closest home is approximately 200 feet from the McKin property.

The site vicinity remains generally rural. According to the 2000 census, the population of the Town of Gray was 6,839. The population of the Town of Gray has increased approximately 15 percent between 1990 and 2000 and is forecast to increase approximately 11 percent between 2000 and 2010 according to the Maine State Planning Office. Private water supply wells surrounding the McKin property used both the surficial overburden aquifer and bedrock aquifer until some of the wells were contaminated in the 1970s. Public water supply was extended to the area in 1978 and is now available to the entire area around the Site.

One of the outcomes of the 1997 - 1999 mediation process was the adoption of a groundwater ordinance by the town. The Groundwater Ordinance of the Town of Gray, Maine, Chapter 404, was adopted January 22, 2002, to protect the health, safety and general welfare of residents via an Institutional Control Zone (ICZ) and also prohibit the removal and any use of groundwater from areas within the ICZ. The prohibition on groundwater use is intended to prevent exposure to contaminated groundwater until the groundwater attains Maine drinking water standards. At the time the ordinance was adopted, the ICZ included 124 properties.

The Town finalized a Comprehensive Plan for land use in 2005. A review of the current zoning map shows that the McKin facility proper and most of the area around the Site remains zoned as a Rural Residential and Agricultural (RRA) district. The RRA district covers those areas of Gray that are the most sparsely populated and rural. The RRA zoning regulations emphasize low density development to retain and enhance the existing rural and open space environment in the district (Gray Zoning Regulations, Section 402.20). There is also an Aquifer Overlay Zone with requirements in addition to the underlying zoning (e.g. RRA). Any land use, construction of any type, within the Aquifer Overlay Zone must adhere

to these requirements, including permitted and allowable uses and prohibited activities, to protect groundwater resources and preserve the resource for present and future use (Gray Zoning Regulations, Section 402.23).

There have been no significant changes in land and resource use since the 2003 five-year review. Three of the larger parcels have divided off house lots, creating an additional three house lots west of the Royal River and three east of the river. All of these new properties are connected to the Gray Water District system.

### **3.3 History of Contamination**

The McKin facility operated from 1965 to 1977 as a collection and transfer station and disposal facility for waste oil and industrial process waste. In 1972, the facility was expanded with the addition of an asphalt-lined lagoon and incinerator to process a large volume of oily waste from an oil spill in Hussey Sound (a shipping channel leading into Portland harbor). The incinerator operated under a permit from MEDEP until operations ceased about 1973. Most of the oily wastes were stored in the on-site lagoon. This lagoon reportedly leaked and discharged portions of its contents to the subsurface. The facility reportedly handled an estimated 100,000 to 200,000 gallons of waste annually between 1972 and 1977.

During 1973 and 1974, local residents reported chemical odors in their well water and discoloration of their laundry. Investigations subsequently found solvents in site soils and groundwater. Volatile organic compounds (VOCs) from the facility contaminated local residential wells through migrating groundwater. In 1977, the solvents were identified as trichloroethene (TCE) and 1,1,1-trichloroethane (TCA), and the Town of Gray ordered the McKin Company to cease operations.

### **3.4 Initial Response**

In December 1977, 16 private water supply wells were capped and water was trucked in on an emergency basis. In 1978, residents were connected to the public water system which had by then been extended to the eastern part of Gray.

During the summer of 1979, MEDEP removed 33,500 gallons of liquid waste from the McKin property. MEDEP entered into a cooperative agreement with EPA in June 1983 to implement initial remedial measures and conduct an RI/FS. During 1983, MEDEP removed 69 drums of solidified sludge, 18 cubic yards of solid materials, and 10,500 cubic yards of soil from the property. These activities were undertaken to remove potential sources of contamination from the Site. The Site was placed on the National Priority List (NPL) on September 1, 1983.

In 1984, the RI/FS began. The RI was completed in February 1985 and the FS in March 1985. The RI identified specific areas of soil contamination on the McKin property as the source of groundwater contamination. Groundwater contamination in both the surficial and bedrock aquifers was also identified in the RI. The FS evaluated a number of on-site source control alternatives and groundwater control alternatives.

Soil contaminants identified on the McKin property included VOCs and heavy metals. The heavy metal concentrations were within the range typically found in soils. Three areas contained soil contaminants typical of oil disposal operations (e.g., constituents of petroleum). Three other areas were heavily contaminated with VOCs including: TCE at 1,500 milligrams per kilogram (mg/kg, also commonly expressed as parts per million or ppm); methylene chloride at 49 mg/kg; xylenes at 21 mg/kg; 1,1,1-TCA

at 4.5 mg/kg; dichlorobenzene at 9.2 mg/kg, and other contaminants.

Contaminants were released to the subsurface at the McKin property. As a result of precipitation-driven groundwater flow, and influenced by the pumping of the residential bedrock wells, contaminated groundwater migrated to the regional aquifer discharge area at the Royal River. The major VOCs found in the surficial aquifer groundwater were TCE and 1,1,1-TCA at concentrations of 16,000 micrograms per liter ( $\mu\text{g/L}$ , also commonly expressed as parts per billion or ppb) and 170 ppb, respectively. Concentrations of the two contaminants were 29,000 ppb and 500 ppb, respectively, in the bedrock aquifer. Concentrations of TCE and 1,1,1-TCA were below a 1 ppb detection limit in Collyer Brook and the Royal River. Both VOCs were detected at Boiling Springs at maximum concentrations of 44 ppb TCE and 30 ppb 1,1,1-TCA.

### **3.5 Basis for Taking Action**

#### **3.5.1 1985 ROD Basis**

The risk assessment completed as part of the RI concluded that there was no significant health risk from surface water or direct contact with soils on the McKin property. Air monitoring on the property indicated no exceedances of state guidelines for ambient air. However, the contaminated soils on the property were considered a source of contaminants that impacted the overburden and bedrock aquifers, which are potential drinking water sources. The public health risk was considered “potential” because there were no known users of the groundwater as a drinking water supply at the time of the RI due to the availability of municipal water, and because it was assumed the contamination could restrict future use of the aquifer. The TCE concentrations exceeded the guideline lifetime risk of cancer, or 28 ppb, at most of the monitoring wells sampled. The risk assessment concluded that at the concentrations found, there was a public health risk associated with long term consumption of groundwater. EPA’s risk assessment concluded that surface water did not present an unacceptable human health or ecological risk, either currently or under a future potential drinking water source scenario. Based on these findings, action to protect human health and the environment was required.

#### **3.5.2 2001 Amended ROD Basis**

During the 1997-1999 mediation process, EPA reviewed human health and environmental risk assessments to evaluate exposure pathways and new risk data. The assessment concluded that an unacceptable risk was associated with drinking water use of groundwater and surface water from Boiling Springs, a depression adjacent to the Royal River where groundwater flows to the surface. Concentrations of TCE in both waters exceeded the newly established federal MCL of 5 ppb. Although the risk from groundwater was confirmed by EPA, EPA also determined that groundwater drinking standards were technically impractical to meet. As a result, the amended ROD focused on institutional controls and long-term monitoring as a way to address this risk. In addition, the amended ROD focused on measures to address the source of contamination into surface water at Boiling Springs.

## 4.0 REMEDIAL ACTIONS

### 4.1 Remedy Selection (1985 Record of Decision)

The following remedial action objectives (RAOs) were used to evaluate alternatives in the 1984 FS:

- Maintain adequate safe drinking water for the public potentially impacted by groundwater contamination;
- Prevent exposure of the public to harmful airborne contaminants;
- Prevent contact by the public with contaminated soils by dermal or ingestion routes;
- Prevent subsurface discharge of contaminated groundwater from the McKin property to off-site aquifers;
- Restore, within a reasonable time and practical limits, the off-site aquifer contaminated by McKin operations to levels acceptable for drinking water supply and protective of the environment; and
- Protect Royal River state-designated uses and aquatic life.

The 1985 ROD included an on-site component for treatment of contaminated soil and an off-site groundwater treatment component. The remedy presented in the ROD included:

- On-site soil aeration of soils from identified areas on the property;
- Off-site disposal of approximately 16 drums;
- Soil testing in the petroleum contaminated areas;
- Construction of the GETS and operation of this system for a period of five years to achieve groundwater performance standards of 92 ppb 1,1,1-TCA and 28 ppb TCE;
- Re-evaluation of the groundwater performance standards if the standards were not met within five years;
- Initiation of an off-site groundwater and surface water monitoring program; and
- Building demolition, clearing debris, removing drums and other materials, and other site closure activities.

Source area soil aeration was selected to actively and significantly reduce the amount of contamination that remained in soil on the McKin property. The performance standard for the remedy was a soil concentration of 0.1 mg/kg TCE, averaged over the volume of treated soils, so contamination in soil was no longer adversely affecting groundwater that could be used as drinking water. The ROD specified that areas of the property contaminated with petroleum derivatives would be tested further during the remedial design to determine an appropriate remedial action.

The remedial action objective for off-site groundwater as stated in the 1985 ROD was to restore the off-site aquifer to levels protective of human health and the environment within practical limits and a reasonable amount of time. The ROD required surface water discharge for treated groundwater. Performance standards were established with the expectation that they could be achieved within the planned five-year period of operation of the off-site groundwater remedy. The performance standards of 92 ppb 1,1,1-TCA and 28 ppb TCE were applicable throughout the impacted area, and were established based on the protection of human health and the environment with consideration given to potential exposures and possible synergistic and additive effects. As a suspected carcinogen, the TCE standard was based on a  $10^{-5}$  lifetime cancer risk value. The 1,1,1-TCA performance standard was based on a

recommended maximum concentration level of 200 ppb, adjusted to 92 ppb based on possible synergistic and additive effects with TCE.

## **4.2 Remedy Implementation (1985 ROD)**

### **4.2.1 On-Site Source Control Remedy**

During 1986, a group of PRPs excavated and treated VOC-impacted soil to minimize continued migration of VOCs to groundwater. Approximately 9,500 cubic yards of soils that contained solvents were excavated and treated by soil aeration between July 1986 and February 1987. These VOC-contaminated soils were excavated outward from the identified source areas until TCE concentrations were below 1 mg/kg, the soil excavation performance standard. Between November 1986 and April 1987, approximately 2,500 cubic yards of petroleum-contaminated soils were excavated to a 1 mg/kg polynuclear aromatic hydrocarbon and total extractable hydrocarbons performance standard and treated in the same manner. The treated soil was then stabilized using cement and replaced in the excavations. The entire property was sloped, graded, loamed, and hydroseeded.

As required by the 1988 Consent Decree, the SP performed a site characterization of the Well DEP-8 area. The nature and extent of contamination in the vicinity of Well DEP-8, located east of the former lagoon, was determined and a remedial action was performed in these petroleum-contaminated areas. This element of the cleanup action was completed with the submittal and approval of a December 1989 “Hydrogeologic Investigation, DEP-8 Study Area Remediation and Pilot-Scale Treatability Study” and an August 20, 1990, “DEP-8 Soil Confirmation Project Summary”.

### **4.2.2 Off-Site Groundwater Remedy**

The 1985 ROD stated that the three RAOs for the off-site groundwater remedy would be achieved by the design, construction and operation of the GETS to remove VOCs from the overburden aquifer and restore overburden groundwater to the established performance standards. The ROD assumed the off-site groundwater remedy would consist of 25 extraction wells into the surficial aquifer and upper bedrock aquifer and anticipated a five-year restoration time frame.

Based upon earlier studies, groundwater contamination appeared to be migrating from the McKin property in two plumes, an eastern and a northern plume. The eastern plume near the McKin property was flowing from the overburden to the bedrock and then back to the overburden downgradient and near the Royal River. Groundwater then discharged into the Royal River through a 500 – 700 foot zone known as the Royal River Discharge Zone. (Figure 3) The northern plume extended north of the McKin property and Depot Road and appeared to attenuate in overburden prior to reaching Collyer Brook.

In 1990, EPA and MEDEP agreed to a phased approach to groundwater remediation beginning with four extraction wells and a central treatment system to address the contamination in these two plumes. Two extraction wells were located approximately 1,000 feet north of the McKin property on the western side of Mayall Road (prior to the intersection with Depot Road), one west of Depot Road and the fourth off of Mayall Road approximately 500 feet west of the Depot Road intersection. (Figure 4) Two infiltration galleries were located in the central and northern areas of the McKin property to reinject treated groundwater. Following an evaluation of the effectiveness of the first phase, a decision to expand the system (e.g., the next phase) to the east side of Mayall Road would be made.

One of the four extraction wells, placed in the eastern plume, (EW-503), was designed with a projected flow of 20 gallons per minute (gpm). The well was installed in soils with a limited saturated overburden thickness that yielded only 1-2 gpm. As a result, the system was not effective in extracting VOCs migrating in the eastern plume from the McKin property to the Royal River. In addition, the expected flushing of VOCs through the use of infiltration galleries did not appear to affect the monitoring wells placed in the northern TCE plume thereby limiting the effectiveness of this action. This observation suggested that pumping the residential wells in the 1970s, historic lagoon operations, and TCE transport through bedrock fractures, may have contributed to the northern plume.

In July 1993, the SP submitted a report evaluating an expansion of the GETS east of Mayall Road (second phase) and concluded that groundwater restoration was not technically practicable because of the presence of contamination in the deep bedrock. Computer modeling of multiple extraction system arrangements (wells placed perpendicular to groundwater flow, wells placed parallel to flow, multiple rows of wells, etc) all indicated a timeframe of over 200 years before the cleanup levels would be attained.

In late 1995, the agencies agreed to allow the SP to submit a Technical Impracticability Evaluation Report in place of the 56-month report required under the Consent Decree. Groundwater data indicated the likely presence of dense non-aqueous phase liquids (DNAPL) in bedrock and overburden aquifers. The presence of residual DNAPL in low permeable strata may act as a continuing source of VOCs that may desorb, dissolve in the groundwater, and be carried to more permeable units. EPA and MEDEP approved a temporary shutdown of the system in October 1995 so the parties could evaluate the effectiveness of the system and alternatives for the site's cleanup. This evaluation included an assessment of the feasibility and cost of groundwater restoration, containment, mitigation, and institutional controls. During the period of operation, from April 1991 to October 1995, the GETS removed approximately 26 gallons of TCE.

### **4.3 Remedy Selection (2001 Amended ROD – Off-Site Groundwater)**

In March 2001, EPA issued an Amended ROD that modified the groundwater remedy so that drinking water standards were waived pursuant to a Technical Impracticability Waiver thereby eliminating the active restoration component of the groundwater remedy. Based on the 50-year timeframe for restoration of the aquifers developed from extrapolations of monitoring data, EPA concluded that it was technically impracticable to achieve federal and state drinking water standards in the plume within a reasonable time frame. Instead, the amended remedy relied upon layered institutional controls and long-term monitoring to ensure that the remedy was protective of human health and the environment. In addition, response activities were required to address surface water contamination in the Boiling Springs area.

The off-site groundwater remedy change replaced the two groundwater RAOs in the 1985 ROD (see Section 4.1) with the following four activities:

1. Develop institutional controls to prevent exposure to contaminated groundwater;
2. Monitor groundwater to show that the contaminant plume does not expand and that contaminant concentrations continue to decline due to natural processes;
3. Monitor surface water to show decreases in TCE concentrations in the Royal River resulting from decreases in groundwater concentrations. A contingency response approach would be implemented if TCE exceeds the state performance standard at a specified location and date; and
4. Evaluate the remedy to assess that it is protective of human health and the environment at least every five years and report findings in Five-Year Review reports.

## **4.4 Remedy Implementation (2001 Amended ROD – Off-Site Groundwater)**

### **4.4.1 Institutional Controls**

Institutional controls (ICs) are required to ensure the protectiveness of the remedy. They are non-engineered instruments, such as administrative and/or legal controls, that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for any areas that do not allow for unlimited use or unrestricted exposure.

The Amended ROD identified four layered institutional controls that were to be used in conjunction with long-term monitoring to assure protectiveness of the remedy.

The Town of Gray established a groundwater ordinance for the Site on January 22, 2002. The objective of this ordinance is to prevent exposure to contaminated groundwater until federal and state drinking water standards are reached. The ordinance prohibits the extraction and use of groundwater for any purpose, with the exception of monitoring the contamination. This ordinance delineates an area known as the ICZ which these restrictions will apply. This zone was established based on the horizontal area of the proposed Technical Impracticability Zone, extending vertically to deep bedrock. The ICZ boundaries include areas where groundwater is known or suspected to exceed federal maximum contaminant levels (MCLs) and state maximum exposure guidelines (MEGs) and areas where contaminated groundwater could migrate in the future. This zone will remain in place as long as contamination above drinking water standards remains in the groundwater. The ordinance includes provisions for Town enforcement and stipulates penalties for any breaches of the ordinance. (See Figure 2 which outlines the ICZ)

The second set of institutional controls included restrictive covenants for nineteen sub-dividable properties. The restrictive covenants were included to prevent the use of groundwater on these properties and alleviate the concern that future development and installation of wells could possibly alter the boundaries of the contaminant plume.

The third set of institutional controls included the establishment of two conservation easements to protect areas of open space with frontage along Collyer Brook.

Finally, the SP were also required to make a good faith effort to procure a restrictive covenant for the McKin property.

