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SUPPLEMENTAL HUMAN HEALTH RISK ASSESSMENT

IRON HORSE PARK SUPERFUND SITE
OPERABLE UNIT 4
North Billerica, Massachusetts

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NORTH BILLERICA, MASSACHUSETTS

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SUPPLEMENTAL HUMAN HEALTH RISK ASSESSMENT

IRON HORSE PARK SUPERFUND SITE – OPERABLE UNIT 4

1.0 INTRODUCTION

This report contains a supplemental human health risk assessment conducted for the Remedial Investigation/Feasibility Study (RI/FS) for Operable Unit 4 (OU-4) of the Iron Horse Park Superfund Site. The risk assessment evaluates current and potential future human health risks and hazards associated with direct and indirect exposure to groundwater potentially impacted by the site, based on groundwater data collected in the winter of 2005/2006. A baseline human health risk assessment was completed in 1997 (M&E, 1997) which included the evaluation of a drinking water ingestion scenario, based on groundwater data collected in 1995. In addition to the supplemental risk assessment, this report also presents a discussion of the 1997 risk assessment results for groundwater used as drinking water compared to the results for this exposure pathway based on the 2005/2006 groundwater data.

Risks and hazards associated with the site are estimated assuming no additional remedial actions will be performed. The results of the quantitative risk assessment will be used to provide a basis for decisions regarding the need for additional future remedial actions at the site.

According to USEPA guidelines (USEPA, 1989), a risk assessment generally consists of four basic steps summarized below:

> **Hazard Identification.** Determination of the nature and amount of chemicals that could potentially be encountered at a site, and selection of those chemicals that are of potential concern for the assessment of the impact on human health.
>
> **Exposure Assessment.** Quantification of the extent, frequency, and duration of actual or potential exposure to chemicals by pathways relevant to a site and the activities of potential receptors.

Toxicity Assessment. Identification of the types of health effects that could be associated with exposure to these chemicals, determination of the relationship between exposure (dose) and the probability of occurrence of the health impact (response).

Risk Characterization. Estimation of the potential carcinogenic and noncarcinogenic health effects that may occur as a result of exposure to chemicals in the amount and by the pathways identified and the uncertainty in those estimates.

This human health risk assessment was conducted using methodologies specified in USEPA guidance documents (USEPA, 1989; 1991a; 1994a; 1995; 1996; 1997a; 1999, 2001a; and 2004a). As a supplemental human health risk assessment, estimates of risk and hazard, under both current and potential future use scenarios, have been provided only for the reasonable maximum exposed (RME) receptor, used to represent the maximum (upper-bound) exposure that is reasonably expected to occur. Central tendency exposure (CTE) estimates, used to represent average exposures occurring at a site, have not been included since this risk assessment supplements the 1997 baseline risk assessment which quantified CTE risks and hazards.

1.1 Organization

This supplemental human health risk assessment consists of several sections. Section 2.0, Hazard Identification, describes the environmental samples used for the risk assessment, the selection of chemicals of potential concern (COPCs) from among the chemicals identified at the site, and the determination of exposure point concentrations (EPCs). Section 3.0, Exposure Assessment, describes the selection of receptors and exposure pathways to be evaluated and the calculation of dose to the receptors selected. Section 4.0, Toxicity Assessment, summarizes the toxicity of the COPCs including both potential carcinogens and noncarcinogens. Section 5.0, Risk Characterization, includes a summary of site risks and an uncertainty analysis.

Table 1 (Selection of Exposure Pathways) provides a conceptual model for the site, identifying the exposure media, exposure points, receptors, and routes of exposure quantitatively evaluated as part of the supplemental human health risk assessment.

1.2 Site Description and Background Information

The Iron Horse Park Superfund Site occupies approximately 553 acres in North Billerica, Massachusetts, near the Tewksbury town line, approximately 20 miles northwest of Boston (Figure 1). The site is bounded on the north by the B&M railroad tracks, on the west by High Street and an auto salvage yard, on the east by Gray Street, and on the south by a wetland, Pond Street, and the Middlesex Canal (Figure 2). The Middlesex Canal flows through the site to the east, where it joins Content Brook at the southeastern edge of the Shaffer Landfill. It then flows to the Shawsheen River and ultimately to the Merrimack River to the north. There are abundant wetlands and forested areas at the site.

The site is divided into four operable units (OUs). Operable Unit 1 (OU-1) is the Boston & Maine (B&M) Wastewater Lagoons, OU-2 is the Shaffer Landfill, and OU-3 is the remainder of the site. OU-3 includes an active industrial complex (the Iron Horse Industrial Park) with currently occupied buildings, a rail yard, numerous manufacturing operations, open storage facilities, landfills, and lagoons. OU-4 is to address residual groundwater, surface water, and sediment contamination following the source control measures that will be implemented for OU-3.

Previous investigational activities, including a baseline human health risk assessment, were completed for OU-3 in 1997. A Feasibility Study (FS) was completed for OU-3 in 2004. Groundwater, surface water, sediments, and soil contamination were studied in the RI/FS for OU-3. The on-site areas of concern for OU-3 included the B&M Railroad Landfill, the Reclamation Services, Inc. (RSI) Landfill, the B&M Locomotive Shop Disposal Areas (A and B), the Old B&M Oil/Sludge Recycling Area, the Contaminated Soils Area, the Asbestos Landfill, the Asbestos Lagoons, and the Site-Wide Surface Water and Sediment Contamination. Groundwater in both the overburden and bedrock aquifers generally enters the site from the southwest and flows to the northeast. Similarly, surface water flows onto the site from the south and flows to the northeast, where it converges with B&M Pond and associated wetlands. Based on seepage

meter, staff gauge, and mini-piezometer results summarized in the RI/FS, the potential for groundwater to discharge to surface water was evident throughout most of the site.

As shown in Figure 3, part of the site overlies what is expected to be a medium-yield aquifer. The remainder is expected to be a low-yield aquifer. No public water supply sources are located within the medium-yield aquifer on the site, but the groundwater beneath the medium-yield aquifer is considered a potential drinking water source by both EPA and the Commonwealth of Massachusetts.

Although not currently in use, community public water supply wells are located less than one mile east of the site in Tewksbury. The Interim Wellhead Protection Area (IWPA) for one of the Tewksbury wells previously extended to within approximately 500 feet of the site on the northeast side, but has since been reduced in size due to well inactivity. Surface water and other groundwater community public water supplies are located at North Billerica on the Concord River, just north of the Route 3A bridge, where a filtration plant is located. Similar to the historical public water supply wells in Tewksbury, a North Billerica well is no longer in use and its associated IWPA has been reduced in size. The historical water supply wells are located either upgradient from the direction of groundwater flow at the site or beyond the wetland areas at the perimeter of the site that serve as groundwater discharge points.

There may be private wells along Gray Street, which is east of the Shaffer Landfill section of the site, based on the knowledge of personnel at the Billerica Health Department (M&E, 1996). The town of Billerica does not maintain records for these wells, if they do exist. It is not known whether any such private wells are used as sources of drinking water or for other domestic uses. However, any private wells in this area are located beyond the wetland areas at the perimeter of the site that serve as groundwater discharge points.

The previous investigations described in the OU-3 RI/FS established that the concentrations of some groundwater contaminants exceed applicable or relevant and appropriate requirements

(ARARs) or contribute to risk in excess of regulatory guidelines. Additional groundwater studies conducted as part of the OU-3 RI/FS included groundwater modeling, which utilized site-specific information such as boring logs, slug tests, water levels from monitoring wells and staff gauges, and stream seepage tests to simulate groundwater migration and estimate relative times to achieve remedial action objectives (RAOs) for groundwater cleanup under the various potential remedies (including source control). The modeling indicated that, in most cases, the time to reach RAOs was far greater than the EPA default period of 30 years. As a result, EPA decided to address potential groundwater cleanup by initially performing source control measures, then monitoring groundwater and evaluating trends in contaminant concentrations that result from those actions. OU-4 is to address residual groundwater, surface water, and sediment contamination following the source control measures.

As part of this effort for OU-4, M&E was charged with conducting additional groundwater investigative activities to support the selection of a groundwater remedy for the site. The investigational activities conducted as part of this effort included supplemental groundwater characterization to: (1) determine the current groundwater contaminant distribution by sampling 45 existing on-site monitoring wells and comparing the current distribution to that noted during groundwater sampling conducted in 1995; (2) confirm the flow characteristics of the aquifers determined as part of the 1997 RI for OU-3 by the collection of current groundwater and surface water elevation data; (3) fill data gaps for groundwater contaminant distribution, flow characteristics, and soil characteristics by installing and sampling 15 new monitoring wells; and (4) confirm the presence or absence of free-phase product and 1,4-dioxane in site groundwater. Non-aqueous phase liquid (NAPL) has been historically noted at the site, and the historical presence of 1,1,1-trichloroethane and trichloroethene in groundwater suggested the possible presence of 1,4-dioxane in groundwater.

2.0 HAZARD IDENTIFICATION

The purpose of this section is the determination of the type and amount of chemicals present in

groundwater at the site and the selection of the COPCs with regard to human health. In addition, this section summarizes the methodology used to determine EPCs for groundwater contaminants selected as COPCs.

2.1 Data Used in Risk Assessment

Environmental data used in this hazard identification were collected during the winter of 2005/2006. Figure 4 presents the groundwater sampling locations. Groundwater data collected in 1995 have not been included because these data are unlikely to be representative of current site conditions. A detailed reporting of the 2005/2006 sampling data can be found in Attachment 1 of this report and in the Groundwater Data Evaluation Report (M&E, 2006).

A total of 60 monitoring wells were sampled and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals in 2005/2006. A subset of these wells were also analyzed for pesticides/polychlorinated biphenyls (PCBs) (21 locations) and 1,4-dioxane (15 locations). One light non-aqueous phase liquid (LNAPL) sample was collected from an on-site piezometer at the B&M Railroad Landfill and sent to a laboratory for hydrocarbon fingerprinting analysis. Hydrocarbon fingerprinting resulted in the determination that the LNAPL is No. 6 Fuel Oil. Tier II data validation was performed on all the analytical chemistry data, except for LNAPL. Tier I data validation was performed on the LNAPL hydrocarbon fingerprint analysis.

For the supplemental human health risk assessment, site-wide overburden monitoring well data were summarized together to evaluate exposure to contaminants in shallow groundwater during excavation work and to evaluate the subsurface vapor intrusion pathway. In addition, site-wide overburden and bedrock monitoring well data were combined to evaluate a future household water use scenario.

Groundwater data are summarized in Table 2.1 for the site-wide overburden exposure point and

the site-wide overburden and bedrock combined exposure point. This summary table provides the frequency of detection, range of detection limits, range of detected concentrations, and location of maximum detected result. The individual wells included for each exposure point are provided in footnotes on Table 2.1.

Because groundwater volatile levels exceeded screening criteria presented in the draft *Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (USEPA, 2002a), concentrations of volatile contaminants detected in overburden groundwater on-site were used to estimate indoor airborne concentrations a current commercial worker and a future resident may be exposed to during indoor activities, conservatively assuming groundwater migration to an occupied on-property building (e.g., an office building or residence).

Volatile contaminants were defined as those compounds with Henry-s Law Constants greater than 1E-05 atm-m^3/mole and molecular weights less than 200 grams/mole (USEPA, 1991a). The Johnson and Ettinger Model (USEPA, 2004c) was used to estimate indoor air contaminant concentrations following subsurface migration from groundwater. Attachment 2 documents the assumptions used in the modeling of indoor air concentrations as well as inputs to the model. Table 2.2 lists the groundwater volatile contaminants detected along with their modeled indoor air concentrations. Maximum groundwater volatile concentrations were used as inputs to the model. Therefore, maximum (i.e., worst-case) indoor air concentrations were derived. Because only one set of air concentrations was modeled, only one set of concentrations (i.e., maximum concentrations) appears on Table 2.2.

To evaluate the outdoor air exposure pathway, concentrations of volatile contaminants detected in overburden groundwater on-site were used to estimate outdoor airborne concentrations a future excavation worker may be exposed to during trenching activities. A modified version of the Johnson and Ettinger Model (USEPA, 2004c) was used to estimate outdoor air contaminant concentrations following migration from groundwater. Maximum groundwater volatile concentrations were used as inputs to the model, resulting in the development of maximum

outdoor air concentrations which are presented on Table 2.3.

As part of the evaluation of the household water use scenario, the inhalation of volatile contaminants released during showering and bathing was also evaluated. The Foster and Chrostowski Model (Foster and Chrostowski, 1986; 1987) was used to develop maximum indoor air concentrations present in a residential bathroom applicable to both the young child bathing scenario or adult showering scenario. The modeling is presented in Attachment 2. The maximum indoor air concentrations associated with bathing/showering are presented on Table 2.4.

2.2 Data Evaluation

Data were qualified by the analytical laboratory and validated as described in Groundwater Data Evaluation Report (M&E, 2006). The qualification and validation of the analytical data included a comparison of the site data to corresponding blank (laboratory, field, equipment, and trip) concentration data. Data rejected by the validation (AR@ qualified) were not used. Estimated values (e.g., AJ@ qualified) were used in the risk assessment without modification. Analytical data from duplicate samples were combined as described in Attachment 3. Frequency of detection was calculated as the number of samples in which the chemical was detected over the total number of samples analyzed after the exclusion of rejected (AR@ qualified) data.

2.3 Identification of COPCs

The scope of the supplemental human health risk assessment includes identification of COPCs based on the chemicals detected at the site. This list was developed using the simple screening process described below. All available and appropriate groundwater data for each exposure point were used to select COPCs for the exposure point.

The maximum detected concentration of a chemical in groundwater or air was compared to

preliminary remedial goals (PRGs) published by USEPA Region 9 (USEPA, 2004b). PRGs are chemical concentrations back-calculated using toxicity criteria and either a 1×10^{-6} target risk level for potential carcinogens or a hazard quotient (HQ) of 1 for noncarcinogens. For purposes of this screening analysis, a HQ of 0.1 was used to add a ten-fold measure of safety to reduce the chance of omitting chemicals from the list of COPCs that could contribute to a total hazard index (HI) of 1. To accomplish this, PRGs for noncarcinogenic chemicals were divided by 10 prior to comparison to maximum detected values.

Tap water PRGs were used for comparison to maximum detected groundwater, and ambient air PRGs were used for comparison to maximum modeled indoor and outdoor air concentrations. Federal Maximum Contaminant Levels (MCLs; USEPA, 2006) were additionally used as screening criteria for groundwater.

A maximum detected chemical concentration less than its screening value indicated that the excess lifetime cancer risk associated with exposure to that chemical concentration would be less than one in one million and the HQ associated with exposure would be less than 0.1. Chemicals detected at concentrations below their screening criteria (and also below MCLs for groundwater) were, therefore, eliminated from further evaluation.

Chemicals with maximum concentrations greater than the relevant screening criteria (or relevant MCLs for groundwater) were selected as COPCs. Comparisons of maximum concentrations to screening criteria are presented in the data summary tables for each medium by exposure point (Tables 2.1 through 2.4). For certain analytes lacking compound-specific screening criteria (e.g., endrin ketone), a surrogate compound was selected (e.g., endrin) and its screening criteria was used for COPC screening. Specific instances where surrogate assignments were made are identified in footnotes on Tables 2.1 through 2.4.

Since PRGs are not available for lead, lead was retained as a COPC if the maximum lead concentration in groundwater exceeded the drinking water criterion of 15 µg/l, a criterion

protective of blood lead levels in children (USEPA, 2006).

Essential human nutrients (i.e., calcium, magnesium, iron, potassium, and sodium) were eliminated prior to the screening process. Essential nutrients are unlikely to cause substantial toxicity at concentrations commonly encountered.

COPCs in Monitoring Wells. Groundwater analytical results from the overburden monitoring wells and overburden/bedrock monitoring wells combined are summarized in Table 2.1. Table 2.1 lists all chemicals detected in groundwater from these monitoring wells as well as the chemicals selected as COPCs in groundwater based on comparison to tap water PRGs and MCLs. The maximum detected results for the following compounds exceed their respective PRGs and/or MCLs and were selected as groundwater COPCs:

Overburden	1,1,2,2-tetrachloroethane, 1,2-dichloroethane, 1,2-dichloropropane, 1,4-dichlorobenzene, benzene, bromochloromethane, carbon tetrachloride, chlorobenzene, cis-1,3-dichloropropene, tetrachloroethene, trichloroethene, vinyl chloride, xylene, 2-methylnaphthalene, atrazine, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, naphthalene, phenanthrene, dieldrin, aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, manganese, and vanadium.
Overburden/Bedrock	1,1,2,2-tetrachloroethane, 1,2-dichloroethane, 1,2-dichloropropane, 1,4-dichlorobenzene, benzene, bromochloromethane, carbon tetrachloride, chlorobenzene, chloroethane, cis-1,3-dichloropropene, tetrachloroethene, trichloroethene, vinyl chloride, xylene, 2-methylnaphthalene, 3-nitroaniline, atrazine, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, naphthalene, phenanthrene, dieldrin, aluminum, antimony, arsenic, barium,

cadmium, chromium, cobalt, lead, manganese, nickel, silver, and vanadium.

COPCs in Indoor Air. Maximum indoor air concentrations, modeled from maximum groundwater volatile concentrations, are presented in Table 2.2. Attachment 2 documents the assumptions used in the modeling as well as inputs to the model. Carbon tetrachloride, tetrachloroethene, and trichloroethene were selected as indoor air COPCs. Therefore, quantitative evaluation of the indoor air pathway has been included in the risk assessment.

COPCs in Outdoor Air. Maximum outdoor air concentrations, modeled from maximum groundwater volatile concentrations, are presented in Table 2.3. Attachment 2 documents the assumptions used in the modeling as well as inputs to the model. No compounds were selected as outdoor air COPCs (i.e., maximum modeled concentrations were below the ambient air PRGs for all volatile compounds). Therefore, quantitative evaluation of the outdoor air pathway has not been quantitatively evaluated in the risk assessment.

COPCs in Indoor Air (Bathing/Showering). Maximum indoor air concentrations that may be present during bathing/showering, modeled from maximum groundwater volatile concentrations, are presented in Table 2.4. Attachment 2 documents the assumptions used in the modeling as well as inputs to the model. 1,1,2,2-Tetrachloroethane, 1,1-dichloroethane, 1,2,3-trichlorobenzene, 1,2-dichloroethane, 1,2-dichloropropane, 1,4-dichlorobenzene, benzene, bromochloromethane, carbon tetrachloride, chlorobenzene, chloroethane, chloromethane, cis-1,2-dichloroethene, cis-1,3-dichloropropene, methyl tert-butyl ether, tetrachloroethene, trans-1,2-dichloroethene, trichloroethene, vinyl chloride, xylene, 2-methylnaphthalene, bis(2-chloroethyl)ether, naphthalene, and phenanthrene were selected as indoor air COPCs for the bathing/showering scenario. Therefore, quantitative evaluation of this air pathway has been included in the risk assessment.

2.4 Determination of Exposure Point Concentrations

A conservative estimate of the mean concentration of each COPC in each exposure medium is used to evaluate the magnitude of potential human exposures. An estimate of this concentration is referred to as an EPC. EPCs were determined for the COPCs in each medium and for each exposure point.

Table 3.1.RME lists the groundwater COPCs selected and their maximum detected concentrations. For groundwater, the maximum detected COPC concentrations were used as the EPCs for the RME exposure case, as recommended by USEPA Region 1 guidance (USEPA, 1999).

For air, concentrations of volatile COPCs detected in groundwater were modeled to estimate indoor and outdoor airborne concentrations. The maximum modeled COPC concentrations, based on maximum detected groundwater concentrations, were used to evaluate the RME exposure case at each exposure point. Table 3.2.RME provides the maximum modeled COPC concentrations for indoor air. Table 3.3.RME provides the maximum modeled indoor air COPC concentrations for the bathing/showering scenario. Because no COPCs were selected for the outdoor air pathway, modeled outdoor air concentrations have not been quantitatively evaluated.

3.0 EXPOSURE ASSESSMENT

The purpose of the exposure assessment is the quantification of the extent, frequency, and duration of actual or potential exposure to chemicals by pathways relevant to the site and activities of the potential receptors.

3.1 Identification of Potentially Exposed Populations and Potential Exposure Pathways

As part of the exposure assessment, current and potential future exposure pathways were

determined through which identified populations may be exposed to the COPCs at the site.

An exposure pathway describes the course a chemical follows while moving through environmental media to the receptor. An exposure pathway may consist of a mechanism of release of contaminants to an environmental medium (e.g., overburden groundwater), an exposure route (e.g., ingestion), and a receptor (e.g., construction worker). An exposure pathway is considered complete when contact by a receptor with contaminated media may occur currently or in the future. For purposes of this risk assessment, only potentially complete exposure pathways were quantitatively evaluated.

USEPA (1989 and 1991b) guidance requires that plausible exposures under both current and future land-use scenarios be evaluated in a risk assessment. Accordingly, potential human exposure pathways were identified for both current and potential future land-use scenarios at the site. The current land-use scenario examines the potential for human exposure under current site conditions, while the future land-use scenario evaluates potential exposures following possible changes in site use (assuming no additional remedial action occurs). Table 1 presents a summary of the current and potential future exposure routes quantitatively evaluated in the supplemental human health risk assessment as well as the human exposure points and receptors.

3.1.1 Potential Exposure Pathways and Receptors Under Current Land-Use Conditions.

Because the site is an active industrial park with occupied buildings constructed over areas where overburden groundwater contamination is present, there is the potential for the completion of the subsurface vapor intrusion pathway. Current workers may inhale volatile contaminants that have migrated from shallow groundwater through the subsurface to impact indoor air quality. Though there is no information indicating that a day care facility is present at the site, children attending day care are also a potential receptor population exposed to impacted indoor air. Because there are currently no known direct uses of site groundwater (e.g., irrigation or industrial process wells), no other current groundwater exposure pathways are considered complete.

3.1.2 Potential Receptors and Exposure Pathways Under Future Land-Use Conditions. To evaluate potential future exposures, it was assumed that no further remedial action will be taken, and that the levels of contamination currently existing at the site would remain the same in the future.

Should land use remain unchanged, future commercial workers could continue to be exposed to volatile contaminants that migrate from overburden groundwater through the subsurface into a building, impacting indoor air quality.

Should residences that use potable wells be constructed on-site, future residents could be exposed to site-related groundwater contaminants in both overburden and bedrock groundwater. Residents (young children and adults) are assumed to be exposed to site-related contaminants in impacted groundwater through the ingestion of drinking water. Exposures through the inhalation and dermal contact pathways during household water use (e.g., bathing and showering) are likely due to the presence of organic contaminants in groundwater. It is further assumed that future residences could be impacted by the completion of the subsurface vapor migration pathway from overburden groundwater, allowing for the inhalation of impacted indoor air by residents. The young child resident exposed to impacted indoor air is used as a health-protective evaluation of the on-site day care scenario.

During site development or future excavation/utility work at the site, overburden groundwater may be exposed and direct worker contact with shallow groundwater contaminants may occur. Under this future scenario, workers may be exposed to groundwater contaminants via ingestion of and dermal contact with exposed groundwater. The inhalation of impacted outdoor air is considered an incomplete exposure pathway because no COPCs were selected based on a comparison of maximum modeled outdoor air concentrations to risk-based ambient air PRGs.

3.2 Calculation of Dose

The purpose of the exposure assessment is to identify exposure equations to be used in the risk assessment and to document assumptions made for each of the parameters used in these equations. USEPA guidance documents used in the exposure assessment include *RAGS, Part A* (USEPA, 1989); *Exposure Factors Handbook* (USEPA, 1997a); and *RAGS Part E (Supplemental Guidance for Dermal Risk Assessment)* (USEPA, 2004a), and *Risk Updates No. 2* (USEPA, 1994a).

3.2.1 Selection of Exposure Equations. Equations are presented for the calculation of chronic daily intake (CDI) values for the ingestion, dermal, and inhalation pathways of exposure. The equations are used for calculating a lifetime average daily dose (LADD) relevant to cancer risk (i.e., cancer intake) or for calculating an average daily dose (ADD) relevant to noncarcinogenic hazard (i.e., noncancer intake). The medium-specific equations used for the calculation of carcinogenic and noncarcinogenic intakes of the COPCs are presented in Tables 4.1.RME through 4.3.RME.

Additional equations used in calculating dose following dermal exposure to organics in groundwater are contained in Attachment 4. For contaminants lacking experimental data on dermal penetration, the dermal risk assessment guidance (USEPA, 2004a) uses a model to predict absorption of contaminants from water. Contaminants for which sufficient data exist to model dermal absorption are said to be within the model=s effective predictive domain (EPD). Therefore, contaminants with experimental data or predicted dermal absorption within the model=s EPD have been quantitatively evaluated for dermal exposures. However, for compounds with predicted dermal absorption outside the model=s EPD, USEPA (2004a) does not recommend the quantitative evaluation of the dermal water pathway. These compounds include dibenz(a,h)anthracene and phenanthrene. Therefore, no quantitative evaluation of the water dermal pathway has been included for these compounds.

3.2.2 Exposure Parameters. The exposure parameters used for each of the receptors evaluated in the risk assessment are described below and are presented in Tables 4.1.RME through 4.3.RME. Since exposure parameters vary depending on the exposure pathway and receptors being evaluated, the exposure parameters are presented by pathway in the tables and are discussed by receptor.

Commercial Worker Exposure Parameters. The exposure parameters for the commercial worker are shown in Table 4.1.RME (indoor air, current/future land use). The exposure parameters rely partially on default RME exposure parameters presented in *Risk Updates No. 2* (USEPA, 1994a) and *RAGS, Part E* (USEPA, 2004a).

For the indoor air pathway, commercial workers were assumed to be involved in activities resulting in the inhalation of volatile compounds in indoor air for 8 hours/day. Air EPCs were modeled from groundwater volatile COPC concentrations as described in Attachment 2. The remaining exposure parameters used for the inhalation exposure pathway (i.e., exposure frequency and exposure duration) are values recommended for the RME scenario by USEPA (USEPA, 2004a; USEPA, 1994a). As recommended in *RAGS* (USEPA, 1989), the averaging time for noncarcinogens was set equal to the exposure duration, and the averaging time for carcinogens was the standard USEPA lifetime duration (70 years).

Adult Resident Exposure Parameters. The exposure parameters for the adult resident are shown in Tables 4.2.RME (groundwater; future land use) and 4.3.RME (indoor air; future land use). These exposure parameters rely partially on default RME parameters presented in *Risk Updates, No. 2* (USEPA, 1994a), *Exposure Factors Handbook* (USEPA, 1997a), and *RAGS, Part E* (USEPA, 2004a).

For the future adult resident, a drinking water ingestion rate of 2 liters/day was assumed (USEPA, 1997a). Exposures were assumed to occur 350 days/year (USEPA, 1994a). Dermal exposures while showering have been evaluated using default assumptions provided in *RAGS, Part E*. These

assumptions include a total body surface area of 18,000 cm^2 (50th percentile value for males and females combined; USEPA, 2004a). Dermal absorbed doses were calculated for each chemical using equations and chemical-specific factors presented in Attachment 4. A shower duration of 35 minutes was assumed (USEPA, 2004a). Adults were assumed to shower once per day for 350 days/year (USEPA, 2004a).

The default high-end exposure duration of 24 years (USEPA, 1994a) and the default value of 70 kg for an adult body weight were used (USEPA, 1997a). Finally, as recommended in *RAGS* (USEPA, 1989), the averaging time for noncarcinogens was set equal to the exposure duration, and the averaging time for carcinogens was the standard USEPA lifetime duration (70 years).

For the indoor air (vapor intrusion) pathway, future adult residents were assumed to be involved in activities resulting in the inhalation of volatile compounds in indoor air for 24 hours/day (95th percentile value; USEPA, 1997a). The remaining exposure parameters used for the inhalation pathway (i.e., exposure frequency, exposure duration and averaging time) were the same as the values described for the groundwater ingestion pathway.

Young Child Resident Exposure Parameters. The exposure parameters for the young child resident are shown in Tables 4.2.RME (groundwater; future land use) and 4.3.RME (indoor air; future land use). These exposure parameters rely partially on default RME parameters presented in *Risk Updates, No. 2* (USEPA, 1994a), *Exposure Factors Handbook* (USEPA, 1997a), and *RAGS, Part E* (USEPA, 2004a).

For the future young child resident, a drinking water ingestion rate of 1.5 liters/day was assumed (USEPA, 1997a). Exposures were assumed to occur 350 days/year (USEPA, 1994a). Dermal exposures while bathing have been evaluated using default assumptions provided in *RAGS, Part E*. These assumptions include a total body surface area of 6,600 cm^2 (50th percentile value for males and females combined; USEPA, 2004a). Dermal absorbed doses were calculated for each chemical using equations and chemical-specific factors presented in Attachment 4. A bath

duration of one hour was assumed (USEPA, 2004a). Young children were assumed to be bathed once per day for 350 days/year (USEPA, 2004a).

The default high-end exposure duration of 6 years (USEPA, 1994a) and the default value of 15 kg for a young child body weight were used (USEPA, 1997a). Finally, as recommended in *RAGS* (USEPA, 1989), the averaging time for noncarcinogens was set equal to the exposure duration, and the averaging time for carcinogens was the standard USEPA lifetime duration (70 years).

For the indoor air (vapor intrusion) pathway, young child residents were assumed to be involved in activities resulting in the inhalation of volatile compounds in indoor air for 24 hours/day (95th percentile value; USEPA, 1997a). The remaining exposure parameters used for the inhalation pathway (i.e., exposure frequency, exposure duration and averaging time) were the same as the values described for the groundwater ingestion pathway. These exposure assumptions are considered health protective for a young child in day care.

Construction Worker Exposure Parameters. The exposure parameters for the construction worker are shown in Table 4.2.RME (overburden groundwater; future land use). The exposure parameters rely partially on default RME exposure parameters presented in *Exposure Factors Handbook* (USEPA, 1997a) and *RAGS Part E* (USEPA, 2004a).

Construction workers were assumed to be exposed to overburden groundwater for 125 days/year. The groundwater exposure time was set at 1 hour/day. The groundwater incidental ingestion rate was set at 50 ml/day, a value representing approximately one mouthful.

An assumed exposure duration of 1 year and the default value of 70 kg for an adult body weight were used (USEPA, 1997a). Finally, as recommended in *RAGS* (USEPA, 1989), the averaging time for noncarcinogens was set equal to the exposure duration, and the averaging time for carcinogens was the standard USEPA lifetime duration (70 years).

For the dermal pathway, skin surface areas were calculated for the body parts that could contact groundwater, using statistical distributions of surface areas provided in *RAGS Part E* (USEPA, 2004a). Workers were assumed to contact overburden groundwater with 3,300 cm^2 of body surface area (50th percentile value; USEPA, 2004a). Dermal absorbed doses were calculated for each chemical using equations and chemical-specific factors presented in Attachment 4. The remaining exposure parameters used for the dermal exposure pathway (i.e., exposure frequency, exposure duration, body weight, and averaging time) were the same as the values described for the ingestion pathway.

Because no outdoor air COPCs were selected, the inhalation of outdoor air impacted by volatile compounds released from overburden groundwater was not quantitatively evaluated.

4.0 TOXICITY ASSESSMENT

The toxicity assessment presented here was conducted in accordance with USEPA guidance (1989). The methodology used for classifying health effects from exposure to chemicals is recommended by USEPA (1989). The health effects analysis considers chronic (long-term) exposures. Less than chronic exposures would result in less risk and hazard than chronic exposure; therefore, if chronic risk is within the EPA cancer risk range of 10^{-6} to 10^{-4} or below a hazard index of 1 (USEPA, 1990), risks and hazards from subchronic exposures will be as well.

The chronic toxicity criteria were obtained from USEPA's Integrated Risk Information System (IRIS) (USEPA, 2008). This source lists the most recent toxicity values recommended by USEPA for use in human health risk assessments. For compounds lacking toxicity values in IRIS, Provisional Peer Review Toxicity Values (PPRTVs) available from the Superfund Technical Support Center (STSC), National Center for Environmental Assessment (NCEA), Office of Research and Development, were used. If STSC was unable to supply a provisional value for a compound, the Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b) and other alternative sources (e.g., the Agency for Toxic Substances and Disease Registry and California

EPA) were consulted for toxicity information.

4.1 Toxicity Information for Noncarcinogenic Effects

Systemic toxic effects other than cancer can be associated with exposures to chemicals. Reference doses (RfDs), for oral exposures, and reference concentrations (RfCs), for inhalation exposures, are the toxicity values that are used to evaluate the hazard associated with exposure to potentially toxic chemicals. RfDs and RfCs have been developed on the premise that there are protective mechanisms that must be overcome before an appreciable risk of adverse health effects is manifested during a defined exposure period. It is assumed that there is a threshold dose that must be exceeded before adverse effects can occur. The RfD and RfC are the levels below which adverse effects are not expected to occur.

Chemicals classified as carcinogens may also produce other systemic effects. Where toxicity values are available, these chemicals were also evaluated for potential noncarcinogenic toxic effects and were included in the determination of chronic noncancer hazards.

Table 5.1 summarizes the chronic and subchronic oral noncarcinogenic toxicity values (i.e., RfDs) and the corresponding critical effects for the COPCs at the site. Chronic toxicity values are applicable to receptors whose exposures are expected to occur over a long interval of time (residents and commercial workers). Subchronic RfDs are applicable to the construction worker whose exposures are expected to occur over a short interval of time (i.e., 1 year or less). Table 5.2 summarizes the chronic inhalation noncarcinogenic toxicity values (i.e., RfCs) and the corresponding critical effects for COPCs at the site.

Oral RfDs for manganese were developed based on IRIS (USEPA, 2008) and USEPA Region I Risk Updates No. 4 (USEPA, 1996). These RfDs were based on a total allowable manganese intake of 10 mg/day (USEPA, 2008). After adjusting for background intake (the average dietary manganese intake in the U.S. population; 5 mg/day), the remaining intake (5 mg/day) was then

normalized for body weight (70 kg) to arrive at a manganese RfD (0.07 mg/kg-day) to which an additional uncertainty factor of 3 was applied for groundwater exposures resulting in a drinking water RfD of 0.024 mg/kg-day. Because no chromium speciation data were available for the site, chromium was evaluated using the hexavalent chromium RfD. Additional information on the noncarcinogenic effects for each COPC is presented in the toxicity profiles in Attachment 5. Chemical-specific permeability coefficients (K_ps), used to evaluate the water dermal pathways, are listed on the bottom of Table 5.1 and in Attachment 4.

4.2 Toxicity Information for Carcinogenic Effects

The potential for human carcinogenic effects is evaluated based on the chemical-specific slope factors (SFs) and unit risk (UR) values along with the weight-of-evidence classification (categories A through E) of the USEPA. The SF and UR values are the toxicity values that quantitatively define the dose-response relationship of a known or suspected carcinogen. Cancer slope factors are an upper bound (95% confidence limit) on the increased cancer risk from a lifetime exposure to a chemical. Unit risks are an upper bound on the increased cancer risk estimated to result from a chemical concentration of 1 ug/m^3 in air. The SF and UR values are a mathematical extrapolation of the slope of the dose-response curve from high doses administered to animals (or the exposures observed in epidemiological studies) to the low doses commonly experienced in the environment.

In USEPA=s *Guidelines for Carcinogen Risk Assessment* (USEPA, 2005), the weight of evidence classifications A through E are replaced with descriptors of carcinogenic potential: Carcinogenic to Humans, Likely to be Carcinogenic to Humans, Suggestive of Evidence of Carcinogenic Potential, Inadequate Information to Assess Carcinogenic Potential, and Not likely to be Carcinogenic to Humans. The guidelines also acknowledge that the mode of action of a carcinogen may involve both threshold and non-threshold mechanisms.

Table 6.1 summarizes the oral carcinogenic toxicity values (i.e., SFs) and the corresponding

weight-of-evidence classifications. Table 6.2 summarizes the inhalation toxicity values (i.e., URs). For PAHs, the SF for benzo(a)pyrene, along with the appropriate relative potency factors (USEPA, 1993), have been used to evaluate the potency of the individual carcinogenic PAHs.

For vinyl chloride, the slope factor and unit risk for Acontinuous lifetime exposure during adulthood@ (USEPA, 2008) were used to evaluate both adult and young child exposures during potable water use. However, an additional calculation was performed to account for Aearly-life@ exposures (i.e., < one year of age) to this compound (see Section 5.2.2 for additional information).

For trichloroethene, cancer risks have been estimated using the high-end provisional oral slope factor of 0.4 $(mg/kg\text{-}day)^{-1}$ and high-end provisional unit risk of 1.1E-04 $(\mu g/m^3)^{-1}$ (USEPA, 2001b). Because the carcinogenicity of this compound is currently under review, risk estimates using the slope factor and unit risk from the low-end of the provisional range (0.2 $[mg/kg\text{-}day]^{-1}$ and 5.7E-06 $[ug/m^3]^{-1}$) and the California EPA (0.13 $[mg/kg\text{-}day]^{-1}$ and 2E-06 $[ug/m^3]^{-1}$) have been included. Likewise for benzene, cancer risks have been estimated using the high-end of the cancer toxicity value range (USEPA, 2008). However, cancer risks using the low-end of the cancer toxicity value range have also been provided. The additional cancer risk estimates appear in footnotes at the bottom of appropriate Table 9s. Additional discussion on each carcinogenic COPC is provided in toxicity profiles presented in Attachment 5.

4.3 Adjustment of Toxicity Factors

No RfDs or SFs are available for evaluating dermal exposure. Therefore, cancer risks and noncancer hazards associated with dermal exposure may be evaluated using an oral SF or RfD, adjusted such that the toxicity value is appropriate for the dermal pathway. As detailed by USEPA (1989), for purposes of evaluating dermal exposure, it is generally necessary to adjust an oral toxicity factor (i.e., RfD or SF) from an administered (i.e., applied) dose to an absorbed (i.e., internal) dose. Because the toxicity values for the COPCs at the site are expressed as orally-

administered doses (i.e., applied or intake-based), it is necessary to adjust both the RfDs and SFs for these substances in estimating exposure on an absorbed-dose basis when assessing dermal exposure.

The oral RfDs and oral SFs for each COPC were modified according to the following equations (USEPA, 1989) for use in assessing dermal exposure:

$$ERfD_o = RfD_o \times BF_{o,a}$$

$$ESF_o = SF_o/BF_{o,a}$$

where:

$ERfD_o$	=	effective absorbed-dose oral RfD for each chemical
RfD_o	=	oral RfD for each chemical
$BF_{o,a}$	=	absolute oral bioavailability factor for each chemical
ESF_o	=	effective absorbed-dose oral SF for chemical
SF_o	=	oral SF for each chemical

Tables 5.1 and 6.1 present the oral to dermal adjustment factors used to adjust the oral toxicity criteria for the COPCs evaluated in the dermal exposure pathways. Oral bioavailability values were obtained from USEPA (2004a). No adjustment for oral absorption efficiency has been applied to any COPC with an absorption efficiency of greater than 50%. These COPCs include all volatile and semivolatile organic compounds, dieldrin, arsenic, and cobalt. Additional information on compound-specific oral-to-dermal adjustment factors is provided in Attachment 5.

4.4 Toxicity of Lead

Lead was selected as a COPC for overburden/bedrock combined groundwater because the maximum groundwater lead concentration (29 µg/L in MW-01) exceeded the drinking water criterion protective of blood lead levels in children (15 µg/L). Because no RfD or SF is available

for lead, this compound has not been quantitatively evaluated in the risk assessment. However, because lead concentrations exceed the drinking water criterion of 15 μg/L, developed using the Integrated Exposure Uptake Biokinetic Model (USEPA, 1994b; 2002b), additional investigation or remedial action may be indicated for lead in groundwater.

5.0 RISK CHARACTERIZATION

Risk characterization combines estimates of exposure with toxicity data to develop estimates of the probability that an adverse effect will occur under the specified conditions of exposure. The risk characterization was divided into three phases: 1) risk estimation; 2) risk description; and 3) uncertainty analysis.

Risk estimation is undertaken by combining the toxicity factors and exposure assessment equations to calculate estimates of risks and hazards. Noncarcinogenic hazards are reported as pathway-specific hazard indices (HIs), which are the sum of individual COPC hazard quotients (HQs) for that pathway. Only HQs from COPCs that affect the same target organ are summed to generate HIs. Estimates of carcinogenic risks are reported as incremental (above background) lifetime cancer incidence risks (ILCRs). Current practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances. Risk description entails several discussions, including the relative contributions of individual exposure pathways to the total risk for each medium. The significance of the risk estimates are relative to risk management criteria set forth in USEPA policy. The uncertainty analysis describes and quantifies, where possible, the impact of data uncertainty and variability, exposure assumptions, and toxicity values on estimates of risk.

5.1 Risk Estimation

Noncancer hazard is estimated by means of a HQ. To calculate noncarcinogenic HQs, the ADDs, calculated as described in subsection 3.2.1, were divided by the RfDs as follows:

$$HQ = ADD / RfD$$

The sum of this ratio for all chemicals within an exposure point and pathway that have the same target organ or type of toxicity is termed the pathway HI. The HI is useful as a reference point for gauging potential effects of environmental exposures to complex mixtures. In general, HIs that are less than 1 are not of regulatory concern; however, a HI of greater than 1 does not automatically indicate that an adverse effect will occur and should not automatically be interpreted as posing an unacceptable hazard to the exposed population.

The total pathway HI for each exposure point was calculated by summing the HQs for COPCs having similar systemic effects. Total HIs for each receptor, by medium, were calculated by summing the total pathway HIs across pathways within the media (e.g., summing dermal and ingestion hazards). As a first approximation, all COPCs are assumed to have additive effects. Total pathway HIs, assuming additivity of effects, are presented on Tables 7.1.RME through 7.4.RME. However, in cases where the total pathway HI for a receptor exceeded 1, only COPCs having similar systemic effects (i.e., target organs) were summed for each pathway and medium. Target organ HIs are presented on Tables 9.1.RME through 9.3.RME.

The cancer risk of each receptor is estimated for each medium by means of an ILCR. USEPA (1991b) states that where the cumulative incremental current or future carcinogenic risk to an individual is less than 10^{-4}, and where the noncarcinogenic HI is less than 1, action generally is not warranted unless there are adverse environmental impacts.

To calculate ILCRs, the chemical- and pathway-specific LADDs, calculated as described in subsection 3.2.1, were multiplied by SFs as follows:

$$ILCR = SF \times LADD$$

The resulting value represents the upper-bound probability that an individual could develop cancer over his or her lifetime due to exposure to potential carcinogens under the conditions specified in the exposure scenario. For example, carcinogenic risk levels of 10^{-6} and 10^{-4} represent a one-in-one-million chance and a one-in-ten-thousand chance, respectively, that an individual could contract cancer over a lifetime.

The cancer risk for each pathway (e.g., the ingestion pathway) was calculated by summing the risks from each COPC at each exposure point within the pathway, while receptor risks for each medium were calculated by summing ILCRs for each pathway within the medium (e.g., the ingestion and dermal contact pathways). For example, receptor cancer risks from exposure to groundwater and indoor air within an exposure area were determined by adding the risk from groundwater ingestion and dermal contact to the risk from inhalation of indoor air for this exposure point. Pathway and receptor ILCRs are presented on Tables 7.1.RME through 7.4.RME. ILCRs were further summed for young child and adult receptors to derive total receptor cancer risks. The total receptor ILCRs are presented on Tables 9.1.RME through 9.3.RME.

5.2 Risk Description

This subsection summarizes the human health risks potentially associated with exposures to environmental media (groundwater and air). Individual chemical-specific carcinogenic risks are expressed as probabilities of contracting cancer (i.e., ILCRs), while noncarcinogenic hazards are expressed as HIs. This risk assessment supplements the 1997 baseline human health risk assessment which included an evaluation of CTE exposures, thus, carcinogenic risks and noncarcinogenic hazards were calculated only using RME assumptions.

The risk description for the site is provided below in two parts. First, the relative contributions of the various exposure pathways within each medium are analyzed for each receptor. Second, the relative contributions of each contaminant are analyzed for each receptor. The noncarcinogenic

hazards and carcinogenic risks associated with COPCs in each medium for the receptors evaluated are presented in Tables 7.1.RME through 7.4.RME.

Tables 9.1.RME through 9.3.RME present target-organ specific HIs, which are discussed if a medium-specific HI exceeds 1. For the residential scenario, the child and adult ILCRs have been summed to present the total receptor cancer risk. However, because the child receptor is the most sensitive receptor for the estimation of noncarcinogenic hazard, only the child receptor HIs have been presented on Tables 9.1.RME through 9.3.RME for the residential scenario.

5.2.1 Description of HI Estimates. HI estimates represent the risk of health effects other than cancer from exposure to contaminants within the site, as described in subsection 5.1. Tables 7.1.RME through 7.4.RME present the noncarcinogenic hazards by receptor and medium. When a receptor-specific HI for an exposure medium exceeded 1, HIs were segregated by target organ and discussed as to whether target organ-specific HIs exceed risk management criteria. These target organ-specific HIs are presented on Tables 9.1.RME through 9.3.RME.