In addition to these institutional controls, two separate agreements were reached between the Settling Parties and the Town of Gray and the Gray Water District. The SP agreed to provide funds to the Gray Water District for development of a new water supply well and for water mains to connect the new well to the existing distribution system. Per a Memorandum of Understanding signed by the Settling Parties, EPA, Maine DEP, Gray Water District, and the Town of Gray, payment by the Settling Parties for these controls and agreements were made on or around January 1, 2002.

### **4.4.2 Groundwater Monitoring**

The major components of the groundwater monitoring program are:

- Installation of wells along the perimeter of the contaminant plume (see the 900 series wells on Figure 5)

- Regular monitoring of groundwater and evaluation of the data to confirm TCE concentrations continue to decrease and the plume boundaries are not expanding
- Refinement of the estimated time to meet federal and state standards.

As noted in Section 4.2.2 above, groundwater contamination has migrated in two plumes from the McKin property. While there were sufficient monitoring locations to observe water quality conditions in the central portions of the plumes, there were no monitoring locations situated along the predicted northern edge of the plume along Collyer Brook, the southern edge of the plume that discharges into the Royal River, or the eastern extent of the plume on the east side of the Royal River. The 2001 ROD addressed this by conservatively setting the boundaries of the ICZ and by requiring a series of monitoring wells in the overburden and bedrock. These wells, designated the 900-series wells, would monitor the plumes' position and potential for lateral expansion. In particular, data from the 900-series wells was to be used to establish that the plume does not expand to areas beyond the ICZ. In addition, the wells would be used as a basis to remove ICs from individual properties as contaminant levels in groundwater decreased over time. These wells have not been installed because property owners have not agreed to access.

The approved LTMP set forth the sampling locations and frequency of sampling. Recent evaluation of monitoring data indicates that groundwater contamination is decreasing at a faster rate than previously predicted. Some wells are predicted to reach cleanup goals before 2010, while others are likely to reach cleanup levels between 2015 and 2020. Previous estimates put a time horizon of 2030 to 2040 on several wells and a few out to 2050.

#### **4.4.3 Surface Water Monitoring**

The major components of the surface water monitoring program are:

- Regular monitoring of the Royal River
- Contingency response approach
- Engineered covering of Boiling Springs to redirect the groundwater discharge.

The 2001 Amended ROD included monitoring the Royal River because TCE concentrations exceeded Maine State Water Quality Criteria (SWQC). It was anticipated that the continuing decrease in groundwater concentrations would result in further decreases of TCE in the river. Because the amount of TCE moving from the groundwater into the Royal River is greatly diluted by river flow, it was projected that the TCE concentrations would meet SWQC within four to six years, or 2005 to 2007.

In addition, the Amended ROD provided for a contingency response approach that would allow development of active remediation for the Royal River if SWQC are not met in 2009 at SW-1 or in 2013 at SW-201.

Finally, the surface water component of the remedy included covering Boiling Springs with a fabric/stone/soil layer cover to prevent contact with the contaminated spring water by humans and wildlife and redirecting the groundwater to the Royal River.

#### **4.4.4 Five-Year Reviews**

The final element of the amended remedy specifies reviews every five years to assess the protectiveness of the remedy. As part of the LTMP, the regression analysis is updated for each five-year review. Each

review will also evaluate site conditions to assess if changes in the plume warrant changes in the ICZ based on the available data and the goal of continued protectiveness of public health and the environment.

#### **4.5 Operation and Maintenance (O&M)**

The 1985 ROD lists maintenance, such as mowing, as the only O&M activity for the on-site source control remedy. The cost of mowing the McKin property was estimated as \$1,600/yr. The SP continue to perform maintenance activities (mowing, snow plowing, fence repair and routine building maintenance) as specified in the 2003 Project Operation Plan. The SP' contractor indicated that mowing has typically not been necessary and thus has not been performed each year; the facility is plowed to provide access as necessary for monitoring activities. The 1985 ROD did not include any O&M for the off-property groundwater remedy because of the expectation that the remedy would either be completed, or would be reassessed, after five years of operation. Since the GETS is now permanently shut down, the only remaining activities associated with the groundwater remedy are decommissioning activities and implementation of the well abandonment plan. Both of these activities are described in the Project Operation Plan.

## 5.0 PROGRESS SINCE THE LAST REVIEW

This is the fourth FYR for the Site. The previous Five-Year Review Report was completed in September 2003. The 2003 review found that “the remedies are expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.” None of the issues identified in the 2003 FYR were considered to affect short-term protectiveness. However, access for the 900-series wells was identified as an issue that could affect future long-term protectiveness.

Actions taken since the last FYR include:

- Update of regression analysis for TCE concentrations at monitoring points
- Repair to access manhole damaged by minor vandalism at Boiling Spring remedy
- Continued monitoring in accordance with LTMP
- Two phases of vapor intrusion study

### Actions Taken Since the Last Five-Year Review

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible*	Milestone Date	Action Taken and Outcome	Date of Action
Regression Analysis	Update regression analysis of groundwater data during every FYR	SP	Fall 2003	Updated regression curves using data up through 2007	May 2008
Scope of LTMP	Review coincident with the FYR	SP/EPA/MEDEP	Fall 2003	Follow modifications as outlined in LTMP	Ongoing
Indoor Air Quality	Evaluate risk based on Maine Ambient Air Guidelines and federal guidance	EPA**	As soon as possible	Vapor Intrusion Studies (two phases)	June 2006 and 2008
POP/RAWP Schedule	Tasks must be carried out on-schedule as much as possible	SP	Throughout long-term monitoring	Work Plans have been approved, awaiting EPA action	2009 – 2010
McKin Property Restrictive Covenant	Continue good faith efforts to obtain a restrictive covenant for the McKin property	SP	As soon as possible	Attempted. Deed modification request denied by owner	Reported to EPA in May 2008
900-series Wells	Continue attempts to obtain access, revisit need for wells if access can not be obtained	SP/EPA	As soon as possible	Access still not obtained. Awaiting EPA instruction.	Reported to EPA in May 2008

\* Oversight agencies for all actions are EPA/State

\*\* Although the 2003 FYR indicated that the PRPs (SP) were responsible for the indoor air evaluation, the evaluation was not identified in the 2001 Consent Decree/Remedial Action Work Plan and therefore was not part of the approved work plans. EPA has conducted the investigations to date.

## **6.0 FIVE-YEAR REVIEW PROCESS**

### **6.1 Administration Components**

EPA, the lead agency for this FYR, notified MEDEP and the SP in April 2008 that it would be conducting a five-year review with a report to be completed in September 2008. The FYR team was led by Terrence Connelly, EPA's Remedial Project Manager. Rebecca Hewett, the project manager for MEDEP, was also a part of the review team. Document review began in May 2008 and other activities were conducted as indicated.

Components of this review included:

- Community involvement
- Document review
- Data review
- Site inspection
- Local interviews
- FYR report development

### **6.2 Community Notification and Involvement**

EPA prepared a public notice announcing the five-year review and requesting the public's participation in the review. The public notice was published in the Portland Press Herald and the Lewiston-Auburn Sun Journal, the two major local daily newspapers. In addition, EPA sent letters on June 16, 2008 to each of the 19 owners of properties with restrictive covenants notifying them of the five-year review and the upcoming June 26, 2008 site inspection. EPA's project manager made follow-up visits on July 29, 2008 to Town of Gray Municipal Offices, Gray Public Library, and the Gray Water District to inform them of the five-year review process.

On May 17, 2008, the Portland Press Herald published an online update on the Site after an interview with EPA's project manager that was triggered by the public notice announcing the five-year review.

EPA received a few telephone calls from the property owners but other than the newspaper interview, EPA did not receive any comments regarding the protectiveness of remedial actions. Site interviews indicate that there is little current public interest in the Site.

In addition to the above notice and letters, EPA has communicated with the community about the vapor intrusion investigations. This included an informational meeting in June 2006 and access requests in June 2008. At the June 2006 meeting, EPA introduced the purpose of the upcoming first phase of the work. This meeting was attended by approximately twenty members of the community. The information about the upcoming investigation was well received. For the second phase of the vapor intrusion investigation, EPA met with property owners to gain access to collect indoor air and sub-slab samples.

### **6.3 Document Review**

The FYR includes a review of documents containing information relevant to assessing the protectiveness of the Site. Documents, such as Records of Decision, provide the remedial action objectives of the Site.

Others, such as Long-Term Monitoring Reports, detail sampling data that allows for assessment of long-term trends in groundwater and surface water quality. Previous FYRs are also examined to assess the status of the Site over time. Additionally, enforcement documents, institutional controls, and various regulations are reviewed. A complete list of documents reviewed for this FYR can be found in Attachment 1.

## **6.4 Data Review**

### **6.4.1 Source Control**

The treatment on the McKin property of approximately 12,000 cubic yards of VOC- and petroleum-contaminated soils from five locations and the former lagoon, and treatment via soil aeration was completed in the late 1980s. After the SP submitted the required soil remediation and site closure reports to the agencies, the soil component of the remedy was considered completed. No additional soil remediation has been performed since then.

### **6.4.2 Groundwater**

The SP conduct routine groundwater and surface water monitoring in accordance with the LTMP. The LTMP, approved by the agencies in 2001, is attached to the revised Remedial Action Work Plan, Appendix A to the 2001 Consent Decree Amendment. Monitoring under the LTMP commenced in January 2002.

As detailed in the LTMP, monitoring points were initially placed in one of three categories: active, intermittent, and inactive. Active included wells that would be sampled quarterly, semi-annually, or annually. When TCE concentrations decreased to less than 50 ppb (ten times the MCL and MEG) in an active well, it was shifted to intermittent category, once every three years. Once TCE concentrations were below 5 ppb for three consecutive sampling events, the well would be shifted to inactive. Between 1998 (three years after GETS shutdown) and 2002, 18 monitoring wells and three seeps/springs were removed from the sampling protocol. Since 2002, nine additional monitoring wells, including B-2A and MW-401C in 2008, and one spring/seep have been removed. As of June 2008, 18 monitoring wells and four surface water points are monitored for site-related contaminants.

Springs and seeps have achieved drinking water standards and are no longer monitored.

Six VOCs are consistently detected in the groundwater: TCE, 1,1,1-TCA, cis-1,2-dichloroethene, 1,1-dichloroethene, 1,1-dichloroethane and PCE. Currently TCE and 1,1-DCE are the contaminants whose concentrations exceed the State MEGs and Federal MCLs and TCE is overwhelmingly the most widespread and has the highest concentrations. PCE exceeded its standard in June 2008 at MW-803C. Prior to that, PCE last exceeded its standard in 2005 at MW-401C.

Over the last five years, contamination concentrations throughout the eastern plume show an overall decreasing trend. Within this general decreasing trend, increased TCE concentrations have been detected periodically along the southern edge of the plume. In 1992, increased concentrations were detected at B-4A followed by increases downgradient at MW-802B in 1994 and B-103B in 2002. While concentrations at B-4A continue to fluctuate and another zone of elevated concentrations may have passed through B-4A in 2000-2002, concentrations at MW-802B and B-103 appear to have peaked in 2004 and are now decreasing. These wells will continue to be monitored to see whether a similar increase occurs over the next few years in response to elevated concentrations measured at B-4A.

Concentrations in the northern plume have shown similar decreasing trends since the 2003 FYR. Consequently, many of the wells within the northern plume have been shifted from active monitoring to intermittent or inactive designation.

Since the rate of decreasing concentrations appeared to accelerate over the past few years, the SP' consultant conducted a review of their sampling protocols and the physical conditions of the monitoring wells to determine if sampling methods or well construction contribute to the apparent acceleration. As a result of this review, neither of these potential sources of error was believed to be a factor at the Site.

Below are tables that provide TCE data. The first table provides data from representative sampling periods in the site history to give a perspective of the duration of sampling effort, the level of sampling, and the decreasing concentrations. The first column indicates when samples were first collected; the second column a year after the GETS was fully operational; the third column the month after operation of the GETS was suspended; and the last column represents the last sampling event prior to implementation of the LTMP.

Groundwater water quality data collected since the LTMP was implemented are presented in the second table, from January 2002 through September 2007. As noted in the sampling frequency column, the status of the monitoring locations, active, intermittent, or inactive changed for several wells following the second LTMP sampling event in August 2002. The August 2002 sampling event also saw the transition in sample collection methodology from using the purge and bail technique to permeable diffusion bags. As this sampling technique targets a limited vertical zone within the monitoring wells, at some locations several sampling apparatus were placed within the same well to assess the potential variability. The August 2002 data identified with an asterisk indicates multiple sampling devices and the upper and lower concentrations detected. With subsequent sampling events, the passive diffusion bag sampling device was to be placed within the zone that had the highest concentration as determined in the August 2002 sampling.

In addition to the overall decreasing concentrations seen in the data, compilation of the data into this format highlighted that there have been minor variations from the approved LTMP, as modified in August 2002, where sampling did not occur as scheduled. This will be addressed by EPA and MEDEP with the Settling Parties so that the sampling schedule is consistent with the LTMP.

## Historical Groundwater TCE Concentrations

(Concentrations in parts per billion)

Sample Location	First Sampling date and conc.	October 1991	October 1995	November 2001
<i>Eastern Plume Sampling Locations</i>				
MW-207A	(9/89) 5U	5U	1U	0.5U
MW-207B	(9/89) 5U	5U	1U	0.5U
MW-401A	(9/89) 910	170	6	16
MW-401B	(9/89) 380	58	2.8	0.54
MW-401C	(9/89) 6100	530	63	54
MW-403B	(8/90) 5T	3J	0.5J	0.5U
MW-403C	(10/89) 34	100	4.4	0.5U
MW-212C	(9/89) 120	49	2.7	0.5U
MW-206A	(9/89) 3100/3200	5000	3800/4100	1500
MW-206B	(9/89) 2900	110	36	48
B-3A	(3/84) 120	6400	1300	180
B-3B	(3/84) 1800	1300	50	70
B-4A	(7/89) 44	60	100	190
MW-801A	(2/92) 5	---	3.3	1.8
MW-801B	(6/91) 420	540	340	56
MW-801C	(6/91) 460	490/540	340	89
MW-802A	(6/91) 5U	5U	0.6J	4.6
MW-802B	(1/92) 3J	5U	10	27
MW-803A	(7/91) 240	490/600	280	120
MW-803B	(6/91) 550	730	380	140
MW-803C	(6/01) 1500/1300	3500	1700	270
B-102	(10/82) 120	2300	1500	290
B-103B	(10/82) 1U	5U	0.5U	NS
<i>Northern Plume Sampling Locations</i>				
MW-402A	(9/89) 28	23	15	0.5U
MW-402B	(9/89) 540	40	49	22
B-1A	(3/84) 16,000	3000/2200	1100	170
B-1B	(3/84) 13,000	4000	740	53
MW-201A	(9/89) 5U	5U	1U	0.5U
MW-201B	(9/89) 5U	5J	1U	0.5U
B-2A	(3/84) 91	27	37	5.4
B-2B	(3/84) 160	28	46	2.2
B-2C	(3/84) 91	83	26	1.3
B-5A	(3/84) 190	170	91	18
B-5B	(7/85) 760 J	410	120	13
MW-202A	(9/89) 9	20	15	8.6
Mitchell Springs	(10/82) 12	14	6.5	0.85
MW-203A	(9/89) 11	4J	3.9	1.4
MW-203B	(9/89) 7	6	4.2	1.9
GWD-2	(12/97) 6.3/9.4/13	--	--	NS

Notes: 1. The sampling locations are listed in increasing distance from the McKin facility. "A" = shallow bedrock well; "B" = deep overburden well; "C" = shallow overburden well

2. U = analyzed but not detected above the detection limit or quantification limit; NS = not sampled; J = estimated quantity; T = trace.

3. 1500/1300 = duplicate samples collected from this location on that date.

4. Locations in red were selected for the LTMP

## Long-Term Monitoring Groundwater Data

Long-Term Monitoring Sampling Locations	Initial Sampling Frequency	January 2002 - 1 <sup>st</sup> LTMP event	August 2002	July 2003	December 2003
<i>Eastern Plume</i> (discharges to the Royal River)					
MW-207A	Every 3 years	NS	0.5U > inactive		
MW-207B	Every 3 years	NS	0.5U > inactive		
MW-401A	Semi-annual	14	3.2- 13* > switched to intermittent		
MW-401C	Semi-annual	70	89-120*	220	79
MW-212C	Every 3 years	0.5U	0.5U > inactive		
MW-206A	Semi-annual	2100	490-1500*	760	810/760
MW-206B	Semi-annual	88	54-89*	29	6.1
B-4A	Semi-annual	150/200	0.5U-140*	0.5U	76/110
MW-801B	Semi-annual	54	45-58*	28 > switched to annual	
MW-801C	Semi-annual	99	42-84*	70	62
MW-802B	Semi-annual	NS	11-35*	15 > switched to annual	
MW-803A	Semi-annual	130	13-88*	71	72
MW-803B	Semi-annual	150	100-140*	86	100
MW-803C	Semi-annual	340/430	93-390*	340	340
B-102	Semi-annual	370	270	88/230	210/230
B-103A	Annual	NS	0.5U > inactive		
B-103B	Annual	NS	46	47	24
<i>Northern Plume</i> (discharge area along Collyer Brook/Royal River confluence)					
MW-402A	Annual	0.66	0.53/0.5U > inactive		
MW-402B	Annual	22	13-63*	76	51
B-1A	Semi-annual	240	0.83-61*	140	130
B-1B	Semi-annual	54	62/59	32	29
B-2A	Every 3 years	6.7	5.9	NS	4.9
B-2B	Every 3 years	2.9	2.8 > inactive		
B-5A	Semi-annual	19	7.1 - 16*	Switched to intermittent	
B-5B	Semi-annual	18	14/18	Switched to intermittent	
MW-201A	Every 3 years	NS	0.5U > inactive		
MW-201B	Every 3 years	NS	0.5U > inactive		
Mitchell Spr	Annual	1.1	0.64 > inactive		
GWD-2	Semi-annual	NS	5.5-6.6	NS - unknown	NS - unknown

**Long-Term Monitoring Groundwater Data (continued)**

Long-Term Monitoring Sampling Locations	Sampling Frequency after Aug 2002 event	June 2004	September 2004	June 2005	September 2005
<b><i>Eastern Plume</i></b>					
MW-207A	Inactive since August 2002				
MW-207B	Inactive since August 2002				
MW-401A	Shifted to intermittent	NS	NS	NS	6
MW-401C	Semi-annual	82	110	74	46
MW-212C	Inactive since August 2002				
MW-206A	Semi-annual	490	670	820	750
MW-206B	Semi-annual	2.1	1.7	4.4	1
B-4A	Semi-annual	0.5U	80/75	57/44	24
MW-801B	Annual	NS	NS-unknown	NS	26/25
MW-801C	Semi-annual	43	44	51	38
MW-802B	Annual	6.2	NS	4.3	NS
MW-803A	Semi-annual	56	70	89	64
MW-803B	Semi-annual	82	80	93	72
MW-803C	Semi-annual	230	230	270	170
B-102	Semi-annual	84	150/170	42/150	2
B-103A	Inactive since August 2002				
B-103B	Annual	22	89	99	130
<b><i>Northern Plume</i></b>					
MW-402A	Inactive since August 2002				
MW-402B	Annual	42/41	29	24/30	6
B-1A	Semi-annual	130	130	180	150/160
B-1B	Semi-annual	24	26	15	39
B-2A	Every 3 years	NS	NS		3
B-2B	Every 3 years	Inactive since August 2002			
B-5A	Shifted to intermittent	NS	NS	NS	9
B-5B	Shifted to intermittent	NS	NS	NS	8
MW-201A	Inactive since August 2002				
MW-201B	Inactive since August 2002				
Mitchell Spr	Inactive since August 2002				
GWD-2	Semi-annual	NS-unknown	NS-unknown	NS-unknown	4

**Long-Term Monitoring Groundwater Data (continued)**

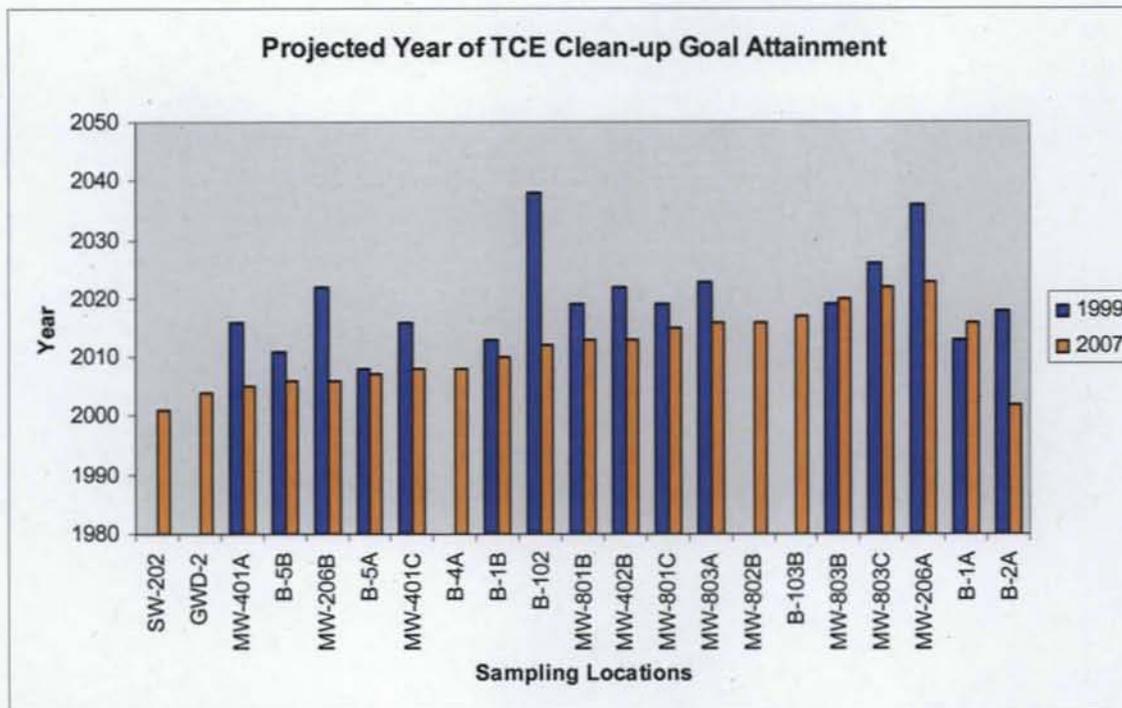
Long-Term Monitoring Sampling Locations	Sampling Frequency after Aug 2002 event	June 2006	September 2006	June 2007	September 2007
<b><i>Eastern Plume</i></b>					
MW-207A	Inactive since August 2002				
MW-207B	Inactive since August 2002				
MW-401A	intermittent	NS	NS	NS	NS
MW-401C	Semi-annual	1	0.6	0.7	0.5U
MW-212C	Inactive since August 2002				
MW-206A	Semi-annual	550/560	520	390/540	590
MW-206B	Semi-annual	2	3	6	3
B-4A	Semi-annual	4/3	0.5U	61/56	31/28
MW-801B	Annual	NS	NS-unknown	NS	NS-unknown
MW-801C	Semi-annual	32	29	22	27
MW-802B	Annual	5	NS	10	NS
MW-803A	Semi-annual	53	7	23	26
MW-803B	Semi-annual	62	57	55	51
MW-803C	Semi-annual	179	150	150	150
B-102	Semi-annual	150/130	0.6	16/23	3
B-103B	Annual	76	61	71	25
<b><i>Northern Plume</i></b>					
MW-402A	Inactive since August 2002				
MW-402B	Annual	NS-unknown	NS	6	6
B-1A	Semi-annual	120	11/10	140	120/130
B-1B	Semi-annual	13	18	15	16
B-2A	Every 3 years	NS	NS	NS	NS
B-2B	Inactive since August 2002				
B-5A	Intermittent	NS	NS	NS	NS
B-5B	Intermittent	NS	NS	NS	NS
MW-201A	Inactive since August 2002				
MW-201B	Inactive since August 2002				
Mitchell Spr	Inactive since August 2002				
GWD-2	Semi-annual	NS-unknown	NS-unknown	NS-unknown	NS-unknown

Notes: \* Multiple PDB sampling devices used, the values represent the upper and lower concentrations detected in the well.

NS = Not sampled; NS-unknown = according to the LTMP, sampling was to have been performed at this location

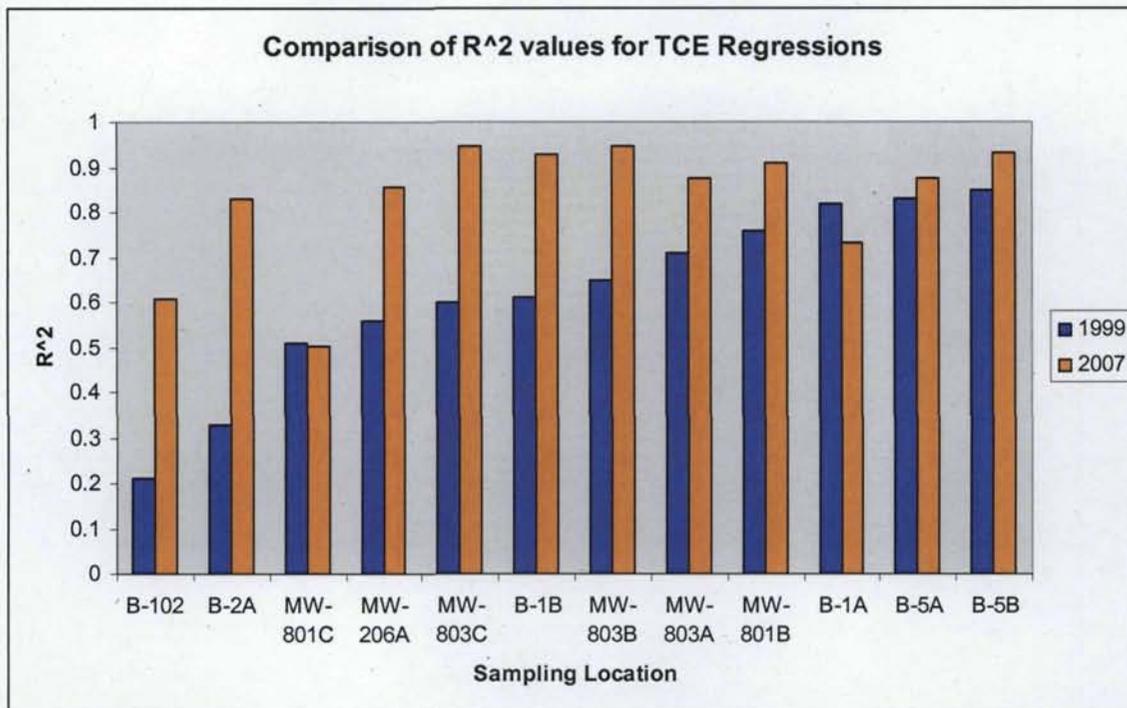
In May 2008 the SP submitted a report that updated the regression analysis on monitoring well TCE concentrations used to project the likely year when drinking water standards will be reached. The analysis added sampling results from 1999-2007 to the regression analysis conducted in 1999. The R<sup>2</sup> values for the regression analysis are statistical measurements of the “goodness-of-fit” of the regression to the actual data points. The 1999 and 2007 R<sup>2</sup> values and projected clean-up years are significantly different (ANOVA, F=8.715, p=0.0076; and, F=11.397, p=0.002). A graph comparing the two regression projections is presented below and illustrates that nearly all the wells are projected to have faster attainment dates with the most recent analysis.

## Comparison of 1999 and 2007 Regression Projections



This updated analysis indicates that groundwater contamination is decreasing at a faster rate than previously predicted. Some wells are predicted to reach cleanup goals before 2010, while others are likely to reach cleanup levels between 2015 and 2020. Previous estimates put a time horizon of 2030 to 2040 on several wells and a few out to 2050.

In addition to the projections showing accelerated attainment, the  $R^2$  values have also improved from 1999 to 2007 (the range for  $R^2$  is from 0.0 to 1.0 and the closer to 1.0, the greater the confidence in the "goodness-to-fit"). It is noted that for some wells, including MW-401A, MW-401C, B-4A, and MW-802B, the  $R^2$  values remain below 0.5 and therefore the projected dates to reach cleanup goals should be viewed conservatively. The following graph illustrates the improvement in  $R^2$  values for those wells with 2007  $R^2$  values above 0.5.



### 6.4.3 Surface Water

The 2001 Amended ROD set the TCE performance standard for the Royal River. To achieve compliance with the state standard, the TCE loading rate to the river cannot exceed 0.32 kg/day, which corresponds to a TCE concentration of 2.7 ppb at the harmonic mean flow of 48 cubic feet per second. Four points downstream from the former Boiling Springs are sampled as part of the LTMP. Monitoring points SW-1 and SW-201B are the point of compliance locations at which the TCE load is evaluated against the ROD criterion of 0.32 kg/day.

During 2002, four of the six monthly samples from SW-1 and two of the five monthly samples from SW-201 were below the 0.32 kg/day compliance loading rate. The rate measured at SW-201 in September 2007 was 0.25 kg/day and the annual rate has averaged at or below the ROD criterion since 2003. Individually, about 80% of the monthly rates have met the ROD criterion since 2003. Sampling other monitoring points downstream of SW-201B has shown TCE levels near the detection limit and decrease in the downstream direction. The diminishing concentrations of TCE in the Royal River are consistent with the decreasing groundwater concentrations observed in the monitoring wells. Figure 7 shows the regression analysis of data collected through 2007 from SW-201.

The Amended ROD remedy included a contingency remedy should TCE concentrations exceed the SWQC at SW-1 in 2009 or at SW-201 in 2013. This contingency remedy would allow for development of an active remediation plan for the Royal River, and the details of compliance monitoring for this contingency were presented in an insurance policy purchased by the SP. Briefly stated, the SP are required to collect a minimum of seven samples each month from May 1 through December 1, 2009 at sampling location SW-1 and the same sampling frequency in 2013 at SW-201. The need for a contingency remedy will be triggered if two of the monthly averages exceed the ROD criterion. For more

information, Endorsements #2 and #3 of the Pollution Legal Liability Select Policy #PLS 8086724 are included as Attachment 2 to this five-year review.

The Amended ROD also included an engineered cover for the Boiling Springs area because of the discharge of highly contaminated groundwater in this area. EPA performed a pilot study in September 2000 to assess the viability of an engineered cover. To address the multiple springs in this area, an area approximately 20x50x3 feet was “squared-off” to allow for the placement of the engineered cover. The cover consisted of, from bottom to top, a porous fabric membrane, perforated plastic pipe embedded in twelve inches of stone, another fabric, and then topsoil. The intent was to allow for the continued discharge of groundwater and then directing it via the piping to the Royal River rather than intending to prevent the discharge because such an effort would simply cause springs to occur elsewhere. Follow-up visits to the area, including during this five-year review’s site inspection, have found that the cover remains intact and is functioning as intended. There has been no redevelopment of springs, the riverbank has been stabilized with gabion structures, and the groundwater continues to discharge to the Royal River where the TCE levels are immediately diluted by the river flow.

#### **6.4.4 Institutional Controls**

The 2001 Amended ROD included layered institutional controls as part of the modified remedy. These included a Town of Gray ordinance, restrictive covenants on nineteen properties, two conservation easements, and a restrictive covenant on the McKin property. The town ordinance established an ICZ where use of groundwater was prohibited. There were 124 properties within the ICZ at the time it was established. There are now 130 properties within the zone following the division of three properties.

The restrictive covenants were obtained on nineteen properties within the ICZ by June 2003. The conservation easements were placed on two properties bordering the north side of Collyer Brook between Merrill Road and the Royal River in January 2002. The SP have attempted to negotiate a restrictive covenant to restrict future groundwater use and soil excavation on the McKin property, but the current owner, Aubine Dingwell, heir to Richard Dingwell, has declined the request to modify the deed.

The 2001 Consent Decree Amendment and its appendices, (Remedial Action Work Plan, Declaration of Restrictive Covenants, and Conservation Easements) and the town ordinance were reviewed to determine the compliance monitoring of these institutional controls. The Consent Decree itself does not include any language pertaining to compliance monitoring of these controls.

The Remedial Action Work Plan (Section III.6(f)) required the SP to make a good faith effort to get a restrictive covenant on the McKin property. The SP have attempted to obtain the restrictive covenant but have not been successful. Paragraph 2 of the each of the Declarations of Restrictive Covenant for the nineteen properties states that the SP, EPA, and MEDEP have the right to enter the properties on foot for the purpose of ensuring compliance with the restrictions set forth, but there is no language stating which party has the compliance responsibility or the frequency of monitoring. The easements on the two properties along Collyer Brook give Maine as the grantee the right to enter the properties to determine if there is compliance with the terms and purpose of the easements, but there is no established monitoring responsibility.

On January 22, 2002, the Town of Gray adopted an ordinance to prevent the use of groundwater within the ICZ. The ordinance states that the Town will enforce the ordinance but there is no language regarding compliance monitoring.

## 6.5 Vapor Intrusion (Indoor Air)

The potential vapor intrusion pathway was not addressed in either the 1985 ROD or the 2001 Amended ROD. Vapor intrusion was identified in the previous FYR as a potential source of exposure to site-related contamination following the issuance of draft guidance in November 2002 by EPA regarding this potential pathway. EPA collected soil gas and groundwater samples from beneath roadways around the Site in 2006. Based on these results, EPA collected indoor air samples in June 2008.

The Phase 1 fieldwork was completed in spring 2006. For this study 54 soil gas with 6 duplicate samples for confirmatory analysis and 6 groundwater samples were collected beneath roadways surrounding the Site. The 54 soil gas samples were collected by advancing a direct push probe eight to ten feet below the ground surface. After a tube was inserted into the probe, a pump was used to pull an air sample from the soil. Samples were then analyzed onsite using the EPA Region 1 Mobile Laboratory and confirmation samples were analyzed at the EPA Regional Laboratory. The results of this study indicated that site-related contaminants, principally TCE, were present in soil gas at levels exceeding cancer screening targets set in the November 2002 draft guidance. Figure 7 shows the soil gas sampling locations.

Six groundwater samples were collected along Yarmouth Road upgradient of the McKin property. Attempts to collect groundwater samples along Depot Road and Mayall Road were not successful because of either hitting refusal (bedrock or other impediment that prevented the probe from advancing any farther) or hitting the target depth of thirty feet without reaching the water table. No contaminants were detected in the Yarmouth Road groundwater samples.