Current/Future Commercial Worker. The estimated HI for the indoor air pathway is listed for the current/future commercial worker in Table 7.1.RME. Indoor commercial workers were assumed to be exposed to volatile groundwater contaminants following the subsurface migration of the contaminants into indoor air. The target organ HIs are presented on Table 9.1.RME. The RME total receptor HI for the inhalation of volatiles in impacted indoor air (0.01) was less than the target HI of 1.

Future Construction Worker. The estimated HIs for the groundwater ingestion and dermal contact pathways for the overburden monitoring wells are listed for the future construction worker in Table 7.2.RME. Target organ HIs are presented on Table 9.2.RME. The RME HI for the groundwater pathways did not exceed the target HI of 1 (HI of 0.5). The outdoor air pathway was not quantitatively evaluated since no COPCs were selected for that exposure pathway.

Future Adult Resident. The estimated HIs for the groundwater ingestion, dermal contact, and inhalation pathways (including the subsurface vapor intrusion pathway) for the on-site overburden/bedrock monitoring wells are listed for the future adult resident in Table 7.3.RME. The RME HI for the groundwater pathways (HI of 70) exceeded the target HI of 1. The largest contributors to the HI in excess of 1 were carbon tetrachloride, trichloroethene, arsenic, cadmium, and manganese. The ingestion pathway contributed approximately 90% of the hazard. The hazard associated with the vapor intrusion pathway (0.06) was below the target HI of 1.

Future Young Child Resident. The estimated HIs for the groundwater ingestion, dermal contact, and inhalation pathways (including the subsurface vapor intrusion pathway) for the on-site overburden/bedrock monitoring wells are listed for the future young child resident in Table 7.4.RME. Target organ HIs are presented on Table 9.3.RME. The total RME HI for the groundwater pathways (HI of 300) exceeded the target HI of 1. In addition, the highest target organ HI (100 for the central nervous system target organ) also exceeded the target HI of 1. The largest contributors to the HIs in excess of 1 were benzene, carbon tetrachloride, trichloroethene, arsenic, cadmium, and manganese (Table 9.3.RME). The ingestion pathway contributed to greater than 90% of the hazard. The hazard associated with the vapor intrusion pathway (0.06) was below the target HI of 1. Because the HI for the young child resident associated with vapor intrusion does not exceed the target HI, hazards to children in day care, should a day care facility be present at the site, would be below the target HI.

5.2.2 Description of ILCR Estimates. Estimates of ILCR represent the incremental risk of cancer from the site, as described in subsection 5.1. Tables 7.1.RME through 7.4.RME present the cancer risks by receptor and medium for exposure to COPCs. For each receptor, medium-specific ILCRs for COPCs are summed and presented as total receptor risks on Tables 9.1.RME through 9.3.RME. ILCRs were summed for the young child and adult receptors to derive a total receptor risk for the resident receptor. The total receptor cancer risks, summed for the adult and child receptors, are presented on Tables 9.1.RME through 9.3.RME.

For vinyl chloride, adult and young child cancer risks associated with potable water use were estimated using toxicity values appropriate for Acontinuous lifetime exposures during adulthood@. However, to account for the apparent increased sensitivity to this compound during early life, vinyl chloride cancer risks estimated for the young child and adult were summed to the Aearly-life@ cancer risk. The Aearly life@ cancer risk estimates were calculated for the ingestion, dermal contact, and inhalation pathways using guidance provided by USEPA (2008). The Aearly-life@ calculation is documented in a footnote on appropriate Table 7s.

Current/Future Commercial Worker. The estimated ILCR for the indoor air pathway is listed for the current/future commercial worker in Tables 7.1.RME and 9.1.RME. The RME ILCR for the inhalation of impacted indoor air (3×10^{-6}) was estimated to be within the target risk range of 10^{-4} to 10^{-6}.

Future Construction Worker. The estimated ILCR for the groundwater ingestion and dermal contact pathways for the overburden monitoring wells is listed for the future construction worker in Table 7.2.RME and 9.2.RME. Total receptor RME ILCR for the groundwater pathways (2×10^{-6}) was estimated to be within the target risk range of 10^{-4} to 10^{-6}. The inhalation of outdoor air was not quantitatively evaluated since no COPCs were selected for this exposure pathway.

Future Young Child/Adult Resident. The estimated ILCRs for the groundwater ingestion, dermal contact, and inhalation pathways (including the subsurface vapor intrusion pathway) for the overburden/bedrock monitoring wells are listed for the future resident in Table 9.3.RME. Total receptor RME ILCR (child and adult risks combined) for the groundwater pathways exceeded the target risk range of 10^{-4} to 10^{-6}. The total receptor RME ILCR was 1×10^{-2}. The largest contributors to the ILCR in excess of 10^{-4} for the RME scenario were 1,2-dichloroethane, 1,4-dichlorobenzene, benzene, carbon tetrachloride, cis-1,3-dichloropropene, tetrachloroethene, trichloroethene, vinyl chloride, atrazine, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, dieldrin, and arsenic, primarily due to the ingestion pathway. The total receptor cancer risk associated

with the vapor intrusion pathway (2×10^{-5}) was within the target risk range. Because the ILCR for the young child resident associated with vapor intrusion does not exceed the target risk range, risks to children in day care, should a day care facility be present at the site, would be within or below the target risk range.

5.2.3 Comparison to MCLs. A comparison to MCLs was conducted as part of the COPC selection process. Because the future use of groundwater is associated with a cancer risk and noncancer hazard in excess of risk management criteria (target organ HI greater than 1; ILCR of greater than 10^{-4}), identification of compounds present in excess of MCLs has been conducted. The following compounds exceed MCLs and require further evaluation in the feasibility study, in addition to those compounds identified as primary risk contributors in the supplemental risk assessment: 1,2-dichloroethane, benzene, carbon tetrachloride, tetrachloroethene, trichloroethene, arsenic, cadmium, and lead.

5.3 Description of Uncertainties

Estimation of risks to human health that may result from exposure to chemicals in the environment is a complex process that often requires the combined efforts of multiple disciplines. Each assumption, whether regarding the toxicity value to use for a particular COPC or the value of a parameter in an exposure equation, has a degree of variability and uncertainty associated with it. In each step of the risk assessment process, beginning with the data collection and analysis and continuing through the toxicity assessment, exposure assessment, and risk characterization, conservative assumptions are made that are intended to be protective of human health and to ensure that risks are not significantly underestimated. The following subsection provides a discussion of the key uncertainties that may affect the final estimates of human health risk in this risk assessment. Uncertainties are arranged by topic.

5.3.1 Environmental Sampling and Analysis. The process of environmental sampling and analysis results in uncertainties from several sources, including errors inherent in sampling

procedures or analytical methods. One area of uncertainty is sampling procedures. Since it is not possible to sample the entire area of interest at a given site, a number of monitoring well locations are sampled within each area of a site, and the results are considered to be representative of the chemicals present throughout each area. This approach may overestimate or underestimate risk.

Analytical methods also involved uncertainties. Due to uncertainty of quantification, individual chemicals were sometimes listed as detected, but with the value qualified as estimated by laboratory qualification or validation procedures. The estimated value was used in the risk assessment. In some cases, analytical errors or sampling errors resulted in the rejection of data, which decreased the amount of data available and increased uncertainty associated with the representativeness of the detected chemical concentrations.

With respect to determining exposure point concentrations for this evaluation, one assumption was that the concentrations of chemicals in groundwater would remain constant over time. Depending on the properties of the chemical and the medium in which it was detected, this assumption may overestimate risks, depending on the degree of chemical degradation or transport to other media. Conversely, biodegradation of chemicals to more toxic chemicals was also not considered.

Tentatively Identified Compounds (TICs) were reported in site data (provided in Attachment 1), but were not included in the quantitative risk analysis due to lack of definitive identity and concentration data. For the VOC and SVOC analyses, TICs were predominantly reported as substituted benzenes, substituted PAHs, and petroleum-related compounds (e.g., eicosane and decane). Substituted benzoic acid and carboxylic acid isomers were also detected. One positively identified PAH compound (dibenz(a,h)anthracene) and benzene were identified as significant contributors to future groundwater risk and hazard. Therefore, due to the presence of TICs in site groundwater, site hazards and risks may be underestimated by the lack of quantitative inclusion of TICs potentially present as the site.

5.3.2 Selection of Chemicals for Evaluation. A comparison of maximum detected chemical concentrations to Region 9 PRGs was conducted. Chemicals whose maximum concentrations were below their respective cancer screening value or 10% of their noncancer screening value were not carried through the assessment. It is unlikely that this risk-based screening excluded chemicals that would be of concern, based on the conservative exposure assumptions and conservatively derived toxicity criteria that are the basis of the screening criteria. Although following this methodology does not provide a quantitative risk estimate for all chemicals, it focuses the assessment on the chemicals accounting for the greatest risks (i.e., chemicals whose maximum concentrations exceeded their respective PRGs), and, although the overall risk estimates are uncertain, it is not expected that actual risks will be significantly greater than estimated risks.

5.3.3 Toxicological Data. Uncertainty is associated with the toxicity values and toxicity information available to assess potential adverse effects. For the site, there is a probability of overestimating health risks or hazards for a number of reasons, which are discussed in the following paragraphs.

One of the major contributors to uncertainty is the accuracy of the toxicity values used. A cancer potency value is a mathematical extrapolation of the slope of the dose-response curve from high doses administered to animals (or the exposures observed in epidemiological studies) to the low doses commonly experienced in the environment. The USEPA has developed potency values for chemicals classified as carcinogens, based on the premise that there is no threshold, i.e., there is no level of exposure below which there is no risk of a carcinogenic effect. USEPA=s *Draft Final Guidelines for Carcinogen Risk Assessment* (USEPA, 2003c) acknowledges that the mode of action of a carcinogen may involve both threshold and non-threshold mechanisms. To the extent that the approach used to develop the potency estimate is incorrect, the extrapolated risks may be over- or underestimates. However, it should be noted that in the derivation of toxicity values, conservative assumptions are employed. Therefore, toxicity values tend to be biased toward overestimating risk.

Trichloroethene is being re-evaluated for carcinogenic potency by EPA. Estimates of carcinogenic potency for this compound range over nearly two orders of magnitude. The high-end of the range of oral slope factors and unit risk values have been used for carcinogenic risk estimation for trichloroethene in Table 9s. Footnotes on Table 9s also present the cumulative receptor cancer risks using the low-end of the range of oral slope factors and unit risk values. Trichloroethene was identified as a risk contributor for the use of groundwater as a source of drinking water and other household uses. Use of the low-end of the range for the oral slope factor and unit risk would reduce the risk associated with trichloroethene. However, trichloroethene would still be identified as a risk-contributing COPC (i.e., ILCR greater than 1×10^{-6}) because the total receptor risk would continue to exceed 1×10^{-4}. Likewise for benzene, the high-end of the range of oral slope factors and unit risk values have been used for carcinogenic risk. Footnotes on Table 9s also present the cumulative receptor cancer risks using the low-end of the range of oral slope factors and unit risk values. Benzene was also identified as a risk contributor for the use of groundwater as a source of drinking water and other household uses. Use of the low-end of the range for the oral slope factor and unit risk would reduce the risk associated with benzene. However, benzene would still be identified as a risk-contributing COPC (i.e., ILCR greater than 1×10^{-6}) because the total receptor risk would continue to exceed 1×10^{-4}.

The following compounds were lacking toxicity values:

- No RfDs for 1,1,2,2-tetrachloroethane, 1,2-dichloroethane, 1,4-dichlorobenzene, bromochloromethane, chloroethane, 3-nitroaniline, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, and cobalt;
- No RfCs for 1,1,2,2-tetrachloroethane, 1,2,3-trichlorobenzene, 1,2-dichloroethane, bromochloromethane, and bis(2-chloroethyl)ether; and
- No cancer or noncancer toxicity values for lead.

The lack of quantitative evaluation of the potential carcinogenic and noncarcinogenic effects of

these compounds results in an underestimation of risk and hazard. However, for 1,2-dichloroethane, 1,4-dichlorobenzene, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, and 1,1,2,2-tetrachloroethane, the potential carcinogenicity of these compounds was quantitatively evaluated. Lead has been qualitatively evaluated based on a comparison to the drinking water criterion protective of childhood lead exposures.

5.3.4 Exposure Assessment. The primary areas of uncertainty affecting exposure parameter estimation involve the assumptions regarding exposure pathways, the estimation of exposure point concentrations, and the parameters used to estimate chemical doses. The uncertainties associated with these various sources are discussed below.

For dermal exposure pathways, the absence of dermal toxicity criteria necessitated the use of oral toxicity data. To calculate risk estimates for the dermal pathway, absolute oral bioavailability factors that reflect the toxicity study conditions were used to modify the oral toxicity criteria. For the chemicals with oral absorption exceeding 50% (e.g., the PAHs), a default oral absorption factor of 100% was used. The risk estimates for the dermal pathways may be over- or underestimated depending on how closely these values reflect the difference between the oral and dermal routes.

For contaminants lacking experimental data on dermal penetration, the dermal risk assessment guidance (USEPA, 2004a) uses a model to predict absorption of contaminants from water. Contaminants for which sufficient data exist to model dermal absorption are said to be within the model=s effective predictive domain (EPD). Therefore, contaminants with experimental data or predicted dermal absorption within the model=s EPD have been quantitatively evaluated for dermal water exposures. However, for compounds with predicted dermal absorption outside the model=s EPD, USEPA (2004a) does not recommend the quantitative evaluation of the dermal water pathway. These compounds include dibenz(a,h)anthracene and phenanthrene. Therefore, no quantitative evaluation of the water dermal pathway has been included for these compounds. The lack of quantitative evaluation of these compounds results in an underestimation of the risk

and hazard for the household water use and construction worker scenarios.

The exposure assumptions selected for this evaluation were based on RME exposures. RME risks are conservative since estimated risks are based on upper-bound exposure assumptions. The parameter values used to describe the extent, frequency, and duration of exposure are associated with some uncertainty. Actual risks for some individuals within an exposed population may vary from those predicted depending upon their actual intake rates (e.g., water ingestion rates) or body weights. The exposure assumptions were selected to produce an upper-bound estimate of exposure in accordance with USEPA guidelines regarding evaluation of potential exposures at Superfund sites. Therefore, exposures and estimated potential risks for the majority of the evaluated receptors are likely to be overestimated.

6.0 COMPARISON OF 1997 AND 2008 RISK ASSESSMENT RESULTS

As part of the 1997 RI for OU-3, future potential residential use of groundwater from the site was evaluated. Exposures of future area residents to COPCs in groundwater underlying the site were assumed to occur under future land-use conditions if groundwater were used for drinking water. Therefore, it was assumed that future area residents would use groundwater with a composition represented by groundwater from the monitoring wells sampled in 1995. Drinking water ingestion exposures for adult residents were quantitatively evaluated for both the RME and CTE cases. Other routes of exposure associated with residential groundwater use (i.e., inhalation of chemicals that have volatilized from groundwater during showering and dermal contact with groundwater during bathing) were qualitatively addressed as exposure assessment uncertainties.

For groundwater, the maximum concentration was used to calculate the RME exposure, and the arithmetic mean concentration for each COPC was used in calculating the CTE exposure, consistent with the EPCs selected for evaluation in this supplemental risk assessment. However, in the 1997 risk assessment, groundwater was evaluated individually for the five site areas

identified in subsection 1.2 and for the groundwater flow zone (shallow overburden, deep overburden, and bedrock) in each of those areas.

For residential adult drinking water exposures, the default CTE and high-end exposure parameters describing drinking water ingestion rates (1.4 and 2 liters/day, respectively), exposure frequency (350 days/year), exposure duration (9 and 30 years, respectively), and body weight (70 kg) were used. The averaging time for noncarcinogens was set equal to the exposure duration (30 years), and the averaging time for carcinogens was the standard EPA lifetime duration (70 years). The exposure parameters used in 1997 for the RME scenario were consistent with the default RME parameters used in this supplemental risk assessment.

Even though the 1997 baseline risk assessment calculated hazards and risks for each area and flow zone, the results of the 1997 assessment are summarized for groundwater as a combined medium in order to compare the 1997 results to the results of this supplemental risk assessment.

Groundwater risks and hazards estimated for the RME residential drinking water scenario exceeded the USEPA carcinogenic risk range of 10^{-4} to 10^{-6} and the noncarcinogenic target organ HI of 1 for most areas and flow zones. The maximum cancer risk calculated for any area and flow zone was 6×10^{-3} for deep overburden groundwater at the RSI Landfill area. This cancer risk is less than the RME cancer risk calculated in this supplemental risk assessment of 1×10^{-2} (ingestion risk of 9×10^{-3}, dermal risk of 4×10^{-4}, and inhalation risk of 4×10^{-4}). The higher estimated risk calculated in this supplemental risk assessment is due to the inclusion of the dermal and inhalation pathways of exposure, which were not quantitatively evaluated in 1997, and the fact that the 1997 calculation used area maximum detected concentrations, rather than site-wide maximum detected concentrations.

In 1997, the following compounds were identified as contributing to hazards and risks in excess of a *de minimus* level of RME risk and hazard (hazard quotient greater than 1 or cancer risk greater than 10^{-6}): 1,1,2,2-tetrachloroethane, 1,2-dichloroethane, 1,1-dichloroethene, benzene,

tetrachloroethene, trichloroethene, bis(2-ethylhexyl)phthalate, carbazole, aldrin, PCBs, arsenic, beryllium, manganese, and thallium. Compounds identified as risk contributors in this supplemental risk assessment include: 1,2-dichloroethane, 1,4-dichlorobenzene, benzene, carbon tetrachloride, cis-1,3-dichloropropene, tetrachloroethene, trichloroethene, vinyl chloride, atrazine, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, dieldrin, arsenic, cadmium, manganese, and lead. The following identifies and explains the discrepancies between the 1997 baseline risk assessment and this supplemental groundwater risk assessment:

- Beryllium is no longer identified as a risk contributor. This metal was detected in 2005/2006 groundwater at similar levels detected in 1995 (2.4 µg/L in 1995 vs. 3.1 µg/L in 2005/2006). However, the toxicity of beryllium was re-evaluated in 1998 which resulted in the determination that the carcinogenicity of beryllium via the ingestion route cannot be determined (previously evaluated as a Class B1 carcinogen via the ingestion route);
- 1,1,2,2-Tetrachloroethane is no longer identified as a risk contributor primarily due to decreases in concentration that have occurred over the past 10 years from a maximum of 5 µg/L in 1995 to 0.077 µg/L in 2005/2006;
- 1,1-Dichloroethene is no longer identified as a risk contributor primarily due to a toxicity re-evaluation that occurred in 2002 resulting in the withdrawal of the quantitative cancer toxicity value for this compound. Decreases in concentration over the past 10 years have resulted in a maximum detected concentration of 4.8 µg/L which is below the MCL of 7 µg/L;
- Bis(2-ethylhexyl)phthalate is no longer identified as a risk contributor primarily due to decreases in concentration over the past 10 years that have resulted in a maximum detected concentration of 1.9 µg/L, significantly below the historical maximum concentration of 17 µg/L and below the MCL of 6 µg/L;
- Aldrin, PCBs, and thallium are no longer identified as risk contributors because these compounds were not detected in groundwater samples collected during the 2005/2006 sampling events;

- Even though carbazole was selected as a risk contributor in 1997, the use of currently accepted methodology concerning significant figures results in the exclusion of carbazole from the list of risk contributors to be evaluated in the FS, based on the 1995 groundwater data. Therefore, the analytical method selected on 2005/2006 did not include carbazole on the analyte list;
- 1,4-Dichlorobenzene has been newly identified as a risk contributor due to inclusion of quantitative risk and hazard estimates for the dermal pathway along with an increase in the maximum detected concentrations (from 3 μg/L in 1995 to 7.5 μg/L in 2005/2006);
- Vinyl chloride, cis-1,3-dichloropropene, bis(2-chloroethyl)ether, and dibenz(a,h)anthracene are newly identified risk contributors primarily because historical detection limits were not low enough to detect these compounds at the maximum concentration found at the site. The toxicity of these compounds is sufficient to cause their identification as risk contributors even though their maximum detected concentrations are less than 10 μg/L;
- Atrazine is a newly identified risk contributor primarily because the analytical method used in 1995 did not include atrazine as part of the analyte list;
- Carbon tetrachloride is a newly identified risk contributor. Carbon tetrachloride was not detected in 1995, even though historical detection limits were sufficient to detect this compound at the levels currently seen in groundwater. This indicates that there may have been a release of carbon tetrachloride at the site since 1995;
- Cadmium and dieldrin are newly identified risk contributors primarily due to increased concentrations detected in 2005/2006 compared to 1995. Maximum detected concentrations in 1995 for cadmium and dieldrin were 2.05 μg/L and 0.004 μg/L, respectively, compared to 22 μg/L and 0.013 μg/L, respectively, detected in 2005/2006;
- Even though lead was not identified as a groundwater contaminant of concern in the 1997 baseline risk assessment, the 1995 maximum detected lead concentration (63.6 μg/L) exceeded the 2005/2006 maximum detected lead concentration (29 μg/L). Since

both historical and current lead detections exceed the MCL of 15 μg/L, lead is identified as requiring further evaluation in the feasibility study.

7.0 SUMMARY OF HUMAN HEALTH RISKS

An overall summary of cancer risk and noncarcinogenic hazard estimates for the current/future commercial worker, future construction worker, and future adult/young child resident are presented in Tables 9.1.RME through 9.3.RME. When hazards and risks were estimated for the young child and adult residents, the young child HIs are presented as the most conservative, while ILCRs presented are the sum of the young child and adult risks (i.e., a total receptor cancer risk). In addition, HIs, segregated by systemic effects, are presented. In cases where the total HI exceeded 1, COPCs having similar systemic effects were summed for each pathway and medium.

Table 10.1.RME summarizes the primary risk contributors for the residential receptor with estimated ILCRs greater than the target range of 10^{-6} to 10^{-4} and target organ-specific HIs greater than 1.

Risks Under Current Conditions. ILCRs and HIs were estimated for current commercial workers exposed to indoor air following the subsurface migration of volatile contaminants in overburden groundwater into an occupied building. Total receptor ILCRs and HIs were below an ILCR of 10^{-4} and a HI of 1. Because the ILCR and HI for the young child resident associated with vapor intrusion are within or below the target risk range and HI, risks and hazards to children in day care at the site, should a day care facility be present at the site, would be within or below the target risk range and HI.