### Results from Vapor Intrusion Phase 1 Investigation

Soil Vapor Chemical of Potential Concern	Units	Maximum Detected Concentration	EPA Generic Target Soil Gas Concentrations <sup>(1)</sup>			Does Maximum Site Chemical Concentration exceed 10 <sup>-6</sup> target cancer risk level?
			ppb/v			
			HI = 1.0 or Cancer Risk = 10 <sup>-4</sup>	HI = 1.0 or Cancer Risk = 10 <sup>-5</sup>	HI = 1.0 or Cancer Risk = 10 <sup>-6</sup>	
1, 1-Dichloroethene	ppb/v	ND	500	500	500	NO
cis-1, 2-Dichloroethene	ppb/v	ND	88	88	88	NO
Trichloroethene	ppb/v	43	4.1	0.41	0.041	YES
Tetrachloroethene	ppb/v	2.5	120	12	1.2	NO
1, 1, 1-Trichloroethane	ppb/v	4.3	4,000	4,000	4,000	NO

(1) Generic Target Soil Gas concentrations corresponding to Target Indoor Concentration where the Soil Gas to Indoor Air Attenuation Factor = 0.1

Phase 1 results indicated the potential for vapor intrusion as a source of exposure and warranted further study at likely points of exposure, namely residential homes. Based on the results of this study, six residential homes on Depot Road were selected for further samples.

Following meetings with property owners to explain the process and obtain access, on June 3 and 4, 2008, EPA personnel from the Region 1 laboratory took samples at six homes as part of the Phase 2 study. Ambient, indoor, and sub-slab air samples were collected. Six-liter canisters were used in the basement of each home to collect 24-hour indoor air samples. Samples were collected in the basement because this is the most likely place for soil vapor to enter the home. During the same period, 24-hour outdoor air samples were collected for background comparison purposes. Sub-slab soil gas samples were collected

using sampling probes installed through the concrete slab in the basement of each home. Air grab samples were also collected in possible avenues of vapor entry (e.g., holes in the basement walls and floor, and drainpipes). These grab samples were analyzed onsite using EPA Region 1 Mobile Laboratory. All sampling, analysis, and quality control measures were conducted in accordance with EPA standards and using the EPA Region 1 Standard Operating Procedure for Canister Sampling, ECASOP-Canister Sampling SOP, August 31, 2007.

Preliminary results from the Phase 2 study indicate that some site-related contaminants are entering some homes via the vapor intrusion pathway. All but one of the sampled homes had TCE soil gas concentrations from the sub-slab samples above the reporting limit of 0.5 ppb/v. Four of the homes had 24-hr indoor air concentrations in excess of the reporting and action limits (0.0041 ppb/v). PCE was also detected in the sub-slab soil gas samples beneath two homes and in the 24-hr indoor air samples from two homes (3 homes in total with PCE exceedances). All homes also had levels of non-target compound, predominantly compounds associated with petroleum products. Other non-target compounds associated with typical household cleaning agents, solvents, paints, and glues were detected. The evidence from three of the homes indicates that the target and non-target VOCs detected are possibly migrating from underneath the homes.

EPA is currently evaluating the data. Preliminary risk assessment suggests that the concentrations detected in the indoor air samples fall within EPA's acceptable risk range of  $10^{-4}$  and  $10^{-6}$  (meaning that the risk associated with a lifetime exposure to such concentrations could result in a one in 10,000 to a one in 1,000,000 increased possibility of cancer). EPA anticipates that it will complete the evaluation of the data by the end of 2008 and then working with property owners, determine what, if any, further steps are to be taken.

## **6.6 Site Inspection**

The FYR site inspection was conducted on June 26, 2008 with representatives from EPA, MEDEP, Sevee and Maher Engineering, the SP' consultant, and a local property owner. EPA made a follow-up visit on September 4, 2008. The inspection included the McKin facility, some of the existing monitoring well locations, and the Boiling Springs remediation area.

The fence, treatment building, the decontamination concrete pad, and subsurface and above ground piping for the two infiltration galleries remain onsite. All of the above items either will be removed or the piping capped during decommissioning activities. The decommissioning activities will follow the approved work plans submitted following the 2001 Consent Decree Amendment. According to the work plans, these activities are to take place no later than 2011. Decommissioning activities will also include the removal of piezometers and monitoring wells on the McKin property, with the exception of four wells (MW-401A, MW-401C, MW-402A, MW-402B) that are included in the long-term monitoring plan.

The Boiling Springs cover remains intact, with the gabion walls along the Royal River riverbank in good condition, and the sampling vault is secured with a locked chain. There were no indications of erosion or reemergence of springs. In addition, the area that had been impacted by EPA's 1998 floodplain investigation appeared to be completely re-vegetated. One property owner stated that there had been illegal dumping of rubbish adjacent to the river, which caused the owner to place a large tree trunk across the access path. No evidence of this was observed during the inspection, with any remaining rubbish likely obscured by the heavily overgrown underbrush.

A site inspection report, including site inspection roster and photographs, is included in Attachment 3.

## 6.7 Site Interviews

Interviews were conducted as part of the FYR. General discussions and observations were documented during the site inspections on June 26 and September 4, 2008. Additional interviews were completed in a follow-up visit on July 29, 2008 with town officials.

Rebecca Hewett, MEDEP project manager, identified the following concerns for MEDEP: surface water compliance, maintenance and restrictions for the McKin property, and the long-term monitoring without the 900-series wells. The ongoing surface water monitoring has shown that the 2001 ROD performance standard, 0.32 kg/day, has been met consistently at sampling location SW-201 since 2003 based on yearly averages. However, on a monthly basis, the ROD performance standard has been met approximately 80% of the time at SW-201 and the contingency remedy is based on monthly averages rather than annual average. The contingency remedy requires the performance standard to be met at SW-1 in 2009, the first date that the contingency response could be triggered. Therefore, the SP will need to return to sampling at SW-1 to ensure that this criterion has been met.

During the site inspection, Ms. Hewett noted the infiltration galleries and decontamination pad could potentially serve as direct conduits to the overburden aquifer. Proper abandonment of these components is part of the approved site closure plan that will be implemented within the next three years as specified by the Consent Decree.

MEDEP is aware that a restrictive covenant has not been placed on the McKin property. While the property is currently undeveloped, Ms. Hewett pointed out that restrictions would be necessary to limit future development of the property to maintain the protectiveness of the remedy. Ted Wolfe, MEDEP, also voiced concern about the lack of a restrictive covenant on the property and suggested that perhaps EPA or Maine DEP through the Attorney General's office could place a lien on the property if the restrictive covenant cannot be obtained.

Ms. Hewett expressed satisfaction with the updated regression analysis that indicated the overburden aquifer was attenuating more quickly than originally projected. However, without data from the 900-series wells, MEDEP will view any request to shrink the ICZ very cautiously.

Jim Foster, Superintendent of the Gray Water District, participated in the mediation process. One of the water district's exploratory wells, designated GWD-2, located just upstream of the Collyer Brook and Royal River confluence, had low levels of TCE. This triggered further sampling of residential wells north of Collyer Brook and east of the Royal River (all non-detect) and installation of microwells along Collyer Brook. Mr. Foster noted that there had been little interest in the McKin Site since the conclusion of the mediation process and that there appeared to be more homes being built in East Gray (the Site and ICZ are within the area generally referred to as East Gray) than elsewhere in town because of the availability of public water. In addition, Gray Water District has found a location for a new water supply well in East Gray, next to the Royal River, approximately a half mile farther downstream from the southern boundary of the ICZ. Pump tests at this location did not show any hydraulic connection with the Site.

Helen Taylor, Town of Gray Tax Assessor, was updated about the five-year process. She also indicated that there has been little interest in the Site over the past several years. She did identify the new homes that have been built within the ICZ (three east of the Royal River and three west of the river). The zoning

remains the same for the area as in 2003, Rural Residential/Agricultural with an overlying Aquifer Overlay Zone along the Royal River and Collyer Brook. Tax assessment information is online.

The site files at the Gray Public Library were reviewed. While the Administrative Record for the 1985 ROD is available, the Administrative Record for the 2001 ROD Amendment is not – there were problems with the compact disc format and it was removed from the library by EPA personnel. Some post-2001 ROD documents are present on the open shelves, but the files need to be updated and any electronic format needs to be more user-friendly. The reference librarian stated that there have been few requests for McKin material.

## 7.0 TECHNICAL ASSESSMENT

### 7.1 Question A: Is the remedy functioning as intended by the decision documents?

Yes.

The information presented in Soil Remediation and Site Closure Report prepared by the PRPs' contractor showed that the site soils have been remediated in accordance with the requirements of the 1985 ROD. The remediation, involving the excavation and on-site treatment of approximately 12,000 cubic yards of VOC- and petroleum-contaminated soils, reduced the risk of further groundwater contamination at the Site. The source control remedy included the treatment, stabilization and placement of soils onsite. The report submitted to EPA in 1987, as dictated by the ROD, completed the Source Control remedy.

The 2001 Amended ROD modified the groundwater remedy from active restoration to waiving the cleanup standards for groundwater. Instead of restoring the groundwater, a combination of long-term monitoring, contingency response for surface water, and institutional controls was required to ensure that the remedy would be protective of human health and the environment. Regression analysis of the groundwater sampling results through 2007 indicates a continued downward trend in TCE concentrations. In addition, the data collected since the last five-year review has improved prediction capability and the projected years needed to meet drinking water standards are less than calculated during the 1997-1999 remediation process. Institutional controls for residential properties have been put in place and appear to be operating as anticipated. Based on inspections and interviews with town and water district officials, EPA is not aware of any wells installed within the ICZ since the Amended ROD. The groundwater restriction ordinance appears to be functioning as intended. However, a restrictive covenant for the McKin property and access for the 900-series wells have not yet been secured.

As the contaminant levels in groundwater have been decreasing with time, levels in surface water have also decreased at SW-201 since the last FYR such that the surface water performance standard is being met on a monthly basis approximately 80% of the time. Surface water monitoring will continue to verify the downward trend. No specific surface water remedial action was included in the Amended ROD, but if long-term monitoring were to indicate that two monthly TCE levels were above the SWQCs in 2009 or 2013 at SW-1 and SW-201, respectively, a contingency response would be necessary. However, since the concentrations in the Royal River are the direct outcome of the groundwater discharging into it, with the continuing decrease in TCE concentrations in the groundwater, and that SW-1 is farther downstream from the discharge zone than SW-201, it is anticipated that the surface water will meet the SWQC in 2009. Surface water monitoring continues, and therefore at the time of this review, the surface water portion of the remedy is functioning as intended.

The Amended ROD also included an engineered cover for the Boiling Springs area because of the discharge of highly contaminated groundwater in this area. Follow-up visits to the area, including during this five-year review's site inspection, have found that the cover remains intact and is functioning as intended.

The 2003 FYR identified vapor intrusion as a potential pathway. However since the two decision documents for the Site, the 1985 ROD and 2001 Amended ROD, did not identify this potential pathway, no remedy was selected to address this potential pathway. Therefore, Question A is not applicable relative to vapor intrusion. Instead, vapor intrusion is more appropriately discussed in Questions B and C

below.

Opportunities for Optimization A procedure to reduce the groundwater monitoring well network was incorporated into the LTMP and the Amended ROD. The SP contractor's monitoring reports include recommendations for changes in status of monitoring wells. The September 2007 Water Quality Results Transmittal identified two more wells that have had at least three recent results below 5 ppb TCE and are thus being moved from active sampling to inactive status. The LTMP initially included 28 monitoring wells and one spring (plus the proposed 900-series wells); with this adjustment, the LTMP now includes 19 monitoring wells. Since it is part of the LTMP, the inactivation of wells will continue to optimize the long-term monitoring.

Indicators of Remedy Problems A review of routine groundwater monitoring data indicates that groundwater concentrations remain above the 1985 ROD performance standards and current federal and state drinking water standards. However, since the Applicable or Relevant and Appropriate Requirements (ARARs) for groundwater were waived in the 2001 Amended ROD, as long as the LTMP is implemented properly, and regression analysis continues to show a downward trend in VOC contamination, then the remedy is functioning as intended. The continued decrease in groundwater concentrations has thus far correlated with the decrease in surface water concentrations as well. The source control remedy has been completed.

## **7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?**

No, the exposure assumptions have changed.

Changes in Standards and TBCs As part of this five-year review, ARARs and To Be Considered (TBC) guidance for the Site were reviewed, and a review of current ARARs was conducted. The 1985 ROD contains health-based performance standards, not ARARs, since the ARARs designation only came into existence in 1986 with the reauthorization of the Superfund law. The ARARs identified in the Amended ROD, as well as current ARARs and TBCs, are applicable to this FYR. In general, the only changes that have been made since the Amended ROD have been updated citations for Maine statutes. The ARARs and TBC guidance are provided in Attachment 4 of this Report for reference.

The soil remedy was completed in compliance with the performance standards included in the 1985 ROD. Currently, there are no new chemical-specific ARARs that apply to soil. The only TBC guidance for soil that was written following the 1985 ROD is the 1997 Maine Remedial Action Guidelines (RAGs). The Maine RAGs for TCE range from 19 to 400 ppm for residential, trespasser and adult worker guidelines. These values are above the 0.1 ppm performance standard set (and attained) for treated soils in the 1985 ROD.

The primary changes to standards applicable to groundwater since the 1985 ROD are the introduction of the MCL and the 1992 MEGs for TCE (5 ppb). The MCL and 1992 MEG for TCE is 5 ppb, which is lower than the 1985 ROD performance standard (28 ppb). The MEGs have been periodically revised, the latest being on July 22, 2008. The 2003 FYR included a review of the 2000 MEGs, the most current MEGs at that time. None of the standards for the contaminants of concern changed from the 2000 to the 2008 MEGs. Neither the 2000 nor the 2008 revisions have been promulgated and thus would be viewed as potential TBCs rather than ARARs. The 1992 MEGs are enforceable and applicable as ARARs. The 1985 ROD performance standard for 1,1,1-TCA is 92 ppb, which is below both the applicable and revised MEGs. The following table illustrates the 1985 clean-up goals with the MCLs and 1992 MEGs and the

2008 TBC MEGs and which will be used in the process for removing institutional controls.

**Performance Standards for Removing Institutional Controls**

Contaminant of Concern	1985 ROD Clean-up Goal	MCL	1992 MEG	2008 MEG (TBC)
Trichloroethylene	28	5 <sup>2</sup>	5	32 – interim status
1,1,1-trichloroethane	92	200	200	200 – interim status
cis-1,2-dichloroethene	no ROD standard	70	70	70 – interim status
1,1-dichloroethene	no ROD standard	7	7	0.6 – final status
Tetrachloroethene	no ROD standard	5	5	7 – final status
vinyl chloride	no ROD standard	2	0.15 <sup>3</sup>	0.2 – interim status

1 all concentrations/standards are in micrograms per liter (µg/L) or parts per billion (ppb)

2 established after the 1985 ROD

3 detection limit varies with location and is generally greater than the 1992 MEG

With the Amended ROD that included a Technical Impracticability Determination and subsequent Consent Decree, the groundwater ARARs (e.g. MCLs and MEGs) were waived, and long-term monitoring was required to document that contaminant levels continue to decrease with time. A risk assessment conducted by EPA Region 1 in 1998 determined that wading or swimming in the river was “unlikely to result in an exceedance of 1E-04 or a Hazard Quotient of 1.” Therefore, as long as contaminant levels continue to decrease, contamination reaching the Royal River will not pose a threat to human health and the environment.

TCE has been detected in the Royal River since 1989. Since 1992, surface water concentrations have been decreasing, following the pattern of groundwater concentrations. The Amended ROD estimated that SWQC levels should be reached sometime between 2007 and 2009. Since the last FYR, the SWQC for TCE has been met monthly approximately 80% of the time.

Changes in Exposure Pathways Exposure scenarios identified in the risk assessment performed in the 1984 FS included direct ingestion, dermal absorption, and inhalation for soils, as well as direct ingestion of groundwater. As stated in the 1985 ROD, “Current and potential health and environmental risks involved with no action alternatives are associated primarily with contaminated groundwater. For exposures to other environmental media, the risks are insignificant based on comparisons with relevant guidelines and the risk assessment performed in the FS.” Since the issuance of that document, exposure to contaminated groundwater has been discontinued through restrictive covenants, institutional controls, and the engineered cover at Boiling Springs. Land use at the Site has not changed and is not expected to change.

The only additional route of exposure could be potential indoor air exposure because of the known presence of the contaminant plume beneath residential properties in Gray. A November 2002 draft EPA

guidance document entitled “Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils” addresses this issue. Additionally, in April 2004 Maine Department of Health & Human Services published Ambient Air Guidelines that are established at an Incremental Lifetime Cancer Risk of  $10^{-5}$  which is the acceptable risk level in Maine’s Uncontrolled Sites Policy (Guidance Manual for Human Health Risk Assessments at Hazardous Substance Sites”, June 1994).

Vapor intrusion has now been identified as a source of exposure to some residents in the vicinity of the site. The ongoing vapor intrusion study in the vicinity of the site provides some evidence for this exposure pathway in six homes. Further assessment is needed to determine whether this exposure presents an unacceptable risk.

Changes in Toxicity and Other Contaminant Characteristics The major contaminant of concern that contributed most to the cancer risk potential at the Site was TCE. In 2002, the cancer slope factor (CSF) and Risk Reference Dose (RfD) for TCE were withdrawn from the EPA Integrated Risk Information System (IRIS). These values remain under review and the date for publishing a new value is uncertain. Until the values are finalized, they are not an applicable standard. In order to ensure that the previously conducted risk characterizations remain protective, the new standards, once published, should be compared to the values used to calculate risk in the FS to ensure remedy protectiveness.

Changes in Risk Assessment Methods The only changes in risk assessment methods include the way in which risk of constituents in air is estimated and the use of certain exposure estimates for soils. Some of the default exposure assumptions for soils have changed, specifically for dermal exposure, based on studies reviewed by EPA. Although the 2001 Amended ROD waived performance standards for groundwater, the institutional controls included federal and state drinking water standards as criteria that needed to be met before the controls could be terminated. Hence, these standards remain protective for the exposures and receptors identified for the Site.

Expected Progress Towards Meeting RAOs The soil remedy was completed and met the specified remedial action goals as documented in the 1987 report. Overall, the groundwater concentrations are decreasing and as long as they continue to do so, the selected remedy is functioning within the limits of the Amended ROD. The 2001 Amended ROD estimated it would take 50 years to attain federal and state drinking water standards. Based on the updated regression analysis through the 2007 monitoring data, the drinking water standards will be attained more quickly, with the projection now shortened to 2036 instead of 2051. However, because access to the properties needed for the installation of the 900-series has not been attained, there is limited bedrock data and therefore EPA and MEDEP will conservatively assess the monitoring data and its impact on the institutional controls prior to recommending removal of any of the controls.

### **7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

Yes.

The vapor intrusion pathway was identified in the previous FYR as a potential issue and has been confirmed as such by studies preceding this FYR. EPA is in the midst of a second phase of an investigation of this pathway. The results of the first study conducted in 2006 along the roadways indicated that there are vapors in the soil gas near the McKin property. Consequently, a second phase was initiated to follow up with sampling sub-slab soil gas and indoor air. Preliminary results from this follow-up study indicate that TCE and PCE are present in the indoor air of some residences near the Site at levels

exceeding reporting and action limits for these compounds. EPA will carefully review the results of the vapor intrusion study, perform a risk assessment of the data, and determine the appropriate response actions to take, if any. Any response decision will be documented in a decision document, such as an Action Memorandum (for a removal action) or an Explanation of Significant Difference (for a remedial action). There currently is no potential for vapor intrusion exposure on the McKin property itself because the building for the groundwater extraction and treatment system is not used other than for site work preparation and there are no other buildings on the property.

#### **7.4 Technical Assessment Summary**

The components of the remedy included in remedial decision documents are performing as expected. The soil remedy is complete and observations and discussions with town officials indicate that several of the institutional controls are being implemented. Groundwater monitoring indicates a downward trend toward federal and state drinking water standards. However confirmation may still be needed as to whether the groundwater in bedrock has attained these standards. Sampling to provide this information was to be obtained from the planned 900-series of monitoring wells, but these have yet to be installed due to difficulties in acquiring the necessary access rights.

Neither of the two decision documents, the 1985 ROD and 2001 Amended ROD, included a remedy component to address the vapor intrusion pathway. EPA is currently conducting a Phase 2 investigation of indoor air for a selected number of homes on Depot Road. Upon conclusion of this investigation, EPA will perform a risk assessment to determine whether there is an unacceptable risk, and if so, a determination will be made as to what further actions are necessary.

## 8.0 ISSUES

Four issues have been identified in this review. Three of the issues were also identified in the 2003 FYR: indoor air quality, lack of a restrictive covenant on the McKin property, and access for the 900-series wells. The fourth issue is the omission of formal compliance monitoring of the institutional controls.

As noted in Sections 7.2 and 7.3, EPA is investigating the vapor intrusion pathway in the vicinity of the McKin property. Preliminary analysis has detected measurable concentrations of TCE in samples collected from six homes that are above the screening criteria in EPA's draft guidance on vapor intrusion. Concentrations above these screening criteria do not, in themselves, equate to an unacceptable risk. Rather, because of the conservative assumptions on which these criteria were developed, these screening criteria are used to screen out sites where further action or investigation is not needed. Upon conclusion of the ongoing investigation, EPA will conduct a risk assessment to determine whether there is an unacceptable risk and, if so, a determination will be made as to what further response action is necessary.

The Remedial Action Work Plan, Appendix A to the 2001 Consent Decree Amendment, required the Settling Parties to make a good faith effort to obtain a restrictive covenant from the property owner of the McKin property. This restrictive covenant was to include, at a minimum, a prohibition against any activity which might disrupt remedial or monitoring measures installed pursuant to the 1988 Consent Decree and 2001 Consent Decree Amendment. The Settling Parties discussed restrictive covenants with the owner, but ultimately, the owner refused the SP' request.

EPA needs to further assess the need for institutional controls on this property. The property is currently undeveloped. Were it to be developed in the future, EPA and MEDEP would seek to have restrictions placed on the property that would prevent certain activities that might affect the protectiveness of the remedy, including addressing the potential vapor intrusion pathway. With the Town of Gray ordinance preventing the use of groundwater on the property, the remedy currently remains protective for this property.

The Remedial Action Work Plan also required the SP to install a series of monitoring wells in the overburden and bedrock. The purpose of these wells, designated the 900-series wells, was to monitor the plumes' positions and potential for lateral expansion. In particular, data from the 900-series wells was to be used to establish that the plumes do not expand to areas beyond the Institutional Control Zone. In addition, the data would be used to make determinations regarding removing restrictive covenants on individual properties as groundwater cleanup standards are met.

EPA needs to further assess the need for these wells. Data from the overburden groundwater suggests that the northern plume is approaching the drinking water standards and the updated regression analysis indicates that the eastern plume may attain these standards more quickly than originally calculated. However, without data from the bedrock aquifer, EPA and MEDEP will need to conservatively assess the progress toward the standards and this includes making decisions regarding removing restrictive covenants from individual properties. Any change to the requirement for the installation of these monitoring wells would require a new decision document.

The three institutional control instruments that have been implemented were reviewed for information on formal compliance monitoring. As described in Section 6.4.4, the 2001 Consent Decree Amendment and

its appendices, (Remedial Action Work Plan, Declaration of Restrictive Covenants, and Conservation Easements) and the town ordinance were reviewed to determine the compliance monitoring of these institutional controls. The Consent Decree itself does not include any language pertaining to compliance monitoring of these controls. Paragraph 2 of each of the Declarations of Restrictive Covenant for the nineteen properties states that the SP, EPA, and MEDEP have the right to enter the properties on foot for the purpose of ensuring compliance with the restrictions set forth, but there is no language stating which party has the compliance responsibility or the frequency of monitoring. The easements on the two properties along Collyer Brook give Maine as the grantee the right to enter the properties to determine if there is compliance with the terms and purpose of the easements, but there is no established monitoring responsibility.

**Issues**

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Vapor intrusion in residential homes	N	Y- Potentially
Former McKin facility property has no restrictive covenant in place	N	Y – Potentially
900 series well- access has not yet been obtained	N	Y – Potentially
Institutional Control Compliance Monitoring	N	Y - Potentially

## 9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

### Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Vapor Intrusion	Determine appropriate response action	EPA/MEDEP	EPA/State	Summer 2009	N	Y
McKin property restrictive covenant	Investigate other options	EPA/MEDEP	EPA/State	Summer 2009	N	Y
900 series wells	Reexamine need and, if appropriate, new strategy for access	EPA/MEDEP/SP	EPA/State	Summer 2009	N	Y
IC compliance monitoring	Determine appropriate schedule and responsibilities	EPA/MEDEP/SP	EPS/State	Summer 2009	N	Y

## 10.0 PROTECTIVENESS STATEMENT

The on-site remedy (OU1) at the McKin Company Superfund Site currently protects human health and the environment because the soil remediation is complete and the Town of Gray ordinance prohibits the use of groundwater. However, in order for the remedy to be protective in the long-term, the following actions need to be taken:

- place institutional controls on the McKin property to limit redevelopment
- implement the approved site closure activities to prevent accidental pathways to the groundwater. These activities include decommissioning of monitoring wells, infiltration galleries, and decontamination pad, and removal of all equipment. Per the 2001 Consent Decree Amendment, these activities were to be performed within ten years of the effective date of the Consent Decree (December 2001).

The off-site groundwater remedy (OU2) at the McKin Company Superfund Site currently protects human health and the environment because the Town of Gray ordinance prohibits the use of groundwater and other institutional controls are in place. The remedy will remain protective as long as the institutional controls are monitored, maintained and, if necessary, enforced. Because levels of contaminants are decreasing faster than anticipated in groundwater and because the outside edge of the eastern and northern plumes are located adjacent to Collyer Brook and Royal River, EPA is less concerned that the plumes have spread beyond the ICZ in those directions. However, without the installation of the 900-series wells that would provide bedrock data, it is expected that the institutional controls will need to remain in place beyond the predicted attainment of federal and state drinking water standards for the overburden groundwater by 2036.

The vapor intrusion pathway continues to be investigated, and thus, a protectiveness determination for this pathway cannot be made at this time until further information is obtained.

The remedial actions at OU1 are protective; however, because a protectiveness determination cannot be made at this time for OU2, the protectiveness of human health for the entire site is deferred. The following actions need to be taken to ensure protectiveness: complete the second phase of the vapor intrusion investigation; determine whether further investigation is necessary, and then perform a final risk assessment of the vapor intrusion data. It is expected that the second phase activities will be completed by the end of 2008, and any further investigation and risk assessment by summer 2009.

## **11.0 NEXT REVIEW**

The next five-year review for the McKin Company Superfund Site is required by September 2013, five years from the date this FYR Report is signed.

**2008 FIVE-YEAR REVIEW  
MCKIN COMPANY SUPERFUND SITE**

**FIGURES**



MAP FROM USGS QUADRANGLE SHEET FOR GRAY, MAINE, EDITED IN 1980 (NE/4 GRAY 15" QUADRANGLE).

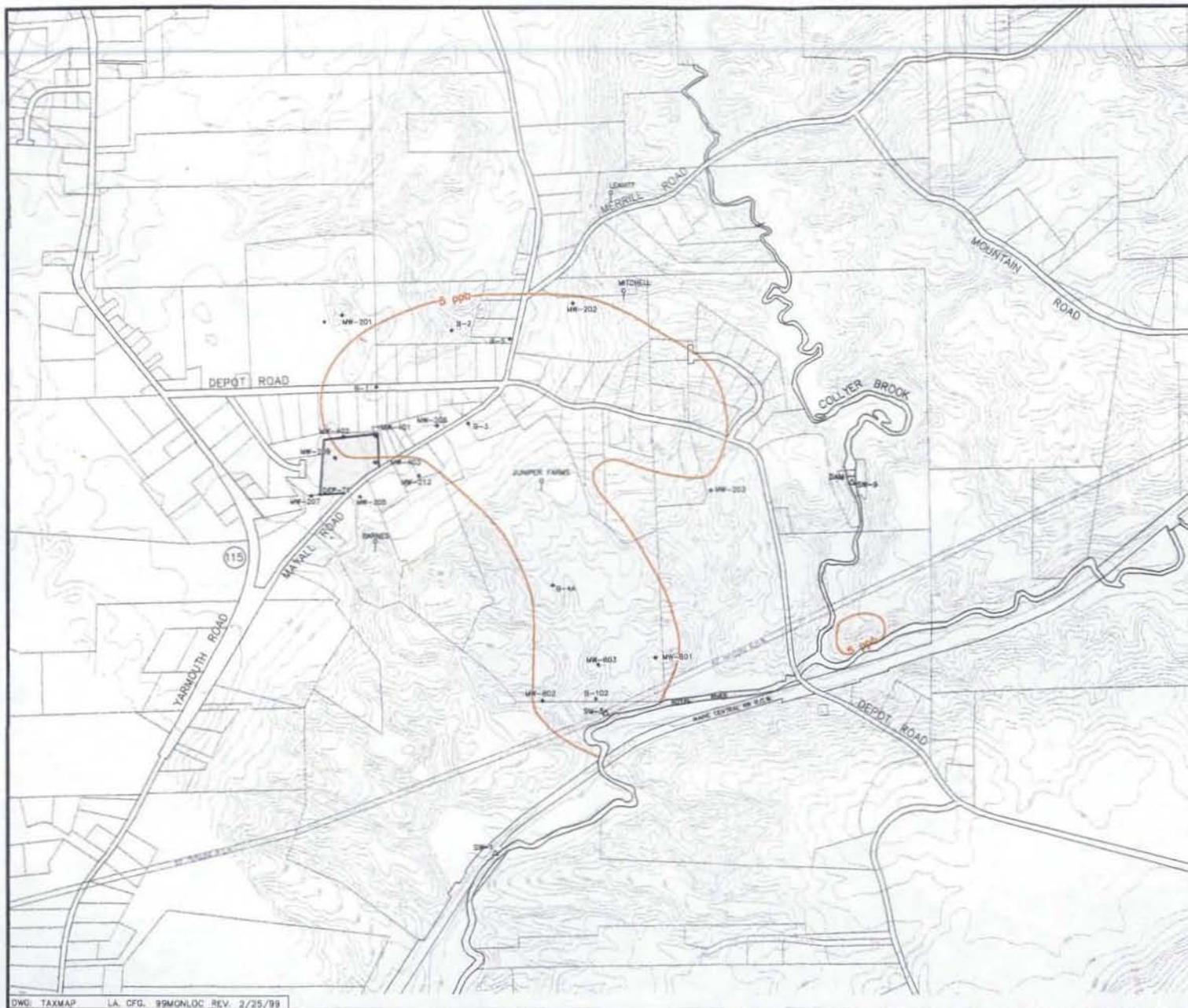


QUADRANGLE LOCATION

2008 Five-Year Review

Figure 1: Site Location Map

McKin Company Superfund Site



**NOTES**  
 BASE MAP FEATURES PROVIDED BY THE TOWN OF GRAY.  
 GROUND SURFACE CONTOURS PROVIDED BY CASCO BAY ESTUARY PROJECT.  
 EXPLORATIONS SURVEYED BY SQUAW BAY CORP.

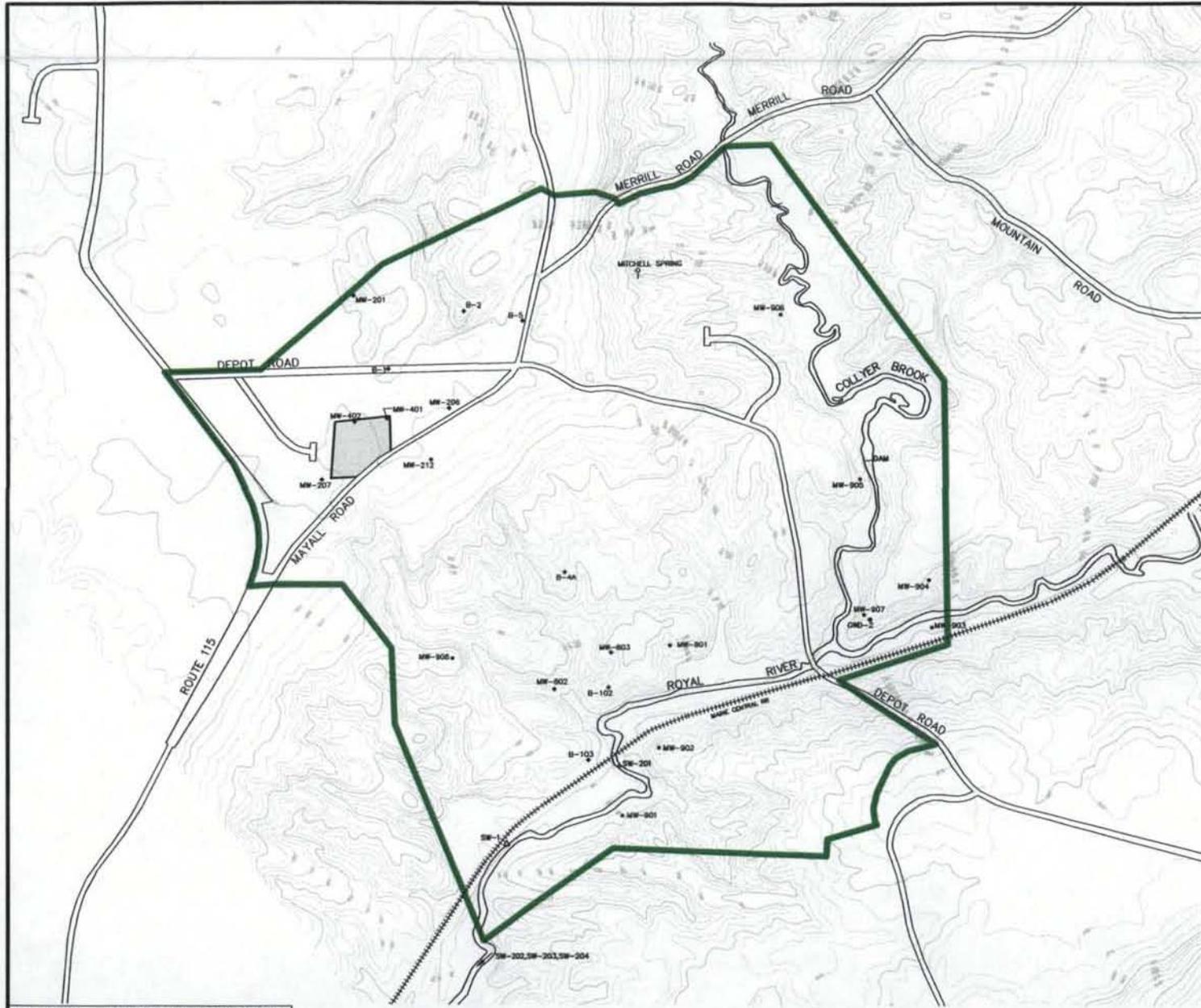
- LEGEND**
- 5 ppb 5 PPB TCE CONTOUR IN SOIL OVERBURDEN GROUNDWATER, INTERPRETED IN NOVEMBER 1998
  - MW-201 EXISTING MONITORING WELL OR WELL CLUSTER
  - SW-1 SURFACE WATER SAMPLING POINTS
  - BARNES SEEP OR SPRING SAMPLING POINTS



**2008 Five-Year Review  
 McKin Company Superfund Site  
 Figure 3: Overburden Plume Map**



0: WCK 15M1\ALAN\18XMAP.DWG THU Feb 25 12:23:38 1999



**NOTES**

BASE MAP FEATURES PROVIDED BY THE TOWN OF GRAY.  
GROUND SURFACE CONTOURS PROVIDED BY CASCO BAY ESTUARY PROJECT.  
EXPLORATIONS SURVEYED BY SQUAW BAY CORP.