Potential Risks Under Future Conditions. ILCRs and HIs were estimated for the following receptors and exposure points: (1) future commercial workers exposed to indoor air following the subsurface migration of volatile compounds in overburden groundwater into an occupied building; (2) future construction workers exposed to overburden groundwater contaminants via ingestion

and dermal contact; and (3) future resident exposed to overburden/bedrock groundwater contaminants during household use of groundwater and following the migration of volatile overburden groundwater contaminants into indoor air.

ILCRs and HIs estimated for the future construction worker were below an ILCR of 10^{-4} and a HI of 1. No COPCs were selected for the inhalation of volatile compounds in outdoor air following their release from overburden groundwater. Therefore, the outdoor air pathway was not quantitatively evaluated.

ILCRs and HIs estimated for the future commercial worker and the future resident for the vapor intrusion pathway were below an ILCR of 10^{-4} and a HI of 1.

Under the assumption that on-site groundwater is used as a source of household water in the future, the RME ILCR and HI for future potable water use were estimated to exceed an ILCR of 10^{-4} and a HI of 1 due to the presence of: 1,2-dichloroethane, 1,4-dichlorobenzene, benzene, carbon tetrachloride, cis-1,3-dichloropropene, tetrachloroethene, trichloroethene, vinyl chloride, atrazine, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, dieldrin, arsenic, cadmium, and manganese (Table 10.1.RME). These compounds were identified based on their association with an ILCR of greater than 10^{-6} and/or a target organ HQ greater than 1.

Because the future use of groundwater is associated with a cancer risk and noncancer hazard in excess of risk management criteria (target organ HI greater than 1; ILCR of greater than 10^{-4}), identification of compounds present in excess of MCLs has been conducted. The following compounds exceed MCLs and require further evaluation in the feasibility study in addition to those identified as significant risk contributors in the supplemental risk assessment: 1,2-dichloroethane, benzene, carbon tetrachloride, tetrachloroethene, trichloroethene, arsenic, cadmium, and lead. Note that, with the exception of lead, these compounds were identified as significant risk contributing chemicals in the risk assessment. Due to a lack of toxicity values, lead was not quantitatively evaluated in the risk assessment, but identified as exceeding the

drinking water lead criterion protective of childhood exposures.

8.0 REFERENCES

Foster, S.A. and Chrostowski, P.C., 1986. *Integrated exposure model for use of tap water contaminated with volatile organic compounds.* 79th Annual Meeting of the Air Pollution Control Association, Minneapolis, Minnesota. June 1986.

Foster, S.A. and Chrostowski, P.C., 1987. *Inhalation exposure to volatile organic contaminants in the shower.* 80th Annual Meeting of the Air Pollution Control Association, New York, New York. June 1986.

Metcalf and Eddy, Inc. (M&E). 1996. Personal communication of J. Young, M&E, with J. Morris, Director of Public Health, Billerica Health Department. March 21, 1996.

Metcalf and Eddy, Inc. (M&E). 1997. *Remedial Investigation Final Report - Iron Horse Park Superfund Site, 3rd Operable Unit, North Billerica, MA.* Report prepared for the U.S. Environmental Protection Agency. September 1997.

Metcalf & Eddy (M&E). 2004. *Feasibility Study Final Report, Iron Horse Park Superfund Site, 3rd Operable Unit, North Billerica, Massachusetts*. June 2004.

Metcalf & Eddy (M&E). 2006. *Groundwater Data Evaluation Report, Iron Horse Park Superfund Site, Operable Unit, North Billerica, Massachusetts*. September 2006.

U.S. Environmental Protection Agency (USEPA). 1989. *Risk assessment guidance for Superfund. Volume I: Human health evaluation manual. Part A.* Interim Final. EPA/540/1-89/002. December 1989.

U.S. Environmental Protection Agency (USEPA). 1990. National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan; NCP). Code of Federal Regulations, Title 40, Part 300, Federal Register, Volume 55, Number 46, pp. 8666 et seq. March 9, 1990.

U.S. Environmental Protection Agency (USEPA). 1991a. *Risk assessment guidance for Superfund. Volume I: Human health evaluation manual. Part B, Development of risk-based preliminary remediation goals.* Interim Final. 9285.7-01B. December 1991.

U.S. Environmental Protection Agency (USEPA). 1991b. *Role of baseline risk assessment in Superfund remedy selection decisions.* Office of Solid Waste and Emergency Response. Washington, D.C. OSWER Directive 9355.0-30. Memo from Don R. Clay. April 22, 1991.

U.S. Environmental Protection Agency (USEPA). 1993. *Provisional guidance for quantitative risk assessment of polycyclic aromatic hydrocarbons.* Office of Research and Development. Washington, DC. EPA/600/R-93/089. July 1993.

U.S. Environmental Protection Agency (USEPA). 1994a. *Risk updates, no. 2.* USEPA Region I. August 1994.

U.S. Environmental Protection Agency (USEPA). 1994b. *Guidance manual for the integrated exposure uptake biokinetic model for lead in children.* Office of Solid Waster and Emergency Response. Washington, D.C. EPA/540/R-93/081. February 1994.

U.S. Environmental Protection Agency (USEPA). 1995. *Risk updates, no. 3.* USEPA Region I. August 1995.

U.S. Environmental Protection Agency (USEPA). 1996. *Risk updates, no. 4.* USEPA Region I. November 1996.

U.S. Environmental Protection Agency (USEPA). 1997a. *Exposure factors handbook.* Office of Research and Development. Washington, D.C. August 1997.

U.S. Environmental Protection Agency (USEPA). 1997b. *Health effects assessment summary tables, FY-1997 annual (HEAST).* Office of Health and Environmental Assessment. Environmental Assessment and Criteria Office and Office of Solid Waste and Emergency Response. Washington, D.C. July 1997.

U.S. Environmental Protection Agency (USEPA). 1999. *Risk updates, no. 5.* USEPA Region I. September 1999.

U.S. Environmental Protection Agency (USEPA). 2001a. *Risk assessment guidance for Superfund. Volume I: Human health evaluation manual. Part D, Standardized planning, reporting, and review of Superfund risk assessments. Final.* Office of Emergency and Remedial Response. Washington, D.C. OSWER Directive 9285.7-47. December 2001.

U.S. Environmental Protection Agency (USEPA). 2001b. *Trichloroethylene health risk assessment: Synthesis and characterization (External Review Draft).* Office of Research and Development. National Center for Environmental Assessment. Washington, D.C. EPA/600/P-01/002A. 2001.

U.S. Environmental Protection Agency (USEPA). 2002a. *Draft guidance for evaluating the vapor intrusion to indoor air pathway from groundwater and soils.* RCRA/2002/033. November 2002. http://www.epa.gov/correctiveaction/eis/vapor.htm.

U.S. Environmental Protection Agency (USEPA). 2002b. *User's guide for the integrated exposure uptake biokinetic model for lead in children.* Off ice of Emergency and Remedial Response. Washington, D.C. EPA 9285.7-42. May 2002.

U.S. Environmental Protection Agency (USEPA). 2004a. *Risk assessment guidance for Superfund Volume I: Human health evaluation manual (Part E, Supplemental guidance for dermal risk assessment). Final.* Office of Superfund Remediation and Technology Innovation. Washington, D.C. EPA/540/R/99/005. July 2004.

U.S. Environmental Protection Agency (USEPA). 2004b. *Preliminary remediation goals table. Region 9 technical support team.* Office of Superfund Programs. Region IX. October 2004.

U.S. Environmental Protection Agency (USEPA). 2004c. *User's guide for evaluating the subsurface vapor intrusion into buildings.* Office of Emergency and Remedial Response. Washington, D.C. Revised February 22, 2004.

U.S. Environmental Protection Agency (USEPA). 2005. *Guidelines for carcinogen risk assessment.* Risk Assessment Forum. March 2005.

U.S. Environmental Protection Agency (USEPA). 2006. *Drinking Water Standards and Health Advisories.* EPA822-R-06-013. August, 2006.

U.S. Environmental Protection Agency (USEPA). 2008. *Integrated risk information system (IRIS)*. Environmental Criterion and Assessment Office. February 2008.

FIGURES

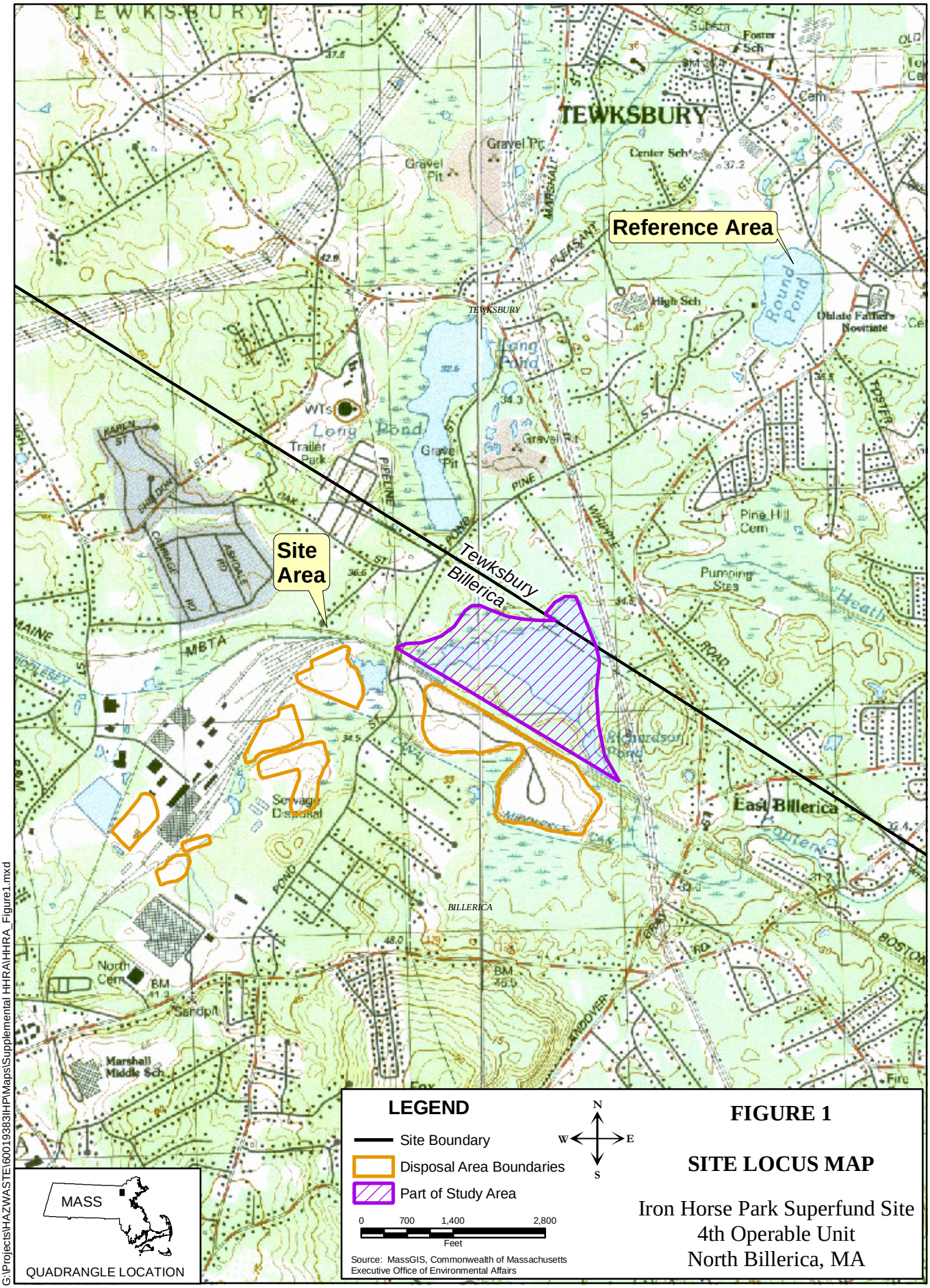
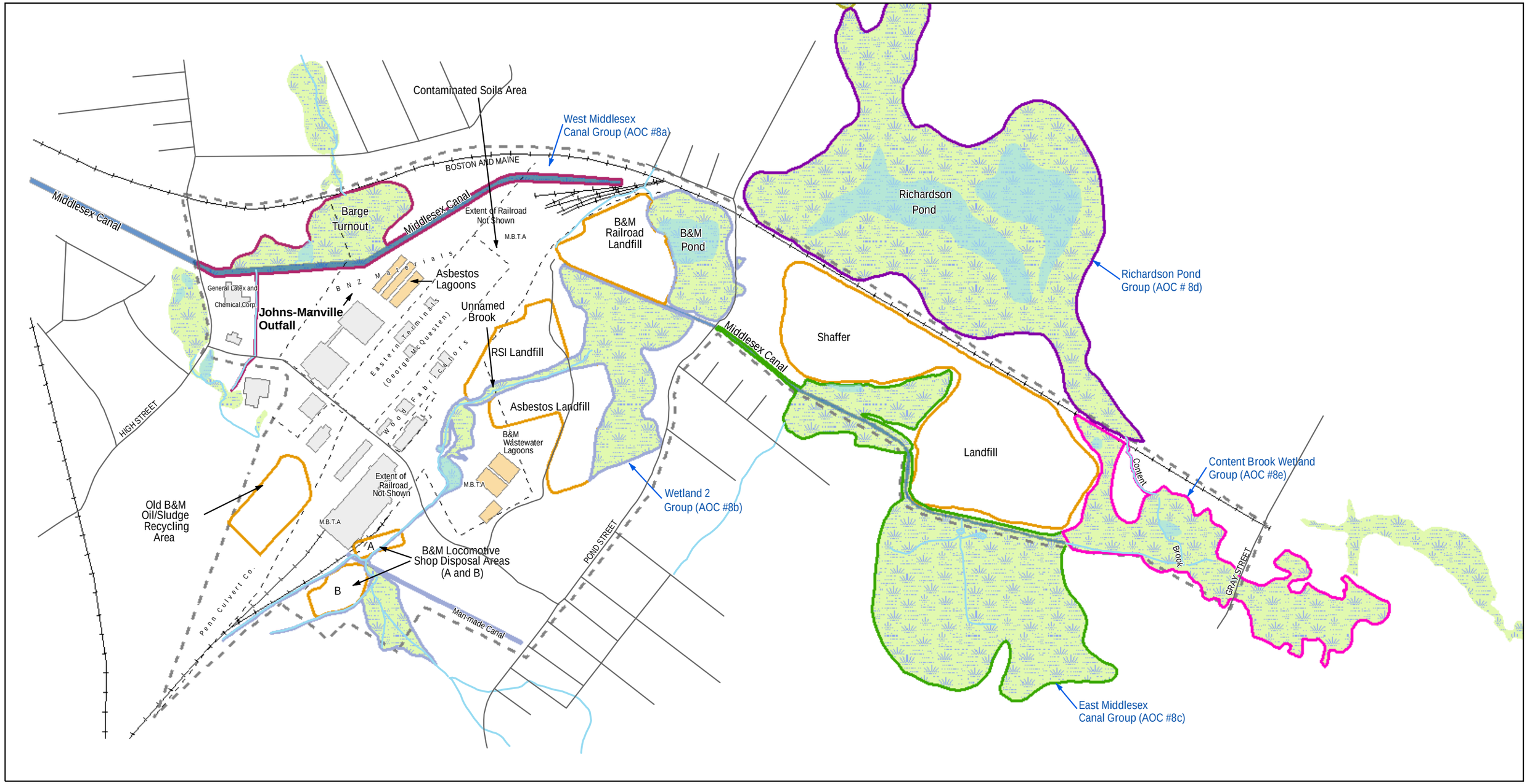


FIGURE 1

SITE LOCUS MAP

Iron Horse Park Superfund Site
4th Operable Unit
North Billerica, MA



LEGEND

- Property Boundary
- Site Boundary
- Roads
- Railroad
- Disposal Area Boundary
- Approximate Location of Johns-Manville Outfall
- Surface Water
- Wetlands
- Lagoon
- Building
- Content Brook Wetland Group
- East Middlesex Canal Group
- Richardson Pond Group
- West Middlesex Canal Group
- Wetland 2 Group

N W E S

800 400 0 800
Feet

Locations for all features area approximate.
Extent of wetland and surface waters are limited to areas confirmed during wetlands reconnaissance on July 15, 1993 and November 8, 1994

Source: MassGIS, Commonwealth of Massachusetts Executive Office of Environmental Affairs

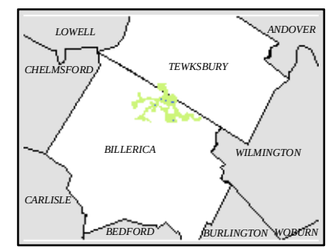


FIGURE 2

SITE MAP

Iron Horse Park Superfund Site
4th Operable Unit
North Billerica, MA

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BOSTON AND MAINE
Middlesex Canal
Barge Turnout
Extent of Railroad Not Shown
Contaminated Soil Area
Asbestos Lagoons
B&M Railroad Landfill
B&M Pond
Richardson Pond
Shaffer
Middlesex Canal
RSI Landfill
Unnamed Brook
Johns-Manville Asbestos Landfill
B&M Wastewater Lagoons
HIGH STREET
Old B&M Oil/Sludge Recycling Area
Extent of Railroad Not Shown
A
B
B&M Locomotive and Shop Disposal Areas (A and B)
Man-made Canal
POND STREET
Landfill
Content
Brook
GRAY STREET

LEGEND

- Iron Horse Site Boundary
- Railroad
- Disposal Area Boundary
- Building
- Lagoon
- Surface Water
- Wetlands
- Medium Yield Aquifer
- Open Space

N
W E
S

800 400 0 800
Feet

Locations for all features area approximate.
Extent of wetland and surface waters are limited to areas confirmed during wetlands reconnaissance on July 15, 1993 and November 8, 1994

Source: MassGIS, Commonwealth of Massachusetts
Executive Office of Environmental Affairs

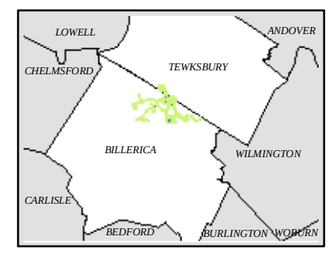

FIGURE 3.

AQUIFERS AND OPEN SPACES

Iron Horse Park Superfund Site
4th Operable Unit
North Billerica, MA

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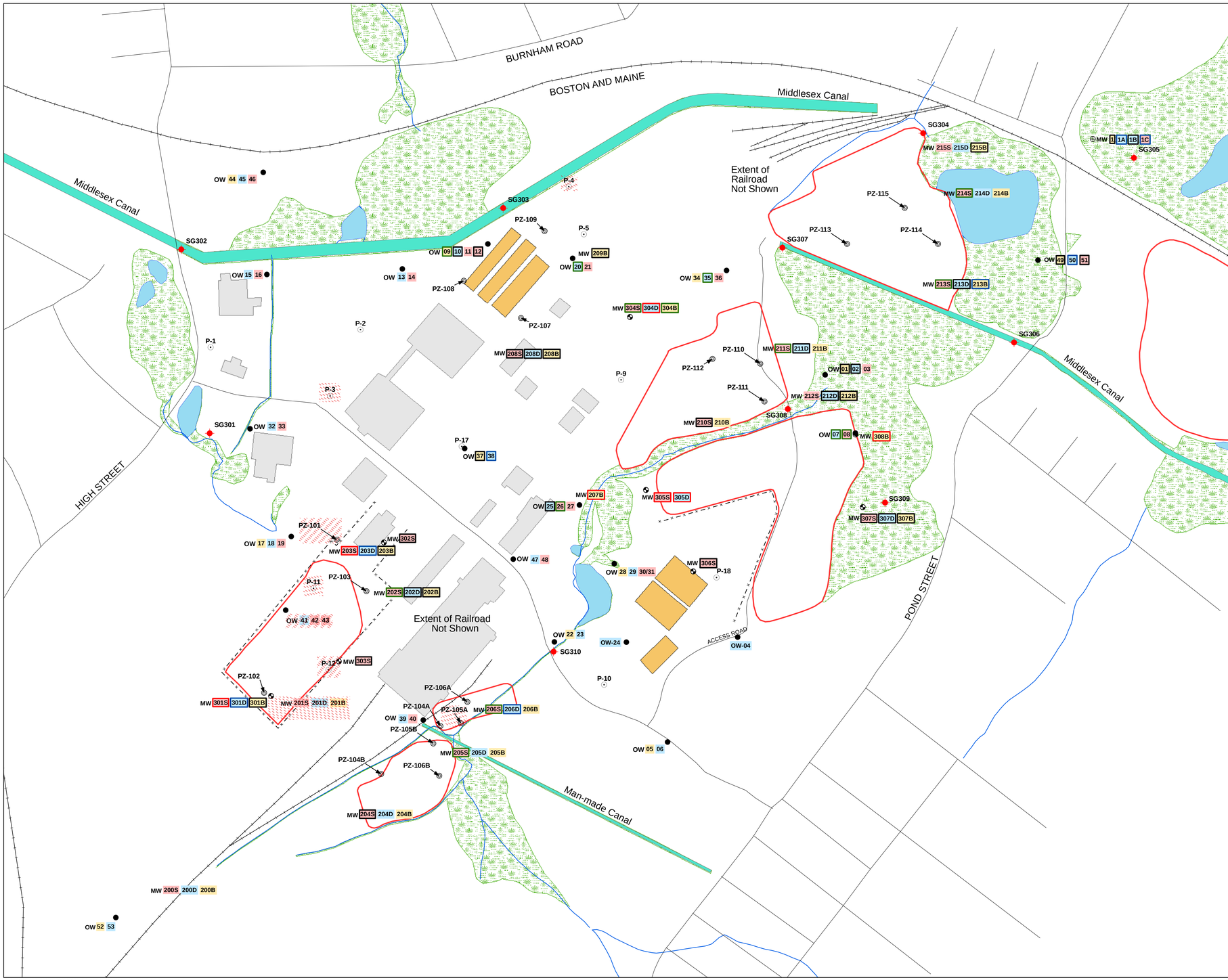

Legend

- Road
- Railroad
- Stream
- Fence
- Disposal Area Boundary
- MW - Series Monitoring Well
- OW - Series Monitoring Well
- P - Series Piezometer
- PZ - Series Piezometer - M&E
- 2006 Staff Gauge
- 2006 Monitoring Wells
- Surface Water
- Wetland
- Lagoon
- Building
- Canal
- Destroyed Wells

Well Depths

- Shallow Overburden
- Deep Overburden
- Bedrock

Parameter Sampling

- Metals/SVOCs/VOCs
- Metals/SVOCs/VOCs/PCB/Pest
- Metals/SVOCs/VOCs/1,4-Dioxane
- Metals/SVOCs/VOCs/PCB/Pest/1,4-Dioxane

0 125 250 500 750 1,000

Scale in Feet

Iron Horse Park Superfund Site
3rd Operable Unit
North Billerica, MA

FIGURE 4.
MONITORING WELL, PIEZOMETER, AND STAFF GAUGE LOCATIONS

Locations for All Features Shown are Approximate.
Extent of Wetland and Surface Waters are limited to Areas Confirmed During Wetlands Reconnaissance on July 15, 1993 and November 8, 1994.

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TABLES

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Indoor Air	Site-Wide Overburden	Commercial Worker	Adult	Inhalation	Quant	Volatile compounds in groundwater may impact indoor air in site buildings.
Future	Groundwater	Groundwater	Site-Wide (Overburden and Bedrock Combined)	Resident	Adult	Dermal	Quant	Organic compounds are present in site-wide wells.
						Inhalation	Quant	Volatile compounds are present in site-wide wells.
						Ingestion	Quant	Site-wide groundwater may be used as a source of drinking water.
					Young Child	Dermal	Quant	Organic compounds are present in site-wide wells.
						Inhalation	Quant	Volatile compounds are present in site-wide wells.
						Ingestion	Quant	Site-wide groundwater may be used as a source of drinking water.
			Site-Wide Overburden	Construction Worker	Adult	Ingestion	Quant	Ingestion of shallow groundwater may occur during trenching.
						Dermal	Quant	Dermal contact with organics in groundwater may occur during trenching.
		Indoor Air	Site-Wide Overburden	Resident	Adult/Young Child	Inhalation	Quant	Volatile compounds present in groundwater may impact indoor air.
		Outdoor Air	Site-Wide Overburden	Construction Worker	Adult	Inhalation	Quant	Volatile compounds present in groundwater may impact outdoor air during trenching.

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Site-Wide	71-55-6	1,1,1-Trichloroethane	0.16 J	22	ug/L	OW-08	5 / 43	0.5	22	N/A	320 N	200	MCL	N	BSL
Overburden (a)	79-34-5	1,1,2,2-Tetrachloroethane	0.077 J	0.077 J	ug/L	MW-202S	1 / 43	0.5	0.077	N/A	0.055 C	N/A	N/A	Y	ASL
	75-34-3	1,1-Dichloroethane	0.066 J	38	ug/L	OW-08	15 / 43	0.5	38	N/A	81 N	N/A	N/A	N	BSL
	75-35-4	1,1-Dichloroethene	1.7	4.8 J	ug/L	OW-20	2 / 43	0.5 - 0.57	4.8	N/A	34 N	7	MCL	N	BSL
	87-61-6	1,2,3-Trichlorobenzene	0.23 J	0.23 J	ug/L	MW-306S	1 / 43	0.5	0.23	N/A	0.72 N	N/A	N/A	N	BSL
	95-50-1	1,2-Dichlorobenzene	0.27 J	1.5	ug/L	OW-10	7 / 43	0.5	1.5	N/A	37 N	600	MCL	N	BSL
	107-06-2	1,2-Dichloroethane	0.095 J	11	ug/L	MW-307D	6 / 43	0.5 - 2.7	11	N/A	0.12 C	5	MCL	Y	ASL
	78-87-5	1,2-Dichloropropane	0.21 J	0.81	ug/L	OW-25	4 / 43	0.5	0.81	N/A	0.16 C	5	MCL	Y	ASL
	541-73-1	1,3-Dichlorobenzene	0.16 J	0.16 J	ug/L	MW-202S	1 / 43	0.5	0.16	N/A	18 N	N/A	N/A	N	BSL
	106-46-7	1,4-Dichlorobenzene	0.27 J	7.5	ug/L	MW-202S	9 / 43	0.5	7.5	N/A	0.5 C	75	MCL	Y	ASL
	67-64-1	Acetone	5.4	5.4	ug/L	MW-307S	1 / 43	5	5.4	N/A	550 N	N/A	N/A	N	BSL
	71-43-2	Benzene	0.26 J	59	ug/L	OW-08	7 / 43	0.5	59	N/A	0.35 C	5	MCL	Y	ASL
	74-97-5	Bromochloromethane	0.057 J	0.26 J	ug/L	MW-305D	2 / 43	0.5	0.26	N/A	0.18 C	N/A	N/A	Y	ASL
	56-23-5	Carbon Tetrachloride	0.22 J	120	ug/L	MW-202S	8 / 43	0.5	120	N/A	0.17 C	5	MCL	Y	ASL
	108-90-7	Chlorobenzene	0.17 J	46	ug/L	OW-08	7 / 43	0.5	46	N/A	11 N	100	MCL	Y	ASL
	75-00-3	Chloroethane	4.5 J	4.5 J	ug/L	MW-305D	1 / 43	0.5 - 1.5	4.5	N/A	4.6 C	N/A	N/A	N	BSL
	74-87-3	Chloromethane	0.22 J	3.2	ug/L	OW-20	8 / 43	0.5	3.2	N/A	16 N	N/A	N/A	N	BSL
	156-59-2	cis-1,2-Dichloroethene	0.24 J	0.98	ug/L	MW-213D	5 / 43	0.5	0.98	N/A	6.1 N	70	MCL	N	BSL
	10061-01-5	cis-1,3-Dichloropropene	1.2 J	8.6	ug/L	OW-08	2 / 43	0.5	8.6	N/A	0.4 C	N/A	N/A	Y	ASL
	110-82-7	Cyclohexane	0.35 J	0.35 J	ug/L	MW-211D	1 / 43	0.5	0.35	N/A	1000 N	N/A	N/A	N	BSL
	75-71-8	Dichlorodifluoromethane	0.23 J	3.5 J	ug/L	MW-307S	3 / 43	0.5	3.5	N/A	39 N	N/A	N/A	N	BSL
	100-41-4	Ethylbenzene	0.10 J	1.1 J	ug/L	MW-307S	5 / 43	0.5	1.1	N/A	130 N	700	MCL	N	BSL
	98-82-8	Isopropylbenzene	0.34 J	0.34 J	ug/L	OW-12	1 / 43	0.5	0.34	N/A	66 N	N/A	N/A	N	BSL
	79-20-9	Methyl acetate	1.8 J	1.8 J	ug/L	MW-203D	1 / 43	0.5	1.8	N/A	610 N	N/A	N/A	N	BSL
	1634-04-4	Methyl tert-butyl ether	0.093 J	3.4	ug/L	MW-301S	15 / 43	0.5	3.4	N/A	11 C	N/A	N/A	N	BSL
	108-87-2	Methylcyclohexane	0.16 J	1.7 J	ug/L	MW-307S	5 / 43	0.5	1.7	N/A	520 N	N/A	N/A	N	BSL
	75-09-2	Methylene Chloride	0.065 J	0.065 J	ug/L	MW-203S	1 / 43	0.5	0.065	N/A	4.3 C	5	MCL	N	BSL
	127-18-4	Tetrachloroethene	0.085 J	39	ug/L	OW-20	9 / 43	0.5	39	N/A	0.1 C	5	MCL	Y	ASL
	108-88-3	Toluene	0.058 J	0.52	ug/L	OW-08	6 / 43	0.5	0.52	N/A	72 N	1000	MCL	N	BSL
	156-60-5	trans-1,2-Dichloroethene	0.076 J	0.58	ug/L	OW-07	6 / 43	0.5	0.58	N/A	12 N	100	MCL	N	BSL
	79-01-6	Trichloroethene	0.080 J	7.0 J	ug/L	OW-20	12 / 43	0.5	7.0	N/A	0.028 C	5	MCL	Y	ASL
	75-69-4	Trichlorofluoromethane	0.11 J	0.11 J	ug/L	OW-25	1 / 43	0.5	0.11	N/A	130 N	N/A	N/A	N	BSL
	75-01-4	Vinyl Chloride	0.66	0.66	ug/L	MW-307S	1 / 43	0.5	0.66	N/A	0.02 C	2	MCL	Y	ASL
	1330-20-7	Xylene (total)	0.29 J	250 J	ug/L	MW-307S	4 / 43	0.5	250	N/A	21 N	10000	MCL	Y	ASL
	123-91-1	1,4-Dioxane	0.59 J	2.9	ug/L	MW-203D	3 / 12	2	2.9	N/A	6.1 C	N/A	N/A	N	BSL
	105-67-9	2,4-Dimethylphenol	0.52 J	1.1 J	ug/L	MW-307S	2 / 43	5 - 5.7	1.1	N/A	73 N	N/A	N/A	N	BSL
	91-57-6	2-Methylnaphthalene	0.077 J	1.2	ug/L	OW-12	3 / 43	0.2 - 5.8	1.2	N/A	0.62 N	N/A	N/A	Y	ASL
	95-48-7	2-Methylphenol	0.48 J	0.48 J	ug/L	MW-306S	1 / 43	5 - 5.7	0.48	N/A	180 N	N/A	N/A	N	BSL
	534-52-1	4,6-Dinitro-2-methylphenol	0.11 J	0.11 J	ug/L	MW-203S	1 / 43	20 - 23	0.11	N/A	0.36 N	N/A	N/A	N	BSL
	106-44-5	4-Methylphenol	0.97 J	0.97 J	ug/L	MW-306S	1 / 43	5 - 5.7	0.97	N/A	18 N	N/A	N/A	N	BSL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	83-32-9	Acenaphthene	0.033 J	1.0	ug/L	MW-214S	8 / 43	0.2 - 0.33	1.0	N/A	37 N	N/A	N/A	N	BSL
	208-96-8	Acenaphthylene	0.015 J	0.015 J	ug/L	MW-214S	1 / 43	0.2 - 5	0.015	N/A	0.62 N	N/A	N/A	N	BSL
	120-12-7	Anthracene	0.49 J	0.74 J	ug/L	MW-213S	2 / 43	5 - 5.7	0.74	N/A	180 N	N/A	N/A	N	BSL
	1912-24-9	Atrazine	0.13 J	1.9 J	ug/L	MW-202D	6 / 26	1 - 5	1.9	N/A	0.3 C	3	MCL	Y	ASL
	100-52-7	Benzaldehyde	1.8 J	1.8 J	ug/L	MW-213S	1 / 43	5 - 5.7	1.8	N/A	360 N	N/A	N/A	N	BSL
	191-24-2	Benzo(g,h,i)perylene	0.033 J	0.097 J	ug/L	OW-25	4 / 43	0.2 - 5	0.097	N/A	0.62 N	N/A	N/A	N	BSL
	111-44-4	Bis(2-chloroethyl)ether	0.020 J	0.70	ug/L	MW-307D	9 / 42	0.05 - 0.82	0.70	N/A	0.01 C	N/A	N/A	Y	ASL
	117-81-7	Bis(2-ethylhexyl)phthalate	1.9 J	1.9 J	ug/L	MW-212D	1 / 43	0.2 - 5	1.9	N/A	4.8 C	6	MCL	N	BSL
	85-68-7	Butylbenzylphthalate	0.50 J	0.71 J	ug/L	MW-305D	2 / 43	5 - 5.7	0.71	N/A	730 N	N/A	N/A	N	BSL
	53-70-3	Dibenz(a,h)anthracene	0.024 J	0.050 J	ug/L	MW-208D and MW-208S	3 / 43	0.1 - 5	0.050	N/A	0.0092 C	N/A	N/A	Y	ASL
	132-64-9	Dibenzofuran	0.90 J	0.90 J	ug/L	MW-213S	1 / 43	5 - 5.7	0.90	N/A	1.2 N	N/A	N/A	N	BSL
	131-11-3	Dimethylphthalate	0.015 J	0.54 J	ug/L	MW-306S	2 / 43	5 - 5.7	0.54	N/A	36000 N	N/A	N/A	N	BSL
	117-84-0	Di-n-octylphthalate	0.58 J	0.58 J	ug/L	MW-306S	1 / 43	5 - 5.7	0.58	N/A	150 N	N/A	N/A	N	BSL
	206-44-0	Fluoranthene	0.13 J	0.98 J	ug/L	MW-214S	3 / 43	5 - 5.7	0.98	N/A	150 N	N/A	N/A	N	BSL
	86-73-7	Fluorene	0.46 J	1.8 J	ug/L	MW-214S	4 / 43	5 - 5.7	1.8	N/A	24 N	N/A	N/A	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.025 J	0.057 J	ug/L	MW-208S	3 / 43	0.1 - 5	0.057	N/A	0.092 C	N/A	N/A	N	BSL
	91-20-3	Naphthalene	0.065 J	1.1	ug/L	OW-12	4 / 42	0.2 - 0.33	1.1	N/A	0.62 N	N/A	N/A	Y	ASL
	86-30-6	N-Nitrosodiphenylamine	0.40 J	0.40 J	ug/L	MW-213S	1 / 43	5 - 5.7	0.40	N/A	14 C	N/A	N/A	N	BSL
	85-01-8	Phenanthrene	0.011 J	2.1	ug/L	MW-214S	9 / 43	0.2 - 0.33	2.1	N/A	0.62 N	N/A	N/A	Y	ASL
	108-95-2	Phenol	5.7	5.7	ug/L	OW-08	1 / 43	5 - 5.7	5.7	N/A	1100 N	N/A	N/A	N	BSL
	129-00-0	Pyrene	0.095 J	0.46	ug/L	MW-214S	4 / 43	0.2 - 0.33	0.46	N/A	18 N	N/A	N/A	N	BSL
	50-29-3	4,4'-DDT	0.0066 J	0.013 J	ug/L	MW-213S	2 / 17	0.01	0.013	N/A	0.2 C	N/A	N/A	N	BSL
	319-86-8	delta-BHC	0.0054	0.0054	ug/L	MW-304S	1 / 16	0.005	0.0054	N/A	0.011 C	N/A	N/A	N	BSL
	60-57-1	Dieldrin	0.013	0.013	ug/L	MW-305S	1 / 16	0.01	0.013	N/A	0.0042 C	N/A	N/A	Y	ASL
	33213-65-9	Endosulfan II	0.016 J	0.016 J	ug/L	MW-213S	1 / 17	0.01	0.016	N/A	22 N	N/A	N/A	N	BSL
	53494-70-5	Endrin Ketone	0.020 J	0.020 J	ug/L	MW-213S	1 / 17	0.01	0.020	N/A	1.1 N	N/A	N/A	N	BSL
	7429-90-5	Aluminum	13 J	7070	ug/L	MW-301D	29 / 43	50	7070	N/A	3600 N	N/A	N/A	Y	ASL
	7440-36-0	Antimony	2.6 J	4.2 J	ug/L	MW-304S	4 / 43	2 - 20	4.2	N/A	1.5 N	6	MCL	Y	ASL
	7440-38-2	Arsenic	0.054 J	281	ug/L	MW-211D	41 / 43	0.5	281	N/A	0.045 C	10	MCL	Y	ASL
	7440-39-3	Barium	5.1 J	837	ug/L	MW-213S	43 / 43	NA	837	N/A	260 N	2000	MCL	Y	ASL
	7440-41-7	Beryllium	0.10 J	1.6 J	ug/L	OW-10	5 / 43	1 - 10	1.6	N/A	7.3 N	4	MCL	N	BSL
	7440-43-9	Cadmium	0.051 J	22	ug/L	MW-01B	25 / 43	1	22	N/A	1.8 N	5	MCL	Y	ASL
	7440-47-3	Chromium	0.083 J	32	ug/L	MW-301D	26 / 43	2 - 20	32	N/A	11 N	1300	MCL	Y	ASL
	7440-48-4	Cobalt	0.23 J	224	ug/L	MW-204S	31 / 43	1 - 2	224	N/A	73 N	N/A	N/A	Y	ASL
	7440-50-8	Copper	0.66 J	15	ug/L	MW-01B	9 / 43	2 - 20	15	N/A	N/A	1300	MCL	N	BSL
	7439-92-1	Lead	0.11 J	11	ug/L	MW-01A	24 / 43	1 - 10	11	N/A	15 N	15	MCL	N	BSL
	7439-96-5	Manganese	6.6	22400 J	ug/L	MW-204S	43 / 43	NA	22400	N/A	88 N	N/A	N/A	Y	ASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	7440-02-0	Nickel	0.48 J	41	ug/L	MW-204S	29 / 43	1 - 10	41	N/A	73 N	N/A	N/A	N	BSL
	7782-49-2	Selenium	0.15 J	2.7 J	ug/L	MW-213S	5 / 43	5 - 50	2.7	N/A	18 N	50	MCL	N	BSL
	7440-62-2	Vanadium	0.046 J	16	ug/L	MW-301D	33 / 43	0.19 - 1	16	N/A	3.6 N	N/A	N/A	Y	ASL
	7440-66-6	Zinc	1.9 J	86 J	ug/L	MW-214S	16 / 43	2 - 45.9	86	N/A	1100 N	N/A	N/A	N	BSL
Site-Wide (Overburden and Bedrock Combined) (b)	71-55-6	1,1,1-Trichloroethane	0.072 J	22	ug/L	OW-08	8 / 60	0.5	22	N/A	320 N	200	MCL	N	BSL
	79-34-5	1,1,2,2-Tetrachloroethane	0.077 J	0.077 J	ug/L	MW-202S	1 / 60	0.5	0.077	N/A	0.055 C	N/A	N/A	Y	ASL
	75-34-3	1,1-Dichloroethane	0.063 J	38	ug/L	OW-08	27 / 60	0.5	38	N/A	81 N	N/A	N/A	N	BSL
	75-35-4	1,1-Dichloroethene	0.26 J	4.8 J	ug/L	OW-20	5 / 60	0.5 - 0.57	4.8	N/A	34 N	7	MCL	N	BSL
	87-61-6	1,2,3-Trichlorobenzene	0.23 J	0.23 J	ug/L	MW-306S	1 / 60	0.5	0.23	N/A	0.72 N	N/A	N/A	N	BSL
	95-50-1	1,2-Dichlorobenzene	0.27 J	1.5	ug/L	OW-10	11 / 60	0.5 - 0.62	1.5	N/A	37 N	600	MCL	N	BSL
	107-06-2	1,2-Dichloroethane	0.095 J	23	ug/L	MW-307B	17 / 60	0.5 - 2.7	23	N/A	0.12 C	5	MCL	Y	ASL
	78-87-5	1,2-Dichloropropane	0.21 J	0.81	ug/L	OW-25	4 / 60	0.5	0.81	N/A	0.16 C	5	MCL	Y	ASL
	541-73-1	1,3-Dichlorobenzene	0.16 J	0.16 J	ug/L	MW-202S	1 / 60	0.5	0.16	N/A	18 N	N/A	N/A	N	BSL
	106-46-7	1,4-Dichlorobenzene	0.14 J	7.5	ug/L	MW-202S	13 / 60	0.5	7.5	N/A	0.5 C	75	MCL	Y	ASL
	67-64-1	Acetone	5.4	5.4	ug/L	MW-307S	1 / 60	5	5.4	N/A	550 N	N/A	N/A	N	BSL
	71-43-2	Benzene	0.20 J	59	ug/L	OW-08	8 / 60	0.5	59	N/A	0.35 C	5	MCL	Y	ASL
	74-97-5	Bromochloromethane	0.057 J	1.4	ug/L	MW-308B	5 / 60	0.5	1.4	N/A	0.18 C	N/A	N/A	Y	ASL
	56-23-5	Carbon Tetrachloride	0.10 J	120	ug/L	MW-202S	12 / 60	0.5	120	N/A	0.17 C	5	MCL	Y	ASL
	108-90-7	Chlorobenzene	0.16 J	46	ug/L	OW-08	10 / 60	0.5	46	N/A	11 N	100	MCL	Y	ASL
	75-00-3	Chloroethane	2.5	7.2	ug/L	MW-308B	3 / 60	0.5 - 1.5	7.2	N/A	4.6 C	N/A	N/A	Y	ASL
	74-87-3	Chloromethane	0.11 J	7.1	ug/L	MW-308B	10 / 60	0.5	7.1	N/A	16 N	N/A	N/A	N	BSL
	156-59-2	cis-1,2-Dichloroethene	0.24 J	2.4	ug/L	OW-49	9 / 60	0.5	2.4	N/A	6.1 N	70	MCL	N	BSL
	10061-01-5	cis-1,3-Dichloropropene	1.2 J	8.6	ug/L	OW-08	2 / 60	0.5	8.6	N/A	0.4 C	N/A	N/A	Y	ASL
	110-82-7	Cyclohexane	0.19 J	0.35 J	ug/L	MW-211D	2 / 60	0.5	0.35	N/A	1000 N	N/A	N/A	N	BSL
	75-71-8	Dichlorodifluoromethane	0.23 J	3.5 J	ug/L	MW-307S	3 / 60	0.5	3.5	N/A	39 N	N/A	N/A	N	BSL
	100-41-4	Ethylbenzene	0.10 J	1.1 J	ug/L	MW-307S	5 / 60	0.5	1.1	N/A	130 N	700	MCL	N	BSL
	98-82-8	Isopropylbenzene	0.34 J	0.34 J	ug/L	OW-12	1 / 60	0.5	0.34	N/A	66 N	N/A	N/A	N	BSL
	79-20-9	Methyl acetate	1.8 J	1.8 J	ug/L	MW-203D	1 / 60	0.5	1.8	N/A	610 N	N/A	N/A	N	BSL
	1634-04-4	Methyl tert-butyl ether	0.089 J	3.4	ug/L	MW-301S	21 / 60	0.5	3.4	N/A	11 C	N/A	N/A	N	BSL
	108-87-2	Methylcyclohexane	0.16 J	1.7 J	ug/L	MW-307S	5 / 60	0.5	1.7	N/A	520 N	N/A	N/A	N	BSL
	75-09-2	Methylene Chloride	0.065 J	0.065 J	ug/L	MW-203S	1 / 60	0.5	0.065	N/A	4.3 C	5	MCL	N	BSL
	127-18-4	Tetrachloroethene	0.085 J	39	ug/L	OW-20	13 / 60	0.5	39	N/A	0.1 C	5	MCL	Y	ASL
	108-88-3	Toluene	0.058 J	0.52	ug/L	OW-08	9 / 60	0.5	0.52	N/A	72 N	1000	MCL	N	BSL
	156-60-5	trans-1,2-Dichloroethene	0.076 J	2.1	ug/L	MW-308B	8 / 60	0.5	2.1	N/A	12 N	100	MCL	N	BSL
	79-01-6	Trichloroethene	0.080 J	75	ug/L	MW-308B	19 / 60	0.5	75	N/A	0.028 C	5	MCL	Y	ASL
	75-69-4	Trichlorofluoromethane	0.11 J	0.71	ug/L	MW-207B	2 / 60	0.5	0.71	N/A	130 N	N/A	N/A	N	BSL
	75-01-4	Vinyl Chloride	0.66	0.74	ug/L	MW-308B	2 / 60	0.5	0.74	N/A	0.02 C	2	MCL	Y	ASL
	1330-20-7	Xylene (total)	0.29 J	250 J	ug/L	MW-307S	4 / 60	0.5	250	N/A	21 N	10000	MCL	Y	ASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	123-91-1	1,4-Dioxane	0.59 J	2.9	ug/L	MW-203D	6 / 15	2	2.9	N/A	6.1 C	N/A	N/A	N	BSL
	105-67-9	2,4-Dimethylphenol	0.52 J	1.1 J	ug/L	MW-307S	2 / 60	5 - 5.7	1.1	N/A	73 N	N/A	N/A	N	BSL
	121-14-2	2,4-Dinitrotoluene	6.7	6.7	ug/L	OW-37	1 / 60	5 - 5.7	6.7	N/A	7.3 N	N/A	N/A	N	BSL
	606-20-2	2,6-Dinitrotoluene	1.3 J	1.3 J	ug/L	OW-37	1 / 60	5 - 5.7	1.3	N/A	3.6 N	N/A	N/A	N	BSL
	91-57-6	2-Methylnaphthalene	0.077 J	1.2	ug/L	OW-12	3 / 60	0.2 - 5.8	1.2	N/A	0.62 N	N/A	N/A	Y	ASL
	95-48-7	2-Methylphenol	0.48 J	0.48 J	ug/L	MW-306S	1 / 60	5 - 5.7	0.48	N/A	180 N	N/A	N/A	N	BSL
	99-09-2	3-Nitroaniline	6.2 J	6.2 J	ug/L	OW-37	1 / 60	20 - 23	6.2	N/A	1.1 N	N/A	N/A	Y	ASL
	534-52-1	4,6-Dinitro-2-methylphenol	0.11 J	0.11 J	ug/L	MW-203S	1 / 60	20 - 23	0.11	N/A	0.36 N	N/A	N/A	N	BSL
	106-44-5	4-Methylphenol	0.97 J	0.97 J	ug/L	MW-306S	1 / 60	5 - 5.7	0.97	N/A	18 N	N/A	N/A	N	BSL
	83-32-9	Acenaphthene	0.033 J	1.0	ug/L	MW-214S	9 / 60	0.2 - 0.33	1.0	N/A	37 N	N/A	N/A	N	BSL
	208-96-8	Acenaphthylene	0.012 J	0.015 J	ug/L	MW-214S	2 / 60	0.2 - 5	0.015	N/A	0.62 N	N/A	N/A	N	BSL
	120-12-7	Anthracene	0.49 J	0.74 J	ug/L	MW-213S	2 / 60	5 - 5.7	0.74	N/A	180 N	N/A	N/A	N	BSL
	1912-24-9	Atrazine	0.13 J	1.9 J	ug/L	MW-202D	7 / 36	1 - 5	1.9	N/A	0.3 C	3	MCL	Y	ASL
	100-52-7	Benzaldehyde	1.8 J	2.0 J	ug/L	OW-37	2 / 60	5 - 5.7	2.0	N/A	360 N	N/A	N/A	N	BSL
	191-24-2	Benzo(g,h,i)perylene	0.024 J	0.097 J	ug/L	OW-25	7 / 60	0.2 - 5	0.097	N/A	0.62 N	N/A	N/A	N	BSL
	111-44-4	Bis(2-chloroethyl)ether	0.020 J	0.70	ug/L	MW-307D	19 / 59	0.05 - 0.82	0.70	N/A	0.01 C	N/A	N/A	Y	ASL
	117-81-7	Bis(2-ethylhexyl)phthalate	1.9 J	1.9 J	ug/L	MW-212D	1 / 60	0.2 - 5	1.9	N/A	4.8 C	6	MCL	N	BSL
	85-68-7	Butylbenzylphthalate	0.19 J	0.71 J	ug/L	MW-305D	3 / 60	5 - 5.7	0.71	N/A	730 N	N/A	N/A	N	BSL
	53-70-3	Dibenz(a,h)anthracene	0.019 J	0.050 J	ug/L	MW-208D and MW-208S	6 / 60	0.1 - 5	0.050	N/A	0.0092 C	N/A	N/A	Y	ASL
	132-64-9	Dibenzofuran	0.90 J	0.90 J	ug/L	MW-213S	1 / 60	5 - 5.7	0.90	N/A	1.2 N	N/A	N/A	N	BSL
	131-11-3	Dimethylphthalate	0.015 J	0.54 J	ug/L	MW-306S	2 / 60	5 - 5.7	0.54	N/A	36000 N	N/A	N/A	N	BSL
	117-84-0	Di-n-octylphthalate	0.58 J	0.58 J	ug/L	MW-306S	1 / 60	5 - 5.7	0.58	N/A	150 N	N/A	N/A	N	BSL
	206-44-0	Fluoranthene	0.13 J	0.98 J	ug/L	MW-214S	3 / 60	5 - 5.7	0.98	N/A	150 N	N/A	N/A	N	BSL
	86-73-7	Fluorene	0.46 J	1.8 J	ug/L	MW-214S	4 / 60	5 - 5.7	1.8	N/A	24 N	N/A	N/A	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.021 J	0.057 J	ug/L	MW-208S	6 / 60	0.1 - 5	0.057	N/A	0.092 C	N/A	N/A	N	BSL
	78-59-1	Isophorone	0.77 J	0.77 J	ug/L	OW-37	1 / 60	5 - 5.7	0.77	N/A	71 C	N/A	N/A	N	BSL
	91-20-3	Naphthalene	0.028 J	1.1	ug/L	OW-12	5 / 59	0.2 - 0.33	1.1	N/A	0.62 N	N/A	N/A	Y	ASL
	86-30-6	N-Nitrosodiphenylamine	0.40 J	0.40 J	ug/L	MW-213S	1 / 60	5 - 5.7	0.40	N/A	14 C	N/A	N/A	N	BSL
	85-01-8	Phenanthrene	0.011 J	2.1	ug/L	MW-214S	12 / 60	0.2 - 0.33	2.1	N/A	0.62 N	N/A	N/A	Y	ASL
	108-95-2	Phenol	5.7	5.7	ug/L	OW-08	1 / 60	5 - 5.7	5.7	N/A	1100 N	N/A	N/A	N	BSL
	129-00-0	Pyrene	0.039 J	0.46	ug/L	MW-214S	5 / 60	0.2 - 0.33	0.46	N/A	18 N	N/A	N/A	N	BSL
	50-29-3	4,4'-DDT	0.0066 J	0.013 J	ug/L	MW-213S	2 / 21	0.01	0.013	N/A	0.2 C	N/A	N/A	N	BSL
	5103-71-9	alpha-Chlordane	0.0051 J	0.0051 J	ug/L	OW-09	1 / 20	0.005	0.0051	N/A	0.19 C	2	MCL	N	BSL
	319-86-8	delta-BHC	0.0054	0.0054	ug/L	MW-304S	1 / 20	0.005	0.0054	N/A	0.011 C	N/A	N/A	N	BSL
	60-57-1	Dieldrin	0.013	0.013	ug/L	MW-305S	1 / 20	0.01	0.013	N/A	0.0042 C	N/A	N/A	Y	ASL
	33213-65-9	Endosulfan II	0.016 J	0.016 J	ug/L	MW-213S	1 / 21	0.01	0.016	N/A	22 N	N/A	N/A	N	BSL
	53494-70-5	Endrin Ketone	0.020 J	0.020 J	ug/L	MW-213S	1 / 21	0.01	0.020	N/A	1.1 N	N/A	N/A	N	BSL
	7429-90-5	Aluminum	11 J	7070	ug/L	MW-301D	42 / 60	50	7070	N/A	3600 N	N/A	N/A	Y	ASL
	7440-36-0	Antimony	2.6 J	4.2 J	ug/L	MW-304S	4 / 60	2 - 20	4.2	N/A	1.5 N	6	MCL	Y	ASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	7440-38-2	Arsenic	0.054 J	281	ug/L	MW-211D	58 / 60	0.5	281	N/A	0.045 C	10	MCL	Y	ASL
	7440-39-3	Barium	2.6 J	837	ug/L	MW-213S	60 / 60	N/A	837	N/A	260 N	2000	MCL	Y	ASL
	7440-41-7	Beryllium	0.10 J	3.1 J	ug/L	OW-09	8 / 60	1 - 10	3.1	N/A	7.3 N	4	MCL	N	BSL
	7440-43-9	Cadmium	0.051 J	22	ug/L	MW-01B	35 / 60	1	22	N/A	1.8 N	5	MCL	Y	ASL
	7440-47-3	Chromium	0.083 J	32	ug/L	MW-301D	35 / 60	2 - 20	32	N/A	11 N	1300	MCL	Y	ASL
	7440-48-4	Cobalt	0.23 J	341	ug/L	OW-09	43 / 60	1 - 10	341	N/A	73 N	N/A	N/A	Y	ASL
	7440-50-8	Copper	0.52 J	135 J	ug/L	OW-09	15 / 60	2 - 20	135	N/A	N/A	1300	MCL	N	BSL
	7439-92-1	Lead	0.11 J	29	ug/L	MW-01	37 / 60	1 - 10	29	N/A	15 N	15	MCL	Y	ASL
	7439-96-5	Manganese	6.6	22600	ug/L	OW-09	60 / 60	N/A	22600	N/A	88 N	N/A	N/A	Y	ASL
	7487-94-7	Mercury (inorganic)	0.083 J	0.90 J	ug/L	MW-207B	2 / 60	0.2	0.90	N/A	1.1 N	2	MCL	N	BSL
	7440-02-0	Nickel	0.35 J	286 J	ug/L	OW-09	41 / 60	1 - 10	286	N/A	73 N	N/A	N/A	Y	ASL
	7782-49-2	Selenium	0.15 J	2.7 J	ug/L	MW-213S	5 / 60	5 - 50	2.7	N/A	18 N	50	MCL	N	BSL
	7440-22-4	Silver	0.63 J	23	ug/L	MW-207B	2 / 60	1 - 10	23	N/A	18 N	N/A	N/A	Y	ASL
	7440-62-2	Vanadium	0.046 J	16	ug/L	MW-301D	48 / 60	0.19 - 1	16	N/A	3.6 N	N/A	N/A	Y	ASL
	7440-66-6	Zinc	1.2 J	357 J	ug/L	OW-09	26 / 60	2 - 45.9	357	N/A	1100 N	N/A	N/A	N	BSL