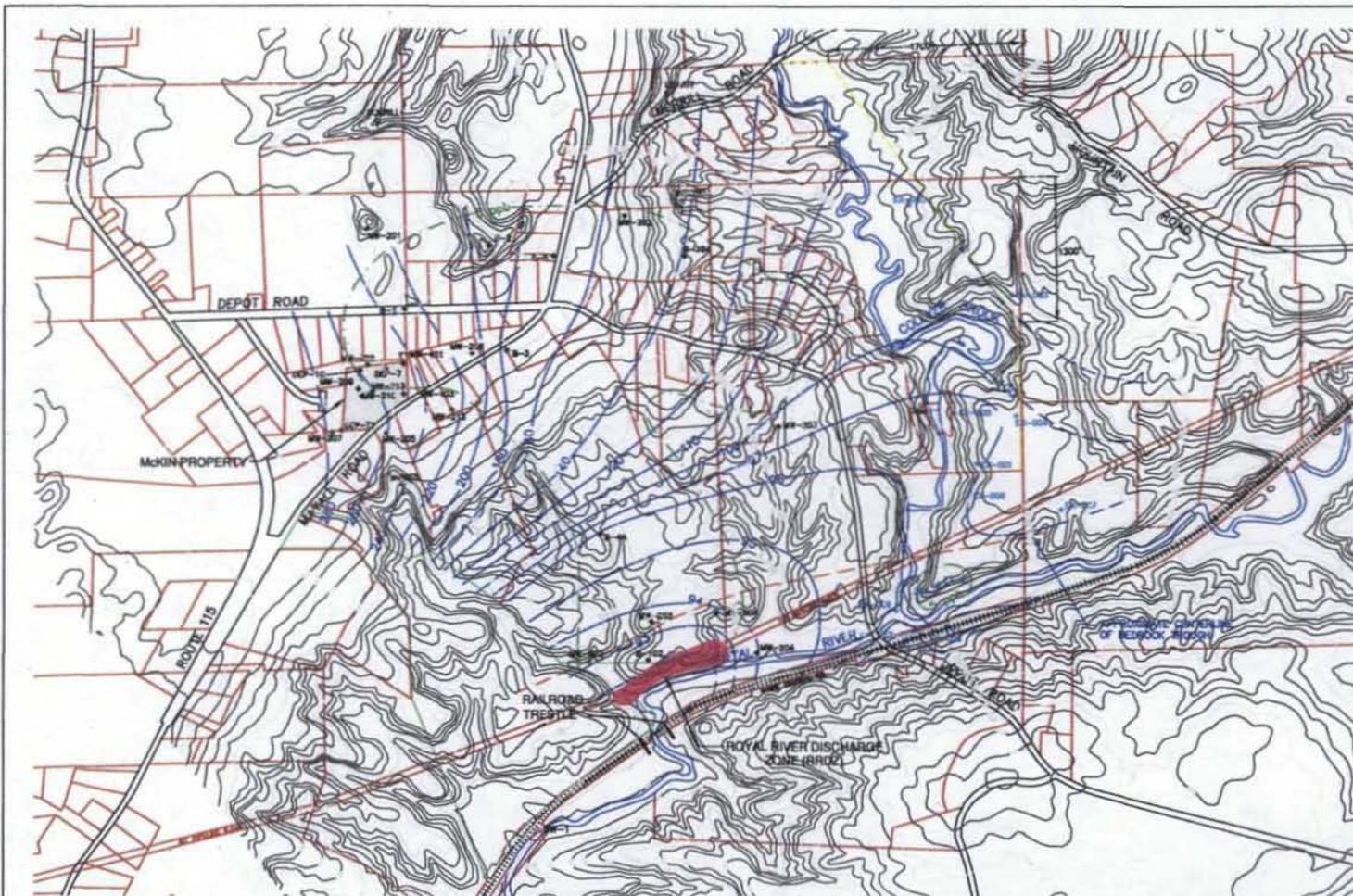
**LEGEND**

- MW-901 PROPOSED LOCATION FOR FUTURE GROUNDWATER MONITORING WELLS
- INSTITUTIONAL CONTROL ZONE BOUNDARY
- ⊕ MW-801 EXISTING MONITORING WELL OR WELL CLUSTER
- △ SW-201 SURFACE WATER SAMPLING POINTS



2008 Five-Year Review  
McKin Company Superfund Site  
Figure 2: Site Map





**NOTES (FROM SMC PLAN - SEE NOTE 1 OF THIS PLAN)**

BASE MAP FEATURES PROVIDED BY THE TOWN OF GRAY. GROUND SURFACE CONTOURS PROVIDED BY CASCO BAY ESTUARY PROJECT. EXPLORATIONS SURVEYED BY SOLAR BAY CORP.

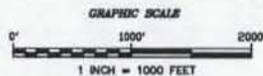
INTERPRETATION OF POTENTIOMETRIC SURFACE ELEVATION CONTOURS BASED ON WATER LEVEL MEASUREMENTS MADE MAY 1998. ACTUAL CONFIGURATION OF POTENTIOMETRIC SURFACE MAY VARY FROM THAT SHOWN. POTENTIOMETRIC SURFACE VARIES WITH SEASON AND PRECIPITATION.

**LEGEND**

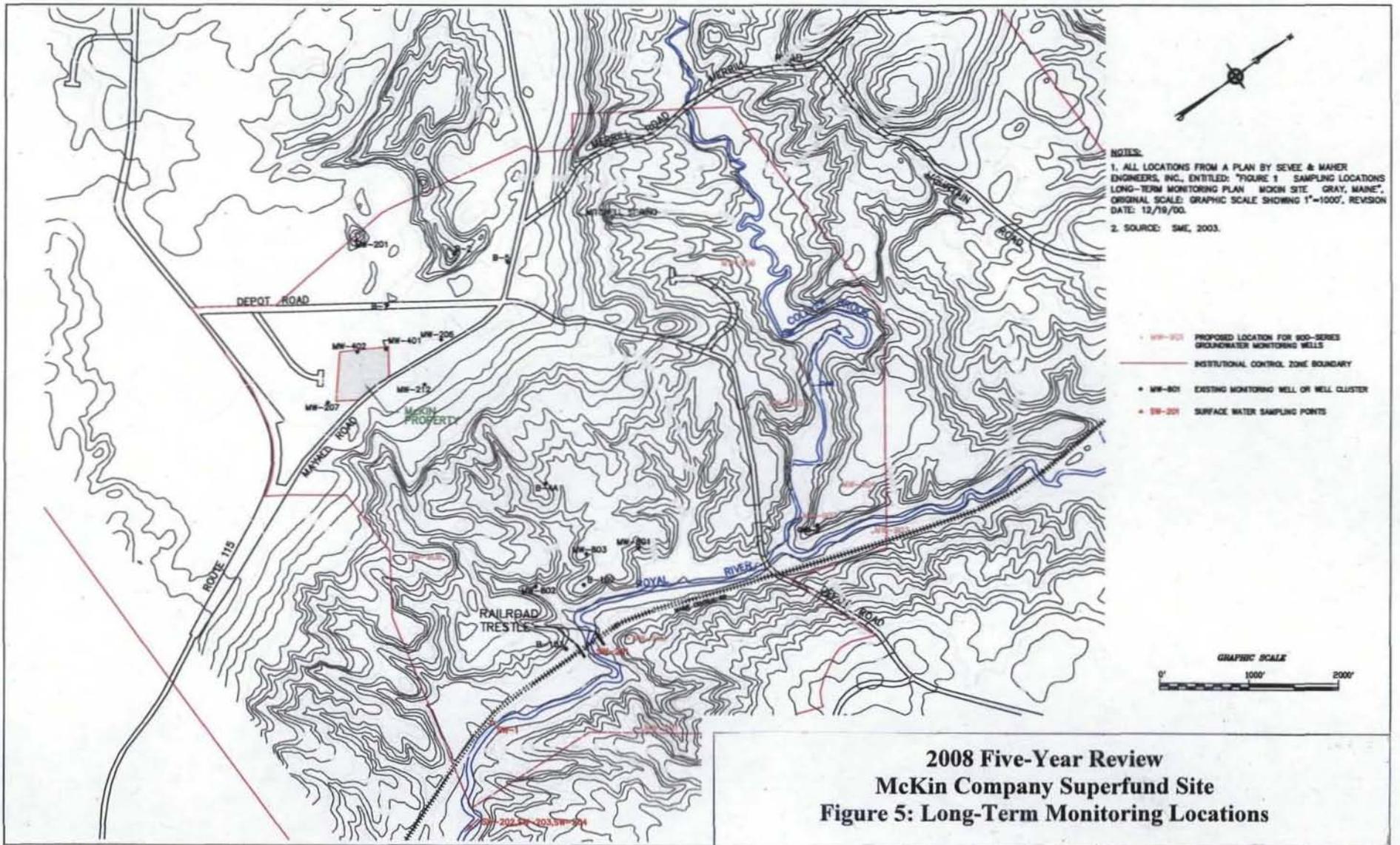
- 5 ppb — 5 PPB TCE CONTOUR IN OVERBURDEN GROUNDWATER, INTERPRETED IN NOVEMBER 1998
- 120 — INTERPRETED SOIL OVERBURDEN GROUND-WATER POTENTIOMETRIC SURFACE CONTOUR IN FEET-NOV, MAY 1998
- MW-801 — EXIST. MONITORING WELL OR WELL CLUSTER
- SW-1 — SURFACE WATER SAMPLING POINTS

**NOTE:**

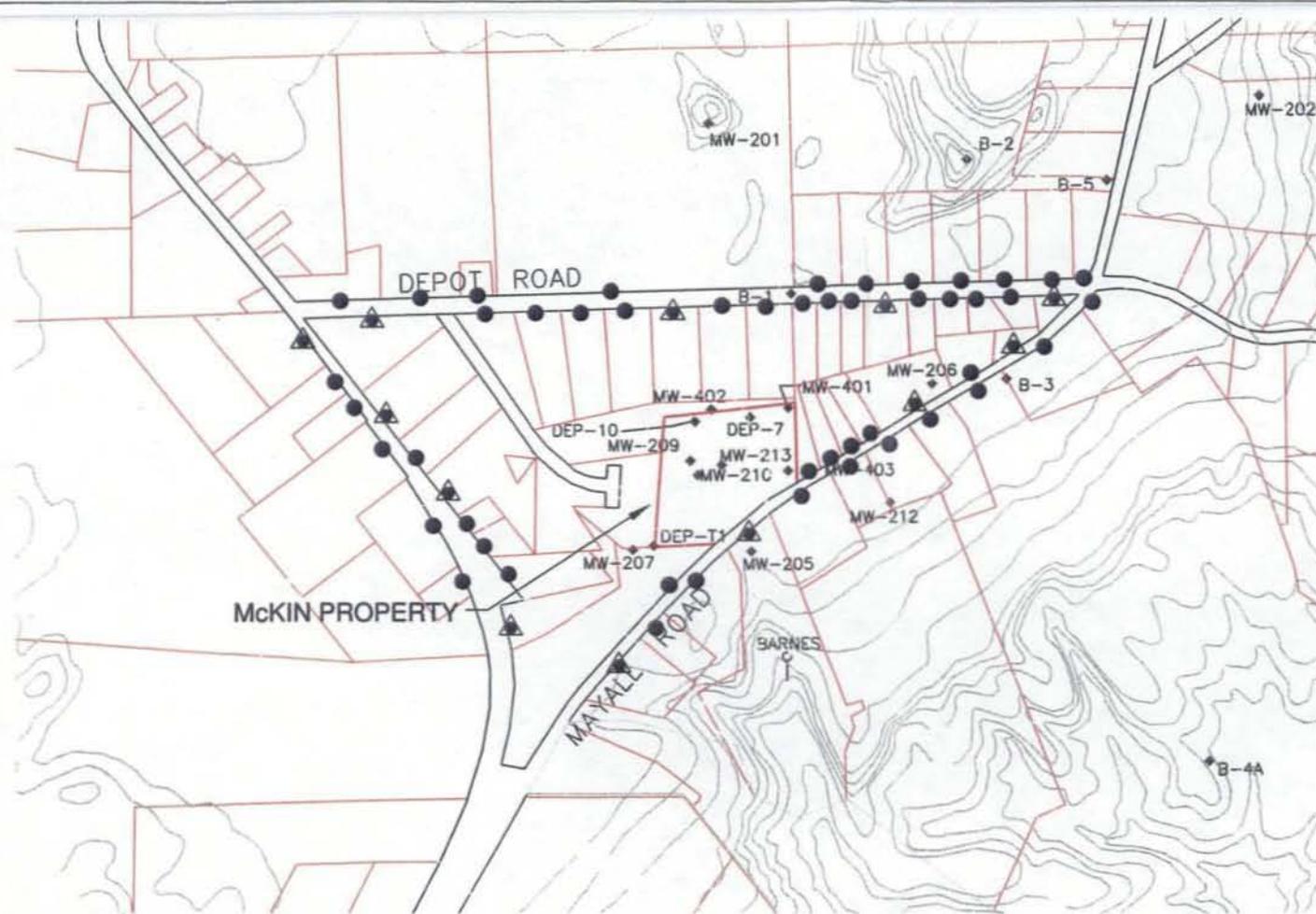
1. BASE MAP SOURCE: PLAN BY SEVEE & MAHER ENGINEERS, INC., ENTITLED: "LOCATION MAP PROPOSED INSTITUTIONAL CONTROL ZONE MONITORING WELLS MCKIN SITE GRAY, MAINE", REV. 12/4/98.



**2008 Five-Year Review  
McKin Company Superfund Site  
Figure 4: Royal River Discharge Zone**



2008 Five-Year Review  
 McKin Company Superfund Site  
 Figure 5: Long-Term Monitoring Locations



NOTES (FROM SMC PLAN - SEE NOTE 1 OF THIS PLAN):  
 BASE MAP FEATURES PROVIDED BY THE TOWN OF GRAY.  
 GROUND SURFACE CONTOURS PROVIDED BY CASCO BAY ESTUARY  
 PROJECT. EXPLORATIONS SURVEYED BY SQUAW BAY CORP.