(a) Samples include: MW-01A, MW-01B, MW-01C, MW-202D, MW-202S, MW-203D, MW-203S, MW-204S, MW-205S, MW-206D, MW-206S, MW-208D, MW-208S, MW-210S, MW-211D, MW-211S, MW-212D (plus duplicate), MW-213D, MW-213S (plus duplicate), MW-214S, MW-301D, MW-301S, MW-302S, MW-303S, MW-304D (plus duplicate), MW-304S, MW-305D, MW-305S, MW-306S, MW-307D, MW-307S, OW-02, OW-07, OW-08, OW-10, OW-12, OW-20, OW-25, OW-26, OW-35, OW-38, OW-50, and OW-51

(b) Samples include: MW-01, MW-01A, MW-01B, MW-01C, MW-202B, MW-202D, MW-202S, MW-203B, MW-203D, MW-203S, MW-204S, MW-205S, MW-206D, MW-206S, MW-207B (plus duplicate), MW-208B, MW-208D, MW-208S, MW-209B, MW-210S, MW-211D, MW-211S, MW-212B, MW-212D (plus duplicate), MW-213B, MW-213D, MW-213S (plus duplicate), MW-214S, MW-215B, MW-301B, MW-301D, MW-301S, MW-302S, MW-303S, MW-304B, MW-304D (plus duplicate), MW-304S, MW-305D, MW-305S, MW-306S, MW-307B, MW-307D, MW-307S, MW-308B, OW-01, OW-02, OW-07, OW-08, OW-09, OW-10, OW-12, OW-20, OW-25, OW-26, OW-35, OW-37, OW-38, OW-49, OW-50, and OW-51

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used for screening.
(3) Refer to supporting information for background discussion.
(4) USEPA Region 9 PRGs for tap water (adjusted to an hazard quotient = 0.1 for noncarcinogens), October 2004.
The most conservative PRG for all BHCs has been used for delta-BHC.
PRG for endosulfan has been used for endosulfan II.
PRG for endrin has been used for endrin ketone.
PRG for mercury and compounds used for mercury (inorganic).
Lead value is is a drinking water criterion protective of blood lead levels in children (USEPA, 2002c).
The most conservative PRG for all noncarcinogenic PAHs has been used for 2-methylnaphthalene, acenaphthylene, benzo(g,h,i)perylene, and phenanthrene.
PRG for chlordane has been used for alpha-chlordane.
PRG for 1,2,4-trichlorobenzene has been used for 1,2,3-trichlorobenzene.
PRG for 1,3-dichloropropene has been used for cis-1,3-dichloropropene.
PRG for chromium VI used for chromium.
PRG for bromodichloromethane has been used for bromochloromethane.
(5) Rationale Codes: Selection Reason: Above Screening Levels (ASL)
No Screening Level (NSL)
Deletion Reason: Below Screening Level (BSL)

Definitions: COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
PRG = Preliminary Remedial Goal
N/A = Not Applicable or Not Available
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
MCL = Maximum Contaminant Level

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Current / Future
Medium: Groundwater
Exposure Medium: Indoor Air (Vapor Intrusion)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Site-Wide Overburden (a)															
	71-55-6	1,1,1-Trichloroethane	N/A	2.4E-01	ug/m^3	N/A	N/A	N/A	2.4E-01	N/A	230 N	N/A	N/A	N	BSL
	79-34-5	1,1,2,2-Tetrachloroethane	N/A	1.9E-05	ug/m^3	N/A	N/A	N/A	1.9E-05	N/A	0.033 C	N/A	N/A	N	BSL
	75-34-3	1,1-Dichloroethane	N/A	1.5E-01	ug/m^3	N/A	N/A	N/A	1.5E-01	N/A	52 N	N/A	N/A	N	BSL
	75-35-4	1,1-Dichloroethene	N/A	9.3E-02	ug/m^3	N/A	N/A	N/A	9.3E-02	N/A	21 N	N/A	N/A	N	BSL
	87-61-6	1,2,3-Trichlorobenzene	N/A	3.9E-04	ug/m^3	N/A	N/A	N/A	3.9E-04	N/A	0.37 N	N/A	N/A	N	BSL
	95-50-1	1,2-Dichlorobenzene	N/A	1.6E-03	ug/m^3	N/A	N/A	N/A	1.6E-03	N/A	21 N	N/A	N/A	N	BSL
	107-06-2	1,2-Dichloroethane	N/A	8.9E-03	ug/m^3	N/A	N/A	N/A	8.9E-03	N/A	0.074 C	N/A	N/A	N	BSL
	78-87-5	1,2-Dichloropropane	N/A	1.6E-03	ug/m^3	N/A	N/A	N/A	1.6E-03	N/A	0.099 C	N/A	N/A	N	BSL
	541-73-1	1,3-Dichlorobenzene	N/A	2.7E-04	ug/m^3	N/A	N/A	N/A	2.7E-04	N/A	11 N	N/A	N/A	N	BSL
	106-46-7	1,4-Dichlorobenzene	N/A	1.0E-02	ug/m^3	N/A	N/A	N/A	1.0E-02	N/A	0.31 C	N/A	N/A	N	BSL
	67-64-1	Acetone	N/A	2.2E-04	ug/m^3	N/A	N/A	N/A	2.2E-04	N/A	330 N	N/A	N/A	N	BSL
	71-43-2	Benzene	N/A	2.3E-01	ug/m^3	N/A	N/A	N/A	2.3E-01	N/A	0.25 C	N/A	N/A	N	BSL
	74-97-5	Bromochloromethane	N/A	5.7E-04	ug/m^3	N/A	N/A	N/A	5.7E-04	N/A	0.11 C	N/A	N/A	N	BSL
	56-23-5	Carbon Tetrachloride	N/A	2.2E+00	ug/m^3	N/A	N/A	N/A	2.2E+00	N/A	0.13 C	N/A	N/A	Y	ASL
	108-90-7	Chlorobenzene	N/A	1.0E-01	ug/m^3	N/A	N/A	N/A	1.0E-01	N/A	6.2 N	N/A	N/A	N	BSL
	75-00-3	Chloroethane	N/A	4.6E-02	ug/m^3	N/A	N/A	N/A	4.6E-02	N/A	2.3 C	N/A	N/A	N	BSL
	74-87-3	Chloromethane	N/A	2.7E-02	ug/m^3	N/A	N/A	N/A	2.7E-02	N/A	9.5 N	N/A	N/A	N	BSL
	156-59-2	cis-1,2-Dichloroethene	N/A	2.9E-03	ug/m^3	N/A	N/A	N/A	2.9E-03	N/A	3.7 N	N/A	N/A	N	BSL
	10061-01-5	cis-1,3-Dichloropropene	N/A	2.8E-02	ug/m^3	N/A	N/A	N/A	2.8E-02	N/A	0.48 C	N/A	N/A	N	BSL
	110-82-7	Cyclohexane	N/A	2.0E-02	ug/m^3	N/A	N/A	N/A	2.0E-02	N/A	620 N	N/A	N/A	N	BSL
	75-71-8	Dichlorodifluoromethane	N/A	6.4E-01	ug/m^3	N/A	N/A	N/A	6.4E-01	N/A	21 N	N/A	N/A	N	BSL
	100-41-4	Ethylbenzene	N/A	4.7E-03	ug/m^3	N/A	N/A	N/A	4.7E-03	N/A	110 N	N/A	N/A	N	BSL
	98-82-8	Isopropylbenzene	N/A	2.0E-03	ug/m^3	N/A	N/A	N/A	2.0E-03	N/A	40 N	N/A	N/A	N	BSL
	79-20-9	Methyl acetate	N/A	2.1E-04	ug/m^3	N/A	N/A	N/A	2.1E-04	N/A	370 N	N/A	N/A	N	BSL
	1634-04-4	Methyl tert-butyl ether	N/A	2.0E-03	ug/m^3	N/A	N/A	N/A	2.0E-03	N/A	7.4 C	N/A	N/A	N	BSL
	108-87-2	Methylcyclohexane	N/A	9.7E-02	ug/m^3	N/A	N/A	N/A	9.7E-02	N/A	310 N	N/A	N/A	N	BSL
	75-09-2	Methylene Chloride	N/A	1.2E-04	ug/m^3	N/A	N/A	N/A	1.2E-04	N/A	4.1 C	N/A	N/A	N	BSL
	127-18-4	Tetrachloroethene	N/A	3.8E-01	ug/m^3	N/A	N/A	N/A	3.8E-01	N/A	0.32 C	N/A	N/A	Y	ASL
	108-88-3	Toluene	N/A	2.1E-03	ug/m^3	N/A	N/A	N/A	2.1E-03	N/A	40 N	N/A	N/A	N	BSL
	156-60-5	trans-1,2-Dichloroethene	N/A	3.8E-03	ug/m^3	N/A	N/A	N/A	3.8E-03	N/A	7.3 N	N/A	N/A	N	BSL
	79-01-6	Trichloroethene	N/A	4.5E-02	ug/m^3	N/A	N/A	N/A	4.5E-02	N/A	0.017 C	N/A	N/A	Y	ASL
	75-69-4	Trichlorofluoromethane	N/A	7.8E-03	ug/m^3	N/A	N/A	N/A	7.8E-03	N/A	73 N	N/A	N/A	N	BSL
	75-01-4	Vinyl Chloride	N/A	1.6E-02	ug/m^3	N/A	N/A	N/A	1.6E-02	N/A	0.11 C	N/A	N/A	N	BSL
	1330-20-7	Xylene (total)	N/A	9.3E-01	ug/m^3	N/A	N/A	N/A	9.3E-01	N/A	11 N	N/A	N/A	N	BSL
	91-57-6	2-Methylnaphthalene	N/A	2.7E-04	ug/m^3	N/A	N/A	N/A	2.7E-04	N/A	0.31 N	N/A	N/A	N	BSL
	83-32-9	Acenaphthene	N/A	7.0E-05	ug/m^3	N/A	N/A	N/A	7.0E-05	N/A	22 N	N/A	N/A	N	BSL
	208-96-8	Acenaphthylene	N/A	3.1E-06	ug/m^3	N/A	N/A	N/A	3.1E-06	N/A	0.31 N	N/A	N/A	N	BSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Current / Future
Medium: Groundwater
Exposure Medium: Indoor Air (Vapor Intrusion)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	120-12-7	Anthracene	N/A	1.8E-05	ug/m^3	N/A	N/A	N/A	1.8E-05	N/A	110 N	N/A	N/A	N	BSL
	100-52-7	Benzaldehyde	N/A	2.4E-05	ug/m^3	N/A	N/A	N/A	2.4E-05	N/A	37 N	N/A	N/A	N	BSL
	111-44-4	Bis(2-chloroethyl)ether	N/A	7.4E-06	ug/m^3	N/A	N/A	N/A	7.4E-06	N/A	0.0061 C	N/A	N/A	N	BSL
	86-73-7	Fluorene	N/A	5.2E-05	ug/m^3	N/A	N/A	N/A	5.2E-05	N/A	15 N	N/A	N/A	N	BSL
	91-20-3	Naphthalene	N/A	3.1E-04	ug/m^3	N/A	N/A	N/A	3.1E-04	N/A	0.31 N	N/A	N/A	N	BSL
	85-01-8	Phenanthrene	N/A	1.4E-04	ug/m^3	N/A	N/A	N/A	1.4E-04	N/A	0.31 N	N/A	N/A	N	BSL

(a) Refer to Table 2.1 for samples.