**LEGEND**

- ⊕ MW-801 EXIST. MONITORING WELL OR WELL CLUSTER
- PROPOSED SOIL GAS SAMPLE LOCATION
- ▲ PROPOSED SOIL GAS AND GROUNDWATER SAMPLE LOCATION

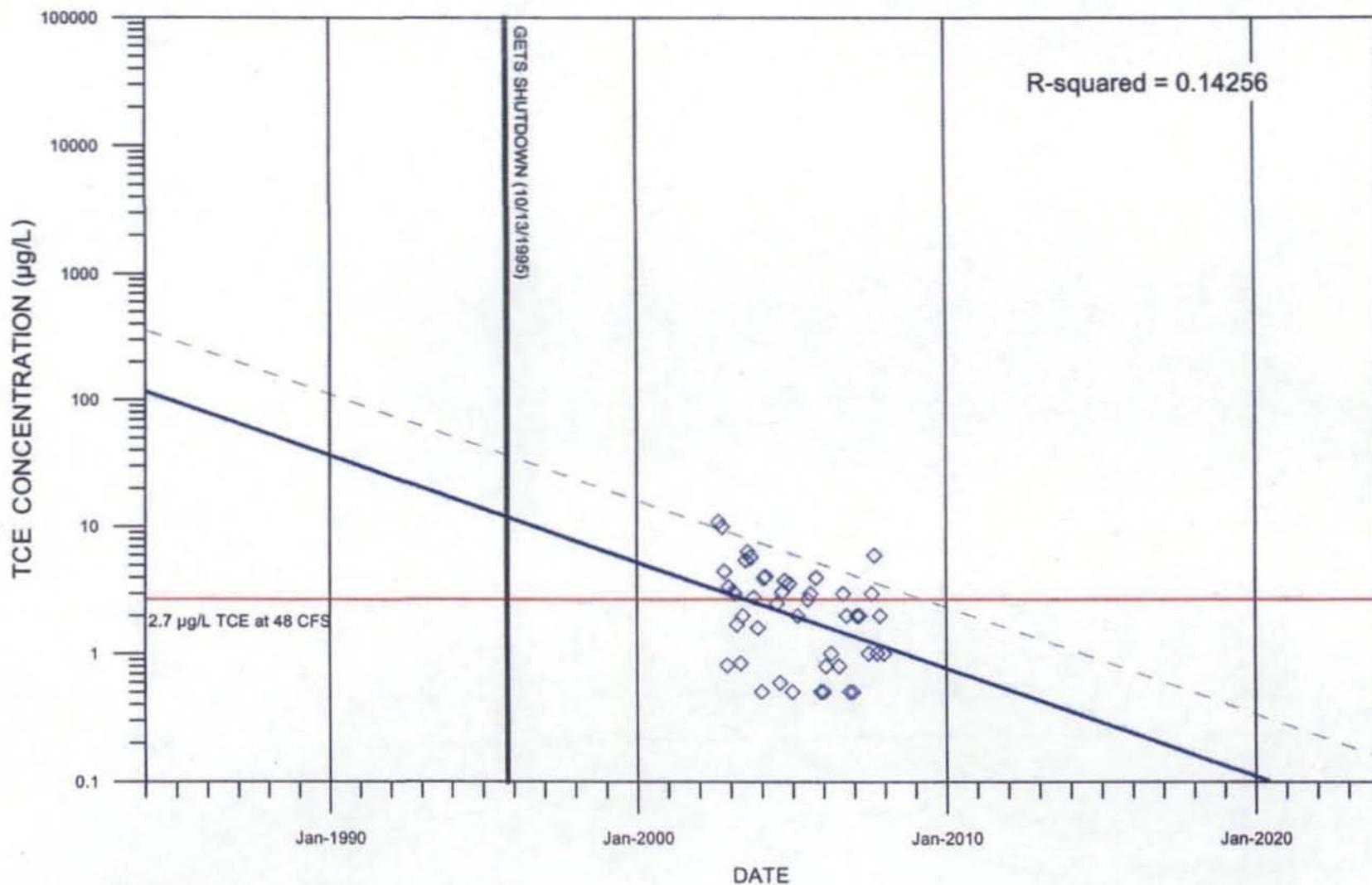
**NOTE:**  
 1. BASE MAP SOURCE: PLAN BY SEVEE & MAHER ENGINEERS, INC., ENTITLED:  
 "LOCATION MAP PROPOSED INSTITUTIONAL CONTROL ZONE MONITORING  
 WELLS MCKIN SITE GRAY, MAINE", REV. 12/4/98.



**2008 Five-Year Review  
 McKin Company Superfund Site**

**Figure 6: Phase 1 Vapor Intrusion  
 Sampling Locations**

2008 Five-Year Review  
McKin Company Superfund Site  
Figure 7: SW-201 Regression Analysis



**2008 FIVE-YEAR REVIEW  
MCKIN COMPANY SUPERFUND SITE**

**ATTACHMENTS**

## **Attachment 1: List of Documents Reviewed**

EPA, 2001a. *Amended Record of Decision, McKin Company Superfund Site, Off-Site Operable Unit* Environmental Protection Agency, Region 1, Boston, Massachusetts. March 30, 2001

, 2001. *Comprehensive Five-Year Review Guidance*, OSWER Directive 9355.7-03B-P.

, 2003. *Five-Year Review Report, McKin Company Superfund Site, Gray, Maine*

Gray Zoning Regulations, Section 420. Amended to January 18, 2000.

SME, 2001. *Long-Term Monitoring Plan, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. April 25, 2001.

, 2003. *Project Operations Plan, Volume 1, McKin Superfund Site, Gray, Maine*. Sevee & Maher Engineers, Inc. February 2002 (Revised April 2003).

, 2003. *July 2006 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. August 26, 2003

, 2004. *June 2004 Groundwater Sampling Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. August, 2004

, 2004. *September 2004 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. November 22, 2004

, 2005. *June 2005 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. September 2, 2005

, 2005. *September 2005 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. October 21, 2005

, 2006. *June 2006 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. August 21, 2006

, 2006. *Response to Review of June 2006 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. September 25, 2006

, 2006. *September 2006 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. October 31, 2006

, 2007. *June/July 2007 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. August 20, 2007

, 2007. *September 2007 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. November 5, 2007

, 2008. *Transmittal of Updated TCE Regressions, McKin Superfund Site, Gray, Maine* Sevee & Maher Engineers, Inc. May 14, 2008

, 2008. *June/July 2008 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine*  
Sevee & Maher Engineers, Inc. August 7, 2008

Tetra Tech NUS, 2006, *Draft Vapor Intrusion Pathway Assessment, Technical Assistance, McKin Site, Gray, Maine*, Tetra Tech NUS, Inc. August 2006

US District Court, 2001. *Maine Civil Action No. 88-0101-B, Amendment to Consent Decree*, United States District Court for the District of Maine, December 6, 2001

US District Court, 2001, *Appendix A to Amendment to Consent Decree, Remedial Action Work Plan*, United States District Court for the District of Maine, December 6, 2001

US District Court, 2001, *Appendix E to Amendment to Consent Decree, Restrictive Covenant*, United States District Court for the District of Maine, December 6, 2001

US District Court, 2001, *Appendix F to Amendment to Consent Decree, Conservation Easement*, United States District Court for the District of Maine, December 6, 2001

US District Court, 2001, *Appendix G to Amendment to Consent Decree, Pollution Legal Liability Select Policy*, United States District Court for the District of Maine, December 6, 2001

**Attachment 2: Insurance Policy Endorsements #2 and 3 for Royal River Contingency,  
Pollution Legal Liability Select Policy**

**Commerce and Industry Insurance Company  
70 Pine Street  
New York, NY 10270**

ENDORSEMENT No. 2

This endorsement, effective 12:01 AM: September 6, 2000

Forms a part of policy no.: PLS 8086724

Issued to: MCKIN SITE TRUSTEES

By: COMMERCE AND INDUSTRY INSURANCE COMPANY

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

It is hereby agreed that Section VI. DEFINITIONS, Paragraph T. Pollution Conditions is deleted in its entirety and replaced with the following:

T. Pollution Conditions means that all of the following conditions apply only:

- a) The surface water contaminant is TCE (and not any transformation products of TCE), and
- b) The TCE levels are solely a result of the McKin Superfund Site contamination, and
- c) Two surface water TCE sampling events results in a value above 2.7 ppb from sampling conducted monthly, commencing May 1, 2009 to December 1, 2009 or May 1, 2013 to December 1, 2013, as stated in the definition of Claim. Under no circumstances does a Pollution Condition constitute one sampling event in 2009 and one sampling event in 2013 resulting in values above 2.7 ppb, rather, sampling events presented as a claim must either be conducted between May 1, 2009 and December 1, 2009 or May 1, 2013 and December 1, 2013, and
- d) The TCE levels have been obtained from the following surface water sampling locations,  
  
Samples taken from May 1, 2009 to December 1, 2009:  
  
Location SW-1: As described in the *Data Transmittal and Site Conceptual Model Description, McKin Superfund Site*, prepared by Sevee & Maher Engineers, Inc., March, 1999, or  
  
Samples taken from May 1, 2013 to December 1, 2013:  
  
Location SW-201: Which has been described to date as 'just downstream of the railroad trestlepast the mixing point, midway between previous sampling points SW-110 and SW-111.' in a memo entitled *Proposed Long-Term Monitoring Plan McKin Superfund Site*, prepared by Sevee & Maher Engineers, Inc., final version November 2, 1999, and
- e) The surface water samples will be collected using standard, US EPA acceptable protocol. The surface water samples will be analyzed at a US EPA certified laboratory. The laboratory certification must include TCE and must be current at the time of

INSURED'S COPY

ENDORSEMENT No. 2 (Continued)

This endorsement, effective 12:01 AM: September 6, 2000

Forms a part of policy no.: PLS 8086724

Issued to: MCKIN SITE TRUSTEES

By: COMMERCE AND INDUSTRY INSURANCE COMPANY

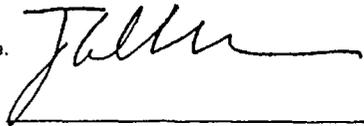
analysis. The detection limit for all analyses of TCE must be the lower of the following:

- Equal to or below 1-microgram per liter, or
- US EPA required detection limit, or
- That required by existing regulatory guidance governing at the time of the analysis, or
- Standard industry practice at the time of analysis.

The sample data must be of a quality to permit data validation per US EPA methods if necessary. AIG reserves the right to validate any and all analytical data used in determining the levels of TCE at SW-1 and SW-201. If any TCE sampling results are reported as non-detect (ND) or below-detection limit (BDL), one half of the concentration between zero and the detection limit will be used for that data point in the compliance determination, and

- f) The eight (8) sampling results for each monthly sampling event (seven at a minimum) will be averaged. Each of these averages will be adjusted for harmonic mean flow. The final number obtained after adjustment for harmonic mean flow will be used to determine the concentration of TCE at sampling locations SW-1 and/or SW-201 each month. This final number is what is meant by a 'sampling event'.

All other terms, conditions and exclusions remain the same.



Authorized Representative  
or countersignature (where required by law)

INSURED'S COPY

ENDORSEMENT No. 3

This endorsement, effective 12:01 AM: September 6, 2000

Forms a part of policy no.: PLS 8086724

Issued to: MCKIN SITE TRUSTEES

By: COMMERCE AND INDUSTRY INSURANCE COMPANY

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

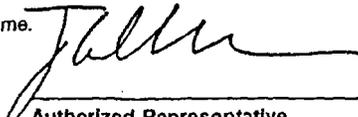
It is hereby agreed that Section VI. DEFINITIONS, Paragraph E. Clean-Up Costs is deleted in its entirety and replaced with the following:

- E. Clean-Up Costs means expenses including reasonable and necessary legal expenses incurred with the Company's written consent, incurred in the investigation, removal, remediation including monitoring, or disposal of soil, surfacewater, groundwater or other contamination and/or co-sharing of (50%-50%) of payment for land access:
- a) to the extent required Environmental Laws, or specifically mandated by court order, the government or any political subdivision of the United States of America or any state thereof, or Canada or any province thereof duly acting under the authority of Environmental Law(s), or
  - b) which have been actually incurred by the government or any political subdivision of the United States of America or any state thereof or Canada or any province thereof, or third parties, and
  - c) which under no circumstance, include current Operations & Maintenance (O&M) groundwater monitoring as set forth in the draft long-term monitoring protocols as agreed to, prior to binding.

The draft 'Proposed Long-Term Monitoring Plan, McKin Superfund Site, Gray, Maine', dated February 17, 2000 (revised) November 20, 1998' as previously forwarded to AIG, will be used in part for determination of Pollution Conditions except as modified by terms contained herein with respect to surface water sampling locations. In addition, sampling methodology will consist of using either the existing conventional bailer or diffusion bag methods, or both, as currently employed at the site. Per the August 21, 2000, letter from Marcia J. Lamel of the US EPA to the Company, incorporated by reference herein, no subsequent changes to the Long-Term Monitoring Plan will affect any requirements of this insurance policy.

Also, it is hereby agreed that the Company's obligation under Claim will have been met when, after the Policy has been triggered, over a period of eight(8) continuous monthly surface water sampling events, the average and adjusted results in eight consecutive months indicate TCE levels of 2.7 ppb or lower (samples will be taken and adjusted for harmonic mean flow exactly like sampling protocol from either May 1, 2009 to December 1, 2009 or May 1, 2013 to December 1, 2013). Provided, however, the Insured shall not be responsible for any costs and/or to perform any such sampling.

All other terms, conditions and exclusions remain the same.

  
Authorized Representative  
or countersignature (where required by law)

INSURED'S COPY

|



3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Maine DEP

Contact: Rebecca Hewett Project Manager July 24, 2007 207 287-8554  
Name Title Date Phone no.

Problems; suggestions;  Report attached: MEDEP has voiced concerns about not knowing the precise extent of the bedrock plume, and long-term access and restrictions.

Agency: Town of Gray

Contact: Helen Taylor Tax Assessor July 29, 2007 207  
Name Title Date Phone no.

Problems; suggestions;  Report attached: The uncertainties associated with how ownership would be transferred and the Right-of-Way need to be resolved before the reuse of the property can take place.

Agency \_\_\_\_\_

Contact \_\_\_\_\_  
Name Title Date Phone no.

Problems; suggestions;  Report attached \_\_\_\_\_

Agency \_\_\_\_\_

Contact \_\_\_\_\_  
Name Title Date Phone no.

Problems; suggestions;  Report attached \_\_\_\_\_

4. **Other interviews** (optional)  Report attached. Randy Smith, Coordinator for the Union Chemical Company Trustees; July 24, 2007; 603 673-0004

No problems with the McKin property itself or surrounding properties that together comprise the McKin Site.

**III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)**

1.	<b>O&amp;M Documents</b> <input type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks: <b>N/A – there is no ongoing remediation. Aboveground components for the groundwater extraction system have been dismantled</b>	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> <input type="checkbox"/> Contingency plan/emergency response plan Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
4.	<b>Permits and Service Agreements</b> <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____ Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5.	<b>Gas Generation Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
6.	<b>Settlement Monument Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
7.	<b>Groundwater Monitoring Records</b> Remarks: <u>Monitoring reports are sent directly to EPA and MEDEP</u>	<input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
8.	<b>Leachate Extraction Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
9.	<b>Discharge Compliance Records</b> <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
10.	<b>Daily Access/Security Logs</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A



**C. Institutional Controls (ICs)**

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented  Yes  No  N/A  
 Site conditions imply ICs not being fully enforced  Yes  No  N/A

Type of monitoring (e.g., self-reporting, drive by): During scheduled groundwater monitoring events and periodic site visits

Frequency: Varies, but typically fewer than ten times a year

Responsible party/agency: Settling Defendants

Contact: Dave Maher

Name	Title	Date	Phone no.
------	-------	------	-----------

Reporting is up-to-date  Yes  No  N/A  
 Reports are verified by the lead agency  Yes  No  N/A

Specific requirements in deed or decision documents have been met  Yes  No  N/A  
 Violations have been reported  Yes  No  N/A

Other problems or suggestions:  Report attached

Restrictive covenant has not been put in place on the McKin property itself, where the release occurred. Heirs of the property owner have not been receptive to agreeing to this.

2. **Adequacy**  ICs are adequate  ICs are inadequate  N/A

Remarks: There are overlapping institutional controls, including a town ordinance, restrictive covenants on all the sub-dividable properties (except the McKin property) within the IC zone, as well as conservation easements. Additionally, there is adequate capacity for public water for future build out.

**D. General**

1. **Vandalism/trespassing**  Location shown on site map  No vandalism evident  
 Remarks \_\_\_\_\_

2. **Land use changes on site**  N/A  
 Remarks \_\_\_\_\_

3. **Land use changes off site**  N/A  
 Remarks: There have been a few more homes built in the area since the last five-year review, but this is consistent with historical land use.

**VI. GENERAL SITE CONDITIONS**

**A. Roads**  Applicable  N/A

1. **Roads damaged**  Location shown on site map  Roads adequate  N/A  
 Remarks \_\_\_\_\_



<b>C. Treatment System</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Treatment Train</b> (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks: <u>Treatment system deactivated in October 1995, and components disposed of offsite</u>		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks: <u>Electrical service is maintained to the treatment building.</u>		
3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks: <u>There are four extraction wells located on private property beyond the McKin property. These were constructed within surface-flush vaults. These vaults are secured, but the PRPs plan to fill them with gravel this summer.</u>		
4.	<b>Discharge Structure and Appurtenances</b> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks: _____		
5.	<b>Treatment Building(s)</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input checked="" type="checkbox"/> Chemicals and equipment properly stored Remarks: _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks: _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality		
2.	Monitoring data suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining		

**E. Monitored Natural Attenuation X N/A**

**1. Monitoring Wells (natural attenuation remedy)**

- Properly secured/locked       Functioning       Routinely sampled       Good condition  
 All required wells located       Needs Maintenance       N/A

Remarks \_\_\_\_\_

**X. OTHER REMEDIES**

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Soil remediation occurred in the mid-1980s and has been discussed in prior five-year reviews. No equipment or facility associated with this component remains onsite.

**XI. OVERALL OBSERVATIONS**

**A. Implementation of the Remedy**

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The 2001 ROD amendment formally changed the remedy from groundwater extraction and treatment to a remedy relying on overlapping institutional controls and long-term monitoring. This remedy acknowledged the technical impracticability of restoring the contaminated bedrock aquifer and therefore relies on the ICs to prevent exposure to contaminated groundwater. From all indications, these ICs are working as intended. Monitoring indicates that the contaminant plume is not expanding and that concentrations within the plume continue to decline.

**B. Adequacy of O&M**

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. With the termination of pump-and-treat, there has not been a need for O&M. Equipment is stored in the treatment building so that it can be used when needed for the regularly scheduled monitoring.

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

There is an ongoing vapor intrusion investigation underway to determine whether further work is needed to maintain the effectiveness of the remedy.

**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. There is a built-in process in the Remedial Action Work Plan and approved LTMP for adjusting the monitoring schedule. This has been implemented as appropriate.

**Five-Year Review Inspection Team Roster  
McKin Company SF Site  
June 26, 2008**

**PRPs' Representatives**

Dave Maher, Sevee & Maher Engineers, Inc  
Peter Mailey, Sevee & Maher Engineers, Inc.

**Community Member**

Mike Wilson, property owner

**Maine DEP Representatives**

Rebecca Hewett, Project Manager  
Ted Wolfe, Supervisor

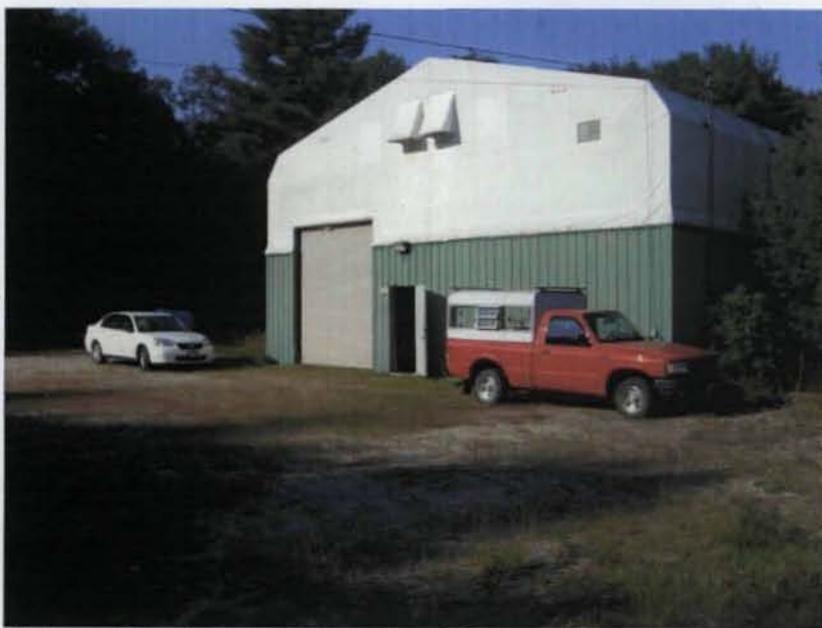
**EPA Representatives**

Terrence Connelly, RPM  
Richard Willey, Hydrologist

## Site Inspection Photographs



Site Inspection Photograph 1: Vehicular Gate leading into McKin property from Mayall Road. Former GETS treatment building in background



Site Inspection Photograph 2: Former GETS treatment building



Site Inspection Photograph 3: Decontamination Pad



Site Inspection Photograph 4: Looking west across McKin property toward one of the infiltration galleries



Site Inspection Photograph 5: Looking south toward treatment building. The facility's operation occurred primarily within this area.



Site Inspection Photograph 6: Monitoring well cluster 403 in northeastern corner of McKin property



Site Inspection Photograph 7: Gabion structures, SW-5 manhole, and Boiling Springs restoration area (from 2003 FYR for comparison)



Site Inspection Photograph 8: Boiling Springs Area looking southerly (2008)



Site Inspection Photograph 9: Gabion structure from Royal River



Site Inspection Photograph 10: Gabion structure looking west across the Royal River



Site Inspection Photograph 11: Monitoring well from Royal River Discharge Zone investigation, locked, and with regrowth of floodplain



Site Inspection Photograph 12: Monitoring well cluster 802, located at southern boundary of overburden plume

## Attachment 4: ARARs

### Identification of Probable Chemical-Specific ARARs and To-Be-Considered Criteria, Advisories, and Guidance

Requirement/Guidance	Status	Requirement/Guidance Synopsis
<b>Groundwater</b>		
<i>Federal</i>		
SDWA – Section 1412 – MCLs (40 CFR 141.11 – 141.16)	Waived	MCLs have been promulgated for several common organic and inorganic contaminants. MCLs regulate the concentration of contaminants in public drinking water supplies, but are also considered applicable as discharge requirements for reinjection of treated groundwater
EPA Risk Reference Doses (RfDs) (EPA, Nov 1999, Integrated Risk Information System)	To be considered	RfDs are an estimate of daily exposure concentration that is likely to be without appreciable risk of deleterious effects during a lifetime exposure.
EPA Carcinogen Assessment Group Carcinogen Potency Factors (CPFs) (EPA, RAGs, March 1995)	To be considered	The CSF is used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime exposure to a particular concentration of a potential carcinogen.
Proposed MCLs and MCLGs	To be considered	Proposed MCLs and proposed non-zero MCLGs were considered in establishing the groundwater cleanup goals.
<i>State of Maine</i>		
Hazardous Waste Management Rules(06-CMR Chapter 800-802, 850-851, 854, 856-857)	Applicable	These rules incorporate RCRA hazardous waste regulations, including standards for hazardous waste facilities and manifesting requirements. “No hazardous waste or constituent or derivative thereof shall appear in ground or surface waters at a concentration above background level, or above current public health drinking water standards for Maine, including the Maximum Exposure Guidelines, or standards for aquatic toxicity, whichever is more stringent (Chapter 854, 58(A)(3)(a).
Maine Drinking Water Rules 10- 144 CMR Chapters 231) <i>Amended March 12, 2008</i>	Relevant and Appropriate	Maine’s Primary Drinking Water Standards are equivalent to federal MCLs.
Rules Relating to Testing of Private Water systems for Potentially Hazardous Contaminants ( 10-144 CMR Chapter 233)	To be Considered	These rules establish MEGs used in determining whether to waive fees for testing for potentially hazardous contaminants in private wells.
Maximum Exposure Guidelines (MEGs) for Drinking Water ( Bureau of Health, Maine Department of Human Services, July 28, 2008)	Waived	MEGs are the Bureau of Health’s most recent recommendations for concentrations of chemical contaminants in drinking water. MEG’s are health-based guidelines (e.g. TBC) and are not legally enforceable.

\*MCLs and MEGs have been waived for technical impracticability, but will be used to determine final clean-up and the ultimate decision of the ICZ

**Identification of Probable Chemical-Specific ARARs and To-Be-Considered Criteria, Advisories, and Guidance (continued)**

<b>Requirement/Guidance</b>	<b>Status</b>	<b>Requirement/Guidance Synopsis</b>
<b>Soil</b>		
<b>State of Maine</b>		
Implementation of Remedial Action Guidelines (MEDEP, Updated May 20, 1997)	To be Considered	The guidance provides concentration levels for direct contact exposure levels for contaminants that are protective of residential, trespasser, and adult worker populations.
<b>Surface Water</b>		
<b>Federal Guidance</b>		
National Recommended Water Quality Criteria (Federal Register, Part IV, FRL-OW-6186-6a, December 1998)	To be considered	This guidance describes the recommended criteria for 157 pollutants used in implementing environmental programs.
<b>State of Maine</b>		
Maine Statewide Water Quality Criteria (SWQC) 38 MRSA § 361-A 06-096 CMR Chapters 530 and 584 Amended October 9, 2005	Applicable	These standards pertain to water quality statutes for the State of Maine
<b>Ambient Air Quality</b>		
Maine Ambient Air Quality Standards 38 MRSA § 584-A 06-096 CMR Ch. 110	Applicable	These standards pertain to ambient air quality statutes for the State of Maine.
Maine Ambient Air Guidelines, Maine Bureau of Health, Department of Health & Human Services, April 2004	TBC	These guidelines are established at a lifetime cancer risk of $10^{-5}$ which is consistent with MEDEP's Uncontrolled Sites Policy (Guidance Manual for Human Health Risk Assessments at Hazardous Substance Sites", June 1994) and therefore used by MEDEP.

**Identification of Probable Action-Specific ARARs and To-Be-Considered Criteria, Advisories, and Guidance**

Requirement/Guidance	Status	Requirement/Guidance Synopsis
<b>Groundwater</b>		
<i>State of Maine</i>		
Maine Underground Injection Control Program regulations, 38 MSRA § 413 (1-B), Chapter 543 <i>Repealed and replaced October 3, 2006</i>	Applicable	These rules regulate the use of wells to inject substances into the subsurface, specifically “injection wells used to help clean up contaminated groundwater, either by injecting solutions to neutralize contamination or to return previously contaminated groundwater that has been treated.”

**Identification of Probable Location-Specific ARARs and To-Be-Considered Criteria, Advisories, and Guidance**

<b>Requirement/Guidance</b>	<b>Status</b>	<b>Requirement/Guidance Synopsis</b>
<b>Groundwater</b>		
<i>State of Maine</i>		
Maine Standards for Classification of Groundwater (38 MSRA, Section 470) <i>Updated October 3, 2006</i>	Applicable	Groundwater is classified under the Maine Standards. The groundwater at the McKin Site is classified as GW-A (i.e., water shall be of such quality that it can be used for domestic purposes.
<b>Surface Water</b>		
<i>State of Maine</i>		
Maine Standards for Classification of Fresh Surface Waters, 38 MRSA, § 468	Applicable	Royal River is classified as a Class B water body under state water quality standards.
<b>Wetlands/Floodplains</b>		
<i>Federal</i>		
Executive Order 11990, Protection of Wetlands (40 CFR Part 6, Appendix A)	Applicable	The Wetlands Executive Order requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.
Executive Order 11988, Floodplain Management (40 CFR Part 6, Appendix A)	Applicable	The Executive Order requires that a remedial action must reduce the risk of flood loss, and restore and preserve the natural and beneficial values served by floodplains.
<i>State of Maine</i>		
Maine Natural Resources Protection Act (NRPA, 38 MRSA § 480-A) and regulations at Chapters 305, 310	Relevant and Applicable	This law and its regulations prohibit the degradation and destruction of streams and brooks by prohibiting alterations in or adjacent to protected natural areas without a permit. At the McKin site, removal of soil or alteration of structures next to streams must not cause unreasonable soil erosion, and must meet other standards.
<b>Other Natural Resources</b>		
<i>State of Maine</i>		
Maine Solid Waste Management Rules, Chapters 400, 401, and 405	Applicable	These rules regulate the disposal of construction/demolition debris and disposal of special waste.

## **Attachment 5: STATE COMMENTS AND CONCURRENCE**

September 17, 2008

Mr. Terrence Connelly  
U.S. EPA, Reg. 1  
1 Congress Street  
Suite 1100 (HBT)  
Boston, MA 02114-2023

Re: **Review Comments on "Fourth Five-Year Review Report" for the McKin Company Site, Gray, Maine" e-mailed on August 27, 2008**

Dear Mr. Connelly:

The Maine Department of Environmental Protection has reviewed the Fourth Five-Year Review report received via e-mail on August 27, 2008, for the McKin Company Site, Gray, Maine. This report was prepared by the U.S. Environmental Protection Agency (EPA).

The MEDEP's review comments on the August 27, 2008 version of the Fourth Five-Year Review report are presented in Attachment A to this letter.

If you have any questions or concerns regarding this letter, please contact me directly at (207) 287-8554 or at (207) 287-2651.

Sincerely,

Rebecca L. Hewett, Project Coordinator  
Division of Remediation  
Bureau Remediation & Waste Management

pc: Ted Wolfe, MEDEP  
Mary Jane O'Donnell, EPA

5-yrReview-fourth draft8-08.doc

## Attachment A

1. Page 8, Executive Summary, 3<sup>rd</sup> paragraph, 4<sup>th</sup> sentence: Amend the end of the sentence to read, "...long-term monitoring with contingency response."
2. Page 8, Executive Summary, 4<sup>th</sup> paragraph, 3<sup>rd</sup> sentence: Amend the sentence to read, "The long-term monitoring included continued groundwater and surface water monitoring and additional monitoring of the surface water in 2009 and 2013, installation of wells..."
3. Page 9, Executive Summary, 1<sup>st</sup> paragraph: Prior to the last sentence add the following sentence, "Also, in 2009 and 2013 additional surface water monitoring is to be conducted at two locations in the Royal River and at a frequency specified in Appendix G of the 2001 Consent Decree Amendment."
4. Page 19, Section 3.5.2, last sentence: Amend the text to read "...drinking water standards, shown in the table below, would need to..."
5. Page 25, Section 4.4.2, top paragraph, 2<sup>nd</sup> sentence of the paragraph: Amend the text to read, "...along Collyer Brook, the southern edge...into the Royal River or the eastern extent of the plume on the east side of the Royal River."
6. Page 27, Section 5.0, 1<sup>st</sup> paragraph, last sentence: Amend the text to read, "However, access for the 900-series..."
7. Page 27, Table 4: Two boxes are blank. Should they each have an entry? Suggest "Locations & frequency amended per LTMP" for the Scope of LTMP row and "Ongoing" for the POP/RAWP Schedule row.
8. Page 29, Section 6.4.2 2<sup>nd</sup> paragraph, 3<sup>rd</sup> - 5<sup>th</sup> sentences: Amend the text to read' "...18 monitoring wells and three seeps/springs...protocol. Since 2002, 9 additional monitoring..MW-401C in 2008, and...removed. As of August 2008, 18 monitoring wells...contaminants."
9. Page 29, Section 6.4.2, 4<sup>th</sup> paragraph, 2<sup>nd</sup> & 3<sup>rd</sup> sentences: Amend the text to read, "Currently TCE and 1,2-DCE are the...highest concentrations. PCE was last detected at its standard in June 2008 at MW-803C."
10. Page 30, Event Table X: Entry errors discussed on September 16, 2008.
11. Page 31, Section 6.4.2, paragraph following Table X, 5<sup>th</sup> sentence: Amend the text to read, "Graphical comparisons are presented below."
12. Page 31, Section 6.4.3, 2<sup>nd</sup> paragraph, 1<sup>st</sup> sentence: Amend the text to read, "...five monthly samples from SW-201 were..."
13. Page 31, Section 6.4.3, new paragraph following the 2<sup>nd</sup> paragraph: New text for the surface water component received September 16, 2008 from EPA - "The Amended ROD remedy included a contingency remedy should TCE concentrations exceed the SWQC at SW-1 in 2009 or at SW-201 in 2013. This contingency remedy would allow for development of an active remediation plan for the Royal River, and the details of compliance monitoring for this contingency were presented in an

insurance policy purchased by the SP. Briefly stated, the SP are required to collect a minimum of seven samples each month from May 1 through December 1, 2009 at sampling location SW-1 and the same sampling frequency in 2013 at SW-201. For more information, Endorsements #2 and #3 of the Pollution Legal Liability Select Policy #PLS 8086724 is included as Attachment X to this five-year review." Is this the intended location for this new text?

14. Page 31, Section 6.4.4, 2<sup>nd</sup> paragraph, 3<sup>rd</sup> sentence: Amend the text to read, "The following is a brief..."
15. Page 32, Section 6.4.4, 1<sup>st</sup> paragraph following the inset table: During the Phase I VI study in 2006, there was a problem with sampling conducted on the Mayall Road. Therefore, Mayall Road sampling was to be redone during the Phase II sampling activities in 2008. What did the Mayall Road resampling results indicate? Do any homes on the Mayall Road need ambient, indoor and sub slab sampling?
16. Page 32, Section 6.4.4, 2<sup>nd</sup> paragraph following the inset table, 2<sup>nd</sup> sentence: Amend the text to read, "Ambient, indoor and sub slab air samples..."
17. Page 33, Section 6.6, 2<sup>nd</sup> paragraph, 2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> sentences: Amend the text to read, "The ongoing LTMP surface water...has been met approximately 80% of the time for the months monitored at sampling location SW-201 since 2003. However, the 2001 Consent Decree Amendment (specifically, Appendix G: Pollution Legal Liability Select Policy) set the...triggered, at SW-1. Therefore, starting in May 2009, the sp need to conduct sampling at SW-1 at the frequency specified to ensure...met."
18. Page 35, Section 7.0, paragraph following "Partially, for groundwater", 1<sup>st</sup> & 3<sup>rd</sup> sentences: Amend the text to read, "The 2001 ROD...Long-term monitoring with a contingency response and institutional controls. Regression...TCE concentrations. In addition, the...capability and the estimated years needed..."
19. Page 35, Section 7.0, 1<sup>st</sup> paragraph following "Yes, for surface water", 3<sup>rd</sup> sentence: Amend the text to read, "...above the SWQCs in 2009 and 2013 (at SW-1 and SW-201, respectively), a contingency response..."
20. Page 36, 7.2, 3<sup>rd</sup> paragraph, 1<sup>st</sup> & 2<sup>nd</sup> sentences: Amend the text to read, "...of the MCL and the 1992...(MEGs) for TCE. Both the MCL and the MEG for TCE are 5 ppb, which is..."
21. Page 37, Section 7.2, Changes in Exposure Pathways, 2<sup>nd</sup> paragraph, 3<sup>rd</sup> sentence: Amend the text to read, "Additionally, Maine DHHS has published revised Ambient Air Guidelines that..."
22. Page 38, Section 7.2, Changes in Exposure Pathways, 2<sup>nd</sup> paragraph, 5<sup>th</sup> sentence: In addition to the "six homes" were any homes on Mayall Road identified for "ongoing vapor intrusion study" following the resampling of Mayall Road during the 2008 Phase II VI sampling? The text should be revised based on Phase II VI results.