(1) The modeled groundwater contributions to indoor air have been presented in the Maximum Concentration field.
Refer to Attachment 2 for model results.
(2) Maximum concentration used for screening.
(3) Refer to supporting information for background discussion.
(4) USEPA Region 9 PRGs for ambient air (adjusted to an hazard quotient = 0.1 for noncarcinogens), October 2004.
The most conservative PRG for all noncarcinogenic PAHs has been used for 2-methylnaphthalene, acenaphthylene, and phenanthrene.
PRG for 1,2,4-trichlorobenzene has been used for 1,2,3-trichlorobenzene.
PRG for 1,3-dichloropropene has been used for cis-1,3-dichloropropene.
PRG for bromodichloromethane has been used for bromochloromethane.
(5) Rationale Codes: Selection Reason: Above Screening Levels (ASL)
No Screening Level (NSL)
Deletion Reason: Below Screening Level (BSL)

Definitions:
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
PRG = Preliminary Remedial Goal
N/A = Not Applicable or Not Available
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Outdoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Site-Wide Overburden (a)															
	71-55-6	1,1,1-Trichloroethane	N/A	1.9E-05	ug/m^3	N/A	N/A	N/A	1.9E-05	N/A	230 N	N/A	N/A	N	BSL
	79-34-5	1,1,2,2-Tetrachloroethane	N/A	1.0E-09	ug/m^3	N/A	N/A	N/A	1.0E-09	N/A	0.033 C	N/A	N/A	N	BSL
	75-34-3	1,1-Dichloroethane	N/A	1.1E-05	ug/m^3	N/A	N/A	N/A	1.1E-05	N/A	52 N	N/A	N/A	N	BSL
	75-35-4	1,1-Dichloroethene	N/A	7.1E-06	ug/m^3	N/A	N/A	N/A	7.1E-06	N/A	21 N	N/A	N/A	N	BSL
	87-61-6	1,2,3-Trichlorobenzene	N/A	2.9E-08	ug/m^3	N/A	N/A	N/A	2.9E-08	N/A	0.37 N	N/A	N/A	N	BSL
	95-50-1	1,2-Dichlorobenzene	N/A	1.0E-07	ug/m^3	N/A	N/A	N/A	1.0E-07	N/A	21 N	N/A	N/A	N	BSL
	107-06-2	1,2-Dichloroethane	N/A	5.1E-07	ug/m^3	N/A	N/A	N/A	5.1E-07	N/A	0.074 C	N/A	N/A	N	BSL
	78-87-5	1,2-Dichloropropane	N/A	1.1E-07	ug/m^3	N/A	N/A	N/A	1.1E-07	N/A	0.099 C	N/A	N/A	N	BSL
	541-73-1	1,3-Dichlorobenzene	N/A	1.8E-08	ug/m^3	N/A	N/A	N/A	1.8E-08	N/A	11 N	N/A	N/A	N	BSL
	106-46-7	1,4-Dichlorobenzene	N/A	6.6E-07	ug/m^3	N/A	N/A	N/A	6.6E-07	N/A	0.31 C	N/A	N/A	N	BSL
	67-64-1	Acetone	N/A	1.1E-08	ug/m^3	N/A	N/A	N/A	1.1E-08	N/A	330 N	N/A	N/A	N	BSL
	71-43-2	Benzene	N/A	1.6E-05	ug/m^3	N/A	N/A	N/A	1.6E-05	N/A	0.25 C	N/A	N/A	N	BSL
	74-97-5	Bromochloromethane	N/A	3.9E-08	ug/m^3	N/A	N/A	N/A	3.9E-08	N/A	0.11 C	N/A	N/A	N	BSL
	56-23-5	Carbon Tetrachloride	N/A	1.8E-04	ug/m^3	N/A	N/A	N/A	1.8E-04	N/A	0.13 C	N/A	N/A	N	BSL
	108-90-7	Chlorobenzene	N/A	7.1E-06	ug/m^3	N/A	N/A	N/A	7.1E-06	N/A	6.2 N	N/A	N/A	N	BSL
	75-00-3	Chloroethane	N/A	2.4E-06	ug/m^3	N/A	N/A	N/A	2.4E-06	N/A	2.3 C	N/A	N/A	N	BSL
	74-87-3	Chloromethane	N/A	1.9E-06	ug/m^3	N/A	N/A	N/A	1.9E-06	N/A	9.5 N	N/A	N/A	N	BSL
	156-59-2	cis-1,2-Dichloroethene	N/A	2.0E-07	ug/m^3	N/A	N/A	N/A	2.0E-07	N/A	3.7 N	N/A	N/A	N	BSL
	10061-01-5	cis-1,3-Dichloropropene	N/A	2.1E-06	ug/m^3	N/A	N/A	N/A	2.1E-06	N/A	0.48 C	N/A	N/A	N	BSL
	110-82-7	Cyclohexane	N/A	1.6E-06	ug/m^3	N/A	N/A	N/A	1.6E-06	N/A	620 N	N/A	N/A	N	BSL
	75-71-8	Dichlorodifluoromethane	N/A	5.7E-05	ug/m^3	N/A	N/A	N/A	5.7E-05	N/A	21 N	N/A	N/A	N	BSL
	100-41-4	Ethylbenzene	N/A	3.5E-07	ug/m^3	N/A	N/A	N/A	3.5E-07	N/A	110 N	N/A	N/A	N	BSL
	98-82-8	Isopropylbenzene	N/A	1.6E-07	ug/m^3	N/A	N/A	N/A	1.6E-07	N/A	40 N	N/A	N/A	N	BSL
	79-20-9	Methyl acetate	N/A	1.1E-08	ug/m^3	N/A	N/A	N/A	1.1E-08	N/A	370 N	N/A	N/A	N	BSL
	1634-04-4	Methyl tert-butyl ether	N/A	1.1E-07	ug/m^3	N/A	N/A	N/A	1.1E-07	N/A	7.4 C	N/A	N/A	N	BSL
	108-87-2	Methylcyclohexane	N/A	8.2E-06	ug/m^3	N/A	N/A	N/A	8.2E-06	N/A	310 N	N/A	N/A	N	BSL
	75-09-2	Methylene Chloride	N/A	7.7E-09	ug/m^3	N/A	N/A	N/A	7.7E-09	N/A	4.1 C	N/A	N/A	N	BSL
	127-18-4	Tetrachloroethene	N/A	3.1E-05	ug/m^3	N/A	N/A	N/A	3.1E-05	N/A	0.32 C	N/A	N/A	N	BSL
	108-88-3	Toluene	N/A	1.5E-07	ug/m^3	N/A	N/A	N/A	1.5E-07	N/A	40 N	N/A	N/A	N	BSL
	156-60-5	trans-1,2-Dichloroethene	N/A	2.9E-07	ug/m^3	N/A	N/A	N/A	2.9E-07	N/A	7.3 N	N/A	N/A	N	BSL
	79-01-6	Trichloroethene	N/A	3.4E-06	ug/m^3	N/A	N/A	N/A	3.4E-06	N/A	0.017 C	N/A	N/A	N	BSL
	75-69-4	Trichlorofluoromethane	N/A	6.2E-07	ug/m^3	N/A	N/A	N/A	6.2E-07	N/A	73 N	N/A	N/A	N	BSL
	75-01-4	Vinyl Chloride	N/A	1.1E-06	ug/m^3	N/A	N/A	N/A	1.1E-06	N/A	0.11 C	N/A	N/A	N	BSL
	1330-20-7	Xylene (total)	N/A	6.8E-05	ug/m^3	N/A	N/A	N/A	6.8E-05	N/A	11 N	N/A	N/A	N	BSL
	91-57-6	2-Methylnaphthalene	N/A	1.5E-08	ug/m^3	N/A	N/A	N/A	1.5E-08	N/A	0.31 N	N/A	N/A	N	BSL
	83-32-9	Acenaphthene	N/A	3.7E-09	ug/m^3	N/A	N/A	N/A	3.7E-09	N/A	22 N	N/A	N/A	N	BSL
	208-96-8	Acenaphthylene	N/A	1.7E-10	ug/m^3	N/A	N/A	N/A	1.7E-10	N/A	0.31 N	N/A	N/A	N	BSL

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Outdoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	120-12-7	Anthracene	N/A	9.4E-10	ug/m^3	N/A	N/A	N/A	9.4E-10	N/A	110 N	N/A	N/A	N	BSL
	100-52-7	Benzaldehyde	N/A	1.2E-09	ug/m^3	N/A	N/A	N/A	1.2E-09	N/A	37 N	N/A	N/A	N	BSL
	111-44-4	Bis(2-chloroethyl)ether	N/A	3.8E-10	ug/m^3	N/A	N/A	N/A	3.8E-10	N/A	0.0061 C	N/A	N/A	N	BSL
	86-73-7	Fluorene	N/A	2.7E-09	ug/m^3	N/A	N/A	N/A	2.7E-09	N/A	15 N	N/A	N/A	N	BSL
	91-20-3	Naphthalene	N/A	1.7E-08	ug/m^3	N/A	N/A	N/A	1.7E-08	N/A	0.31 N	N/A	N/A	N	BSL
	85-01-8	Phenanthrene	N/A	7.6E-09	ug/m^3	N/A	N/A	N/A	7.6E-09	N/A	0.31 N	N/A	N/A	N	BSL

(a) Refer to Table 2.1 for samples.

(1) The modeled groundwater contributions to outdoor air have been presented in the Maximum Concentration field.
Refer to Attachment 2 for model results.
(2) Maximum concentration used for screening.
(3) Refer to supporting information for background discussion.
(4) USEPA Region 9 PRGs for ambient air (adjusted to an hazard quotient = 0.1 for noncarcinogens), October 2004.
The most conservative PRG for all noncarcinogenic PAHs has been used for 2-methylnaphthalene, acenaphthylene, and phenanthrene.
PRG for 1,2,4-trichlorobenzene has been used for 1,2,3-trichlorobenzene.
PRG for 1,3-dichloropropene has been used for cis-1,3-dichloropropene.
PRG for bromodichloromethane has been used for bromochloromethane.
(5) Rationale Codes: Selection Reason: Above Screening Levels (ASL)
No Screening Level (NSL)
Deletion Reason: Below Screening Level (BSL)

Definitions:
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
PRG = Preliminary Remedial Goal
N/A = Not Applicable or Not Available
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

TABLE 2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor Air (Bathing)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Site-Wide (Overburden and Bedrock Combined) (a)															
	71-55-6	1,1,1-Trichloroethane	N/A	7.2E+01	ug/m^3	N/A	N/A	N/A	7.2E+01	N/A	230 N	N/A	N/A	N	BSL
	79-34-5	1,1,2,2-Tetrachloroethane	N/A	1.5E-01	ug/m^3	N/A	N/A	N/A	1.5E-01	N/A	0.033 C	N/A	N/A	Y	ASL
	75-34-3	1,1-Dichloroethane	N/A	1.4E+02	ug/m^3	N/A	N/A	N/A	1.4E+02	N/A	52 N	N/A	N/A	Y	ASL
	75-35-4	1,1-Dichloroethene	N/A	1.8E+01	ug/m^3	N/A	N/A	N/A	1.8E+01	N/A	21 N	N/A	N/A	N	BSL
	87-61-6	1,2,3-Trichlorobenzene	N/A	5.8E-01	ug/m^3	N/A	N/A	N/A	5.8E-01	N/A	0.37 N	N/A	N/A	Y	ASL
	95-50-1	1,2-Dichlorobenzene	N/A	4.3E+00	ug/m^3	N/A	N/A	N/A	4.3E+00	N/A	21 N	N/A	N/A	N	BSL
	107-06-2	1,2-Dichloroethane	N/A	7.1E+01	ug/m^3	N/A	N/A	N/A	7.1E+01	N/A	0.074 C	N/A	N/A	Y	ASL
	78-87-5	1,2-Dichloropropane	N/A	2.7E+00	ug/m^3	N/A	N/A	N/A	2.7E+00	N/A	0.099 C	N/A	N/A	Y	ASL
	541-73-1	1,3-Dichlorobenzene	N/A	4.8E-01	ug/m^3	N/A	N/A	N/A	4.8E-01	N/A	11 N	N/A	N/A	N	BSL
	106-46-7	1,4-Dichlorobenzene	N/A	2.2E+01	ug/m^3	N/A	N/A	N/A	2.2E+01	N/A	0.31 C	N/A	N/A	Y	ASL
	67-64-1	Acetone	N/A	4.4E+00	ug/m^3	N/A	N/A	N/A	4.4E+00	N/A	330 N	N/A	N/A	N	BSL
	71-43-2	Benzene	N/A	2.3E+02	ug/m^3	N/A	N/A	N/A	2.3E+02	N/A	0.25 C	N/A	N/A	Y	ASL
	74-97-5	Bromochloromethane	N/A	4.1E+00	ug/m^3	N/A	N/A	N/A	4.1E+00	N/A	0.11 C	N/A	N/A	Y	ASL
	56-23-5	Carbon Tetrachloride	N/A	3.7E+02	ug/m^3	N/A	N/A	N/A	3.7E+02	N/A	0.13 C	N/A	N/A	Y	ASL
	108-90-7	Chlorobenzene	N/A	1.5E+02	ug/m^3	N/A	N/A	N/A	1.5E+02	N/A	6.2 N	N/A	N/A	Y	ASL
	75-00-3	Chloroethane	N/A	3.0E+01	ug/m^3	N/A	N/A	N/A	3.0E+01	N/A	2.3 C	N/A	N/A	Y	ASL
	74-87-3	Chloromethane	N/A	3.2E+01	ug/m^3	N/A	N/A	N/A	3.2E+01	N/A	9.5 N	N/A	N/A	Y	ASL
	156-59-2	cis-1,2-Dichloroethene	N/A	8.5E+00	ug/m^3	N/A	N/A	N/A	8.5E+00	N/A	3.7 N	N/A	N/A	Y	ASL
	10061-01-5	cis-1,3-Dichloropropene	N/A	2.8E+01	ug/m^3	N/A	N/A	N/A	2.8E+01	N/A	0.48 C	N/A	N/A	Y	ASL
	110-82-7	Cyclohexane	N/A	1.4E+00	ug/m^3	N/A	N/A	N/A	1.4E+00	N/A	620 N	N/A	N/A	N	BSL
	75-71-8	Dichlorodifluoromethane	N/A	1.2E+01	ug/m^3	N/A	N/A	N/A	1.2E+01	N/A	21 N	N/A	N/A	N	BSL
	100-41-4	Ethylbenzene	N/A	3.9E+00	ug/m^3	N/A	N/A	N/A	3.9E+00	N/A	110 N	N/A	N/A	N	BSL
	98-82-8	Isopropylbenzene	N/A	1.1E+00	ug/m^3	N/A	N/A	N/A	1.1E+00	N/A	40 N	N/A	N/A	N	BSL
	79-20-9	Methyl acetate	N/A	2.9E+00	ug/m^3	N/A	N/A	N/A	2.9E+00	N/A	370 N	N/A	N/A	N	BSL
	1634-04-4	Methyl tert-butyl ether	N/A	1.0E+01	ug/m^3	N/A	N/A	N/A	1.0E+01	N/A	7.4 C	N/A	N/A	Y	ASL
	108-87-2	Methylcyclohexane	N/A	6.4E+00	ug/m^3	N/A	N/A	N/A	6.4E+00	N/A	310 N	N/A	N/A	N	BSL
	75-09-2	Methylene Chloride	N/A	2.3E-01	ug/m^3	N/A	N/A	N/A	2.3E-01	N/A	4.1 C	N/A	N/A	N	BSL
	127-18-4	Tetrachloroethene	N/A	1.2E+02	ug/m^3	N/A	N/A	N/A	1.2E+02	N/A	0.32 C	N/A	N/A	Y	ASL
	108-88-3	Toluene	N/A	1.9E+00	ug/m^3	N/A	N/A	N/A	1.9E+00	N/A	40 N	N/A	N/A	N	BSL
	156-60-5	trans-1,2-Dichloroethene	N/A	7.6E+00	ug/m^3	N/A	N/A	N/A	7.6E+00	N/A	7.3 N	N/A	N/A	Y	ASL
	79-01-6	Trichloroethene	N/A	2.4E+02	ug/m^3	N/A	N/A	N/A	2.4E+02	N/A	0.017 C	N/A	N/A	Y	ASL
	75-69-4	Trichlorofluoromethane	N/A	2.2E+00	ug/m^3	N/A	N/A	N/A	2.2E+00	N/A	73 N	N/A	N/A	N	BSL
	75-01-4	Vinyl Chloride	N/A	3.2E+00	ug/m^3	N/A	N/A	N/A	3.2E+00	N/A	0.11 C	N/A	N/A	Y	ASL
	1330-20-7	Xylene (total)	N/A	8.7E+02	ug/m^3	N/A	N/A	N/A	8.7E+02	N/A	11 N	N/A	N/A	Y	ASL
	91-57-6	2-Methylnaphthalene	N/A	2.8E+00	ug/m^3	N/A	N/A	N/A	2.8E+00	N/A	0.31 N	N/A	N/A	Y	ASL
	83-32-9	Acenaphthene	N/A	1.4E+00	ug/m^3	N/A	N/A	N/A	1.4E+00	N/A	22 N	N/A	N/A	N	BSL

TABLE 2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor Air (Bathing)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	208-96-8	Acenaphthylene	N/A	1.7E-02	ug/m^3	N/A	N/A	N/A	1.7E-02	N/A	0.31 N	N/A	N/A	N	BSL
	120-12-7	Anthracene	N/A	5.3E-01	ug/m^3	N/A	N/A	N/A	5.3E-01	N/A	110 N	N/A	N/A	N	BSL
	100-52-7	Benzaldehyde	N/A	8.0E-01	ug/m^3	N/A	N/A	N/A	8.0E-01	N/A	37 N	N/A	N/A	N	BSL
	111-44-4	Bis(2-chloroethyl)ether	N/A	1.9E-01	ug/m^3	N/A	N/A	N/A	1.9E-01	N/A	0.0061 C	N/A	N/A	Y	ASL
	86-73-7	Fluorene	N/A	1.3E+00	ug/m^3	N/A	N/A	N/A	1.3E+00	N/A	15 N	N/A	N/A	N	BSL
	91-20-3	Naphthalene	N/A	2.6E+00	ug/m^3	N/A	N/A	N/A	2.6E+00	N/A	0.31 N	N/A	N/A	Y	ASL
	85-01-8	Phenanthrene	N/A	9.3E-01	ug/m^3	N/A	N/A	N/A	9.3E-01	N/A	0.31 N	N/A	N/A	Y	ASL

(a) Refer to Table 2.1 for samples.

(1) The modeled groundwater contributions to indoor air have been presented in the Maximum Concentration field.
Refer to Attachment 2 for model results.
(2) Maximum concentration used for screening.
(3) Refer to supporting information for background discussion.
(4) USEPA Region 9 PRGs for ambient air (adjusted to an hazard quotient = 0.1 for noncarcinogens), October 2004.
The most conservative PRG for all noncarcinogenic PAHs has been used for 2-methylnaphthalene, acenaphthylene, and phenanthrene.
PRG for 1,2,4-trichlorobenzene has been used for 1,2,3-trichlorobenzene.
PRG for 1,3-dichloropropene has been used for cis-1,3-dichloropropene.
PRG for bromodichloromethane has been used for bromochloromethane.
(5) Rationale Codes: Selection Reason: Above Screening Levels (ASL)
No Screening Level (NSL)
Deletion Reason: Below Screening Level (BSL)

Definitions:
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
PRG = Preliminary Remedial Goal
N/A = Not Applicable or Not Available
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

TABLE 3.1.RME

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point (1)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)		Exposure Point Concentration			
							Value	Units	Statistic (2)	Rationale (3)
Site-Wide Overburden										
	1,1,2,2-Tetrachloroethane	ug/L	N/A	N/A	7.7E-02	J	7.7E-02	ug/L	Max	(a)
	1,2-Dichloroethane	ug/L	N/A	N/A	1.1E+01		1.1E+01	ug/L	Max	(a)
	1,2-Dichloropropane	ug/L	N/A	N/A	8.1E-01		8.1E-01	ug/L	Max	(a)
	1,4-Dichlorobenzene	ug/L	N/A	N/A	7.5E+00		7.5E+00	ug/L	Max	(a)
	Benzene	ug/L	N/A	N/A	5.9E+01		5.9E+01	ug/L	Max	(a)
	Bromochloromethane	ug/L	N/A	N/A	2.6E-01	J	2.6E-01	ug/L	Max	(a)
	Carbon Tetrachloride	ug/L	N/A	N/A	1.2E+02		1.2E+02	ug/L	Max	(a)
	Chlorobenzene	ug/L	N/A	N/A	4.6E+01		4.6E+01	ug/L	Max	(a)
	cis-1,3-Dichloropropene	ug/L	N/A	N/A	8.6E+00		8.6E+00	ug/L	Max	(a)
	Tetrachloroethene	ug/L	N/A	N/A	3.9E+01		3.9E+01	ug/L	Max	(a)
	Trichloroethene	ug/L	N/A	N/A	7.0E+00	J	7.0E+00	ug/L	Max	(a)
	Vinyl Chloride	ug/L	N/A	N/A	6.6E-01		6.6E-01	ug/L	Max	(a)
	Xylene (total)	ug/L	N/A	N/A	2.5E+02	J	2.5E+02	ug/L	Max	(a)
	2-Methylnaphthalene	ug/L	N/A	N/A	1.2E+00		1.2E+00	ug/L	Max	(a)
	Atrazine	ug/L	N/A	N/A	1.9E+00	J	1.9E+00	ug/L	Max	(a)
	Bis(2-chloroethyl)ether	ug/L	N/A	N/A	7.0E-01		7.0E-01	ug/L	Max	(a)
	Dibenz(a,h)anthracene	ug/L	N/A	N/A	5.0E-02	J	5.0E-02	ug/L	Max	(a)
	Naphthalene	ug/L	N/A	N/A	1.1E+00		1.1E+00	ug/L	Max	(a)
	Phenanthrene	ug/L	N/A	N/A	2.1E+00		2.1E+00	ug/L	Max	(a)
	Dieldrin	ug/L	N/A	N/A	1.3E-02		1.3E-02	ug/L	Max	(a)
	Aluminum	ug/L	N/A	N/A	7.1E+03		7.1E+03	ug/L	Max	(a)
	Antimony	ug/L	N/A	N/A	4.2E+00	J	4.2E+00	ug/L	Max	(a)
	Arsenic	ug/L	N/A	N/A	2.8E+02		2.8E+02	ug/L	Max	(a)
	Barium	ug/L	N/A	N/A	8.4E+02		8.4E+02	ug/L	Max	(a)
	Cadmium	ug/L	N/A	N/A	2.2E+01		2.2E+01	ug/L	Max	(a)
	Chromium	ug/L	N/A	N/A	3.2E+01		3.2E+01	ug/L	Max	(a)
	Cobalt	ug/L	N/A	N/A	2.2E+02		2.2E+02	ug/L	Max	(a)
	Manganese	ug/L	N/A	N/A	2.2E+04	J	2.2E+04	ug/L	Max	(a)
	Vanadium	ug/L	N/A	N/A	1.6E+01		1.6E+01	ug/L	Max	(a)

TABLE 3.1.RME

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point (1)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)		Exposure Point Concentration			
							Value	Units	Statistic (2)	Rationale (3)
Site-Wide (Overburden and Bedrock Combined)										
	1,1,2,2-Tetrachloroethane	ug/L	N/A	N/A	7.7E-02	J	7.7E-02	ug/L	Max	(a)
	1,2-Dichloroethane	ug/L	N/A	N/A	2.3E+01		2.3E+01	ug/L	Max	(a)
	1,2-Dichloropropane	ug/L	N/A	N/A	8.1E-01		8.1E-01	ug/L	Max	(a)
	1,4-Dichlorobenzene	ug/L	N/A	N/A	7.5E+00		7.5E+00	ug/L	Max	(a)
	Benzene	ug/L	N/A	N/A	5.9E+01		5.9E+01	ug/L	Max	(a)
	Bromochloromethane	ug/L	N/A	N/A	1.4E+00		1.4E+00	ug/L	Max	(a)
	Carbon Tetrachloride	ug/L	N/A	N/A	1.2E+02		1.2E+02	ug/L	Max	(a)
	Chlorobenzene	ug/L	N/A	N/A	4.6E+01		4.6E+01	ug/L	Max	(a)
	Chloroethane	ug/L	N/A	N/A	7.2E+00		7.2E+00	ug/L	Max	(a)
	cis-1,3-Dichloropropene	ug/L	N/A	N/A	8.6E+00		8.6E+00	ug/L	Max	(a)
	Tetrachloroethene	ug/L	N/A	N/A	3.9E+01		3.9E+01	ug/L	Max	(a)
	Trichloroethene	ug/L	N/A	N/A	7.5E+01		7.5E+01	ug/L	Max	(a)
	Vinyl Chloride	ug/L	N/A	N/A	7.4E-01		7.4E-01	ug/L	Max	(a)
	Xylene (total)	ug/L	N/A	N/A	2.5E+02	J	2.5E+02	ug/L	Max	(a)
	2-Methylnaphthalene	ug/L	N/A	N/A	1.2E+00		1.2E+00	ug/L	Max	(a)
	3-Nitroaniline	ug/L	N/A	N/A	6.2E+00	J	6.2E+00	ug/L	Max	(a)
	Atrazine	ug/L	N/A	N/A	1.9E+00	J	1.9E+00	ug/L	Max	(a)
	Bis(2-chloroethyl)ether	ug/L	N/A	N/A	7.0E-01		7.0E-01	ug/L	Max	(a)
	Dibenz(a,h)anthracene	ug/L	N/A	N/A	5.0E-02	J	5.0E-02	ug/L	Max	(a)
	Naphthalene	ug/L	N/A	N/A	1.1E+00		1.1E+00	ug/L	Max	(a)
	Phenanthrene	ug/L	N/A	N/A	2.1E+00		2.1E+00	ug/L	Max	(a)
	Dieldrin	ug/L	N/A	N/A	1.3E-02		1.3E-02	ug/L	Max	(a)
	Aluminum	ug/L	N/A	N/A	7.1E+03		7.1E+03	ug/L	Max	(a)
	Antimony	ug/L	N/A	N/A	4.2E+00	J	4.2E+00	ug/L	Max	(a)
	Arsenic	ug/L	N/A	N/A	2.8E+02		2.8E+02	ug/L	Max	(a)
	Barium	ug/L	N/A	N/A	8.4E+02		8.4E+02	ug/L	Max	(a)
	Cadmium	ug/L	N/A	N/A	2.2E+01		2.2E+01	ug/L	Max	(a)
	Chromium	ug/L	N/A	N/A	3.2E+01		3.2E+01	ug/L	Max	(a)
	Cobalt	ug/L	N/A	N/A	3.4E+02		3.4E+02	ug/L	Max	(a)
	Lead	ug/L	N/A	N/A	2.9E+01		2.9E+01	ug/L	Max	(a)
	Manganese	ug/L	N/A	N/A	2.3E+04		2.3E+04	ug/L	Max	(a)
	Nickel	ug/L	N/A	N/A	2.9E+02	J	2.9E+02	ug/L	Max	(a)
	Silver	ug/L	N/A	N/A	2.3E+01		2.3E+01	ug/L	Max	(a)
	Vanadium	ug/L	N/A	N/A	1.6E+01		1.6E+01	ug/L	Max	(a)

TABLE 3.1.RME

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future

Medium: Groundwater

Exposure Medium: Groundwater

Exposure Point (1)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale (3)

(1) Refer to Table 2.1 for sample groupings for each exposure point; only COPCs selected on Table 2.1 and detected at each exposure point appear.
(2) Statistics: Maximum Detected Value (Max)
(3) Rationale:
(a) Per Region I guidance (USEPA, 1999), the maximum detected concentration has been selected as the EPC.

J = Estimated Concentration
Max = Maximum Detected Concentration
N/A = Not Applicable
UCL = Upper Confidence Limit
EPC = Exposure Point Concentration
RME = Reasonable Maximum Exposure

TABLE 3.2.RME

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Current / Future

Medium: Groundwater

Exposure Medium: Indoor Air (Vapor Intrusion)

Exposure Point (1)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Site-Wide Overburden									
	Carbon Tetrachloride	N/A	N/A	N/A	2.2E+00	2.2E+00	ug/m^3	Max	(a)
	Tetrachloroethene	N/A	N/A	N/A	3.8E-01	3.8E-01	ug/m^3	Max	(a)
	Trichloroethene	N/A	N/A	N/A	4.5E-02	4.5E-02	ug/m^3	Max	(a)

(1) Refer to Table 2.1 for sample groupings; only COPCs selected on Table 2.2 appear.
(2) Statistics: Maximum Detected Value (Max)
(a) The indoor air pathway has been conservatively evaluated using maximum modeled air EPCs.
U = Not Detected (Maximum of half the detection limits used)
J = Estimated Concentration
Max = Maximum Detected Concentration
N/A = Not Applicable
UCL = Upper Confidence Limit
EPC = Exposure Point Concentration
RME = Reasonable Maximum Exposure

TABLE 3.3.RME

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future

Medium: Groundwater

Exposure Medium: Indoor Air (Bathing)

Exposure Point (1)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Site-Wide (Overburden and Bedrock Combined)									
	1,1,2,2-Tetrachloroethane	N/A	N/A	N/A	1.5E-01	1.5E-01	ug/m^3	Max	(a)
	1,1-Dichloroethane	N/A	N/A	N/A	1.4E+02	1.4E+02	ug/m^3	Max	(a)
	1,2,3-Trichlorobenzene	N/A	N/A	N/A	5.8E-01	5.8E-01	ug/m^3	Max	(a)
	1,2-Dichloroethane	N/A	N/A	N/A	7.1E+01	7.1E+01	ug/m^3	Max	(a)
	1,2-Dichloropropane	N/A	N/A	N/A	2.7E+00	2.7E+00	ug/m^3	Max	(a)
	1,4-Dichlorobenzene	N/A	N/A	N/A	2.2E+01	2.2E+01	ug/m^3	Max	(a)
	Benzene	N/A	N/A	N/A	2.3E+02	2.3E+02	ug/m^3	Max	(a)
	Bromochloromethane	N/A	N/A	N/A	4.1E+00	4.1E+00	ug/m^3	Max	(a)
	Carbon Tetrachloride	N/A	N/A	N/A	3.7E+02	3.7E+02	ug/m^3	Max	(a)
	Chlorobenzene	N/A	N/A	N/A	1.5E+02	1.5E+02	ug/m^3	Max	(a)
	Chloroethane	N/A	N/A	N/A	3.0E+01	3.0E+01	ug/m^3	Max	(a)
	Chloromethane	N/A	N/A	N/A	3.2E+01	3.2E+01	ug/m^3	Max	(a)
	cis-1,2-Dichloroethene	N/A	N/A	N/A	8.5E+00	8.5E+00	ug/m^3	Max	(a)
	cis-1,3-Dichloropropene	N/A	N/A	N/A	2.8E+01	2.8E+01	ug/m^3	Max	(a)
	Methyl tert-butyl ether	N/A	N/A	N/A	1.0E+01	1.0E+01	ug/m^3	Max	(a)
	Tetrachloroethene	N/A	N/A	N/A	1.2E+02	1.2E+02	ug/m^3	Max	(a)
	trans-1,2-Dichloroethene	N/A	N/A	N/A	7.6E+00	7.6E+00	ug/m^3	Max	(a)
	Trichloroethene	N/A	N/A	N/A	2.4E+02	2.4E+02	ug/m^3	Max	(a)
	Vinyl Chloride	N/A	N/A	N/A	3.2E+00	3.2E+00	ug/m^3	Max	(a)
	Xylene (total)	N/A	N/A	N/A	8.7E+02	8.7E+02	ug/m^3	Max	(a)
	2-Methylnaphthalene	N/A	N/A	N/A	2.8E+00	2.8E+00	ug/m^3	Max	(a)
	Bis(2-chloroethyl)ether	N/A	N/A	N/A	1.9E-01	1.9E-01	ug/m^3	Max	(a)
	Naphthalene	N/A	N/A	N/A	2.6E+00	2.6E+00	ug/m^3	Max	(a)
	Phenanthrene	N/A	N/A	N/A	9.3E-01	9.3E-01	ug/m^3	Max	(a)

TABLE 3.3.RME

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future

Medium: Groundwater

Exposure Medium: Indoor Air (Bathing)

Exposure Point (1)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale

(1) Refer to Table 2.1 for sample groupings; only COPCs selected on Table 2.4 appear.
(2) Statistics: Maximum Detected Value (Max)
(a) The indoor air pathway has been conservatively evaluated using maximum modeled air EPCs.
U = Not Detected (Maximum of half the detection limits used)
J = Estimated Concentration
Max = Maximum Detected Concentration
N/A = Not Applicable
UCL = Upper Confidence Limit
EPC = Exposure Point Concentration
RME = Reasonable Maximum Exposure

TABLE 4.1.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Current / Future
Medium: Groundwater
Exposure Medium: Indoor Air (Vapor Intrusion)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Commercial Worker	Adult	Site-Wide Overburden	CA	Modeled Concentration in Air	see Table 3s	ug/m^3	see Table 3s	Chronic Daily Intake (CDI) (ug/m^3) =
				ET	Exposure Time	8	hrs/day	Prof. Judgement	CA x ET x EF x ED / CF x AT
				EF	Exposure Frequency	250	days/year	USEPA, 2004a	
				ED	Exposure Duration	25	years	USEPA, 1994a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	
				CF	Conversion Factor	24	hrs/day	- -	

TABLE 4.2.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Site-Wide (Overburden and Bedrock Combined)	CW	Chemical Concentration in Water	see Table 3s	ug/L	see Table 3s	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-W	Ingestion Rate of Water	2	liters/day	USEPA, 1997a	CW x IR x EF x ED x CF1 / BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 1994a	
				ED	Exposure Duration	24	years	USEPA, 1994a	
				BW	Body Weight	70	kg	USEPA, 1997a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	
				CF1	Conversion Factor 1	0.001	mg/ug	- -	
		Young Child (ages 1-6)	Site-Wide (Overburden and Bedrock Combined)	CW	Chemical Concentration in Water	see Table 3s	ug/L	see Table 3s	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-W	Ingestion Rate of Water	1.5	liters/day	USEPA, 1997a	CW x IR x EF x ED x CF1 / BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 1994a	
				ED	Exposure Duration	6	years	USEPA, 1994a	
				BW	Body Weight	15	kg	USEPA, 1997a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				CF1	Conversion Factor 1	0.001	mg/ug	- -	
	Construction Worker	Adult	Site-Wide Overburden	CW	Chemical Concentration in Water	see Table 3s	ug/L	see Table 3s	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-W	Ingestion Rate of Water	0.05	liters/day	Prof. Judgement	CW x IR x EF x ED x CF1 / BW x AT
				EF	Exposure Frequency	125	days/year	Prof. Judgement	
				ED	Exposure Duration	1	years	Prof. Judgement	
				BW	Body Weight	70	kg	USEPA, 1997a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
				CF1	Conversion Factor 1	0.001	mg/ug	- -	

TABLE 4.2.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact while Showering/ Bathing	Resident	Adult	Site-Wide (Overburden and Bedrock Combined)	CW	Chemical Concentration in Water	see Table 3s	ug/L	see Table 3s	Organics:
				DA	Dose Absorbed per Unit Area per Event	see Attachment 4	mg/cm^2-event	USEPA, 2004a	Chronic Daily Intake (CDI) (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	18000	cm^2	USEPA, 2004a	
				PC	Permeability Constant	see Attachment 4	cm/hr	USEPA, 2004a	DA x SA x EV x EF x ED / BW x AT
				ET	Event Time	0.58	hrs/event	USEPA, 2004a	
				EV	Event Frequency	1	events/day	USEPA, 2004a	
				EF	Exposure Frequency	350	days/year	USEPA, 2004a	Inorganics:
				ED	Exposure Duration	24	years	USEPA, 1994a	CDI (mg/kg-day) =
				BW	Body Weight	70	kg	USEPA, 1997a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CW x SA x PC x ET x EV x EF x ED x CF1 x CF2 / BW x AT
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	
				CF1	Conversion Factor 1	0.001	L/cm^3	- -	
				CF2	Conversion Factor 2	0.001	mg/ug	- -	
		Young Child (ages 1-6)	Site-Wide (Overburden and Bedrock Combined)	CW	Chemical Concentration in Water	see Table 3s	ug/L	see Table 3s	Organics:
				DA	Dose Absorbed per Unit Area per Event	see Attachment 4	mg/cm^2-event	USEPA, 2004a	Chronic Daily Intake (CDI) (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	6600	cm^2	USEPA, 2004a	
				PC	Permeability Constant	see Attachment 4	cm/hr	USEPA, 2004a	DA x SA x EV x EF x ED / BW x AT
				ET	Event Time	1	hrs/event	USEPA, 2004a	
				EV	Event Frequency	1	events/day	USEPA, 2004a	
				EF	Exposure Frequency	350	days/year	USEPA, 2004a	Inorganics:
				ED	Exposure Duration	6	years	USEPA, 1994a	CDI (mg/kg-day) =
				BW	Body Weight	15	kg	USEPA, 1997a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CW x SA x PC x ET x EV x EF x ED x CF1 x CF2 / BW x AT
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				CF1	Conversion Factor 1	0.001	L/cm^3	- -	
				CF2	Conversion Factor 2	0.001	mg/ug	- -	

TABLE 4.2.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	Construction Worker	Adult	Site-Wide Overburden	CW	Chemical Concentration in Water	see Table 3s	ug/L	see Table 3s	Organics:
				DA	Dose Absorbed per Unit Area per Event	see Attachment 4	mg/cm^2-event	USEPA, 2004a	Chronic Daily Intake (CDI) (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	3300	cm^2	USEPA, 2004a	
				PC	Permeability Constant	see Attachment 4	cm/hr	USEPA, 2004a	DA x SA x EV x EF x ED / BW x AT
				ET	Event Time	1	hrs/event	Prof. Judgement	
				EV	Event Frequency	1	events/day	Prof. Judgement	
				EF	Exposure Frequency	125	days/year	Prof. Judgement	Inorganics:
				ED	Exposure Duration	1	years	Prof. Judgement	CDI (mg/kg-day) =
				BW	Body Weight	70	kg	USEPA, 1997a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CW x SA x PC x ET x EV x EF x ED x CF1 x CF2 / BW x AT
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
				CF1	Conversion Factor 1	0.001	L/cm^3	- -	
				CF2	Conversion Factor 2	0.001	mg/ug	- -	
Inhalation of Volatiles while Showering/Bathing	Resident	Adult	Site-Wide (Overburden and Bedrock Combined)	CA	Chemical Concentration in Air	see Table 3s	ug/m^3	see Table 3s	Chronic Daily Intake (CDI) (ug/m^3) =
				ET	Exposure Time	0.58	hrs/day	USEPA, 2004a	CA x ET x EF x ED / AT x CF
				EF	Exposure Frequency	350	days/year	USEPA, 2004a	
				ED	Exposure Duration	24	years	USEPA, 1994a	
				CF	Conversion Factor	24	hrs/day	- -	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
		Young Child (ages 1-6)	Site-Wide (Overburden and Bedrock Combined)	CA	Chemical Concentration in Air	see Table 3s	ug/m^3	see Table 3s	Chronic Daily Intake (CDI) (ug/m^3) =
				ET	Exposure Time	1	hrs/day	USEPA, 2004a	CA x ET x EF x ED / AT x CF
				EF	Exposure Frequency	350	days/year	USEPA, 2004a	
				ED	Exposure Duration	6	years	USEPA, 1994a	
				CF	Conversion Factor	24	hrs/day	- -	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

TABLE 4.3.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor Air (Vapor Intrusion)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Site-Wide Overburden	CA	Modeled Concentration in Air	see Table 3s	ug/m^3	see Table 3s	Chronic Daily Intake (CDI) (ug/m^3) =
				ET	Exposure Time	24	hrs/day	USEPA, 1997a	CA x ET x EF x ED / CF x AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004a	
				ED	Exposure Duration	24	years	USEPA, 2004a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	
				CF	Conversion Factor	24	hrs/day	- -	
		Young Child (ages 1-6)	Site-Wide Overburden	CA	Modeled Concentration in Air	see Table 3s	ug/m^3	see Table 3s	Chronic Daily Intake (CDI) (ug/m^3) =
				ET	Exposure Time	24	hrs/day	USEPA, 1997a	CA x ET x EF x ED / CF x AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004a	
				ED	Exposure Duration	6	years	USEPA, 2004a	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				CF	Conversion Factor	24	hrs/day	- -	

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

IRON HORSE PARK SUPERFUND SITE - OU4

Chemical of Potential Concern (3)	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
1,1,2,2-Tetrachloroethane	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloropropane	Chronic	2E-02	mg/kg-day	(4)	2E-02	mg/kg-day	Blood	1000	IRIS	01/31/08
1,4-Dichlorobenzene	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	Chronic	4E-03	mg/kg-day	(4)	4E-03	mg/kg-day	Immune System	300	IRIS	01/31/08
Bromochloromethane	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	Chronic	7E-04	mg/kg-day	(4)	7E-04	mg/kg-day	Liver	1000	IRIS	01/31/08
Chlorobenzene	Chronic	2E-02	mg/kg-day	(4)	2E-02	mg/kg-day	Liver	1000	IRIS	01/31/08
Chloroethane	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,3-Dichloropropene	Chronic	3E-02	mg/kg-day	(4)	3E-02	mg/kg-day	GI System	100	IRIS	01/31/08
Tetrachloroethene	Chronic	1E-02	mg/kg-day	(4)	1E-02	mg/kg-day	Liver	1000	IRIS	01/31/08
Trichloroethene	Chronic	3E-04	mg/kg-day	(4)	3E-04	mg/kg-day	Liver	3000	NCEA	01/31/08
Vinyl Chloride	Chronic	3E-03	mg/kg-day	(4)	3E-03	mg/kg-day	Liver	30	IRIS	01/31/08
Xylene (Total)	Chronic	2E-01	mg/kg-day	(4)	2E-01	mg/kg-day	General Toxicity	1000	IRIS	01/31/08
2-Methylnaphthalene	Chronic	4E-03	mg/kg-day	(4)	4E-03	mg/kg-day	Respiratory	1000	IRIS	01/31/08
3-Nitroaniline	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Atrazine	Chronic	3.5E-02	mg/kg-day	(4)	3.5E-02	mg/kg-day	General Toxicity/Cardiovascular	100	IRIS	01/31/08
Bis(2-chloroethyl)ether	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)anthracene	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	2E-02	mg/kg-day	(4)	2E-02	mg/kg-day	General Toxicity	3000	IRIS	01/31/08
Phenanthrene	Chronic	2E-02	mg/kg-day	(4)	2E-02	mg/kg-day	General Toxicity	3000	IRIS	01/31/08
Dieldrin	Chronic	5E-05	mg/kg-day	(4)	5E-05	mg/kg-day	Liver	100	IRIS	01/31/08
Aluminum	Chronic	1E+00	mg/kg-day	0.01	1.0E-02	mg/kg-day	Developmental	100	STSC	01/31/08
Antimony	Chronic	4E-04	mg/kg-day	0.15	6.0E-05	mg/kg-day	General Toxicity	1000	IRIS	01/31/08
Arsenic	Chronic	3E-04	mg/kg-day	(4)	3E-04	mg/kg-day	Skin	3	IRIS	01/31/08
Barium	Chronic	2E-01	mg/kg-day	0.07	1.4E-02	mg/kg-day	Kidney	300	IRIS	01/31/08
Cadmium (drinking water)	Chronic	5E-04	mg/kg-day	0.05	2.5E-05	mg/kg-day	Kidney	10	IRIS	01/31/08
Chromium (VI)	Chronic	3E-03	mg/kg-day	0.025	7.5E-05	mg/kg-day	GI System	300	IRIS	01/31/08
Cobalt	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01/31/08

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

IRON HORSE PARK SUPERFUND SITE - OU4

Chemical of Potential Concern (3)	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Lead	Chronic	N/A	N/A	N/A	N/A	N/A	CNS	N/A	IRIS	01/31/08
Manganese (drinking water	Chronic	2.4E-02	mg/kg-day	0.04	9.6E-04	mg/kg-day	CNS	9	IRIS	01/31/08
Manganese (other media)	Chronic	7E-02	mg/kg-day	0.04	2.8E-03	mg/kg-day	CNS	3	IRIS	01/31/08
Nickel	Chronic	2E-02	mg/kg-day	0.04	8.0E-04	mg/kg-day	General Toxicity	300	IRIS	01/31/08
Silver	Chronic	5E-03	mg/kg-day	0.04	2.0E-04	mg/kg-day	Skin	3	IRIS	01/31/08
Vanadium	Chronic	4.9E-03	mg/kg-day	0.026	1.3E-04	mg/kg-day	Kidney	300	STSC	01/31/08
1,1,2,2-Tetrachloroethane	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloropropane	Subchronic	2E-02	mg/kg-day	(4)	2E-02	mg/kg-day	Blood	1000	IRIS	01/31/08
1,4-Dichlorobenzene	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	Subchronic	1.2E-02	mg/kg-day	(4)	1.2E-02	mg/kg-day	Immune System	100	IRIS	01/31/08
Bromochloromethane	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	Subchronic	7E-03	mg/kg-day	(4)	7E-03	mg/kg-day	Liver	100	IRIS	01/31/08
Chlorobenzene	Subchronic	2E-01	mg/kg-day	(4)	2E-01	mg/kg-day	Liver	100	IRIS	01/31/08
Chloroethane	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,3-Dichloropropene	Subchronic	3E-02	mg/kg-day	(4)	3E-02	mg/kg-day	GI System	100	IRIS	01/31/08
Tetrachloroethene	Subchronic	1E-01	mg/kg-day	(4)	1E-01	mg/kg-day	Liver	100	IRIS	01/31/08
Trichloroethene	Subchronic	3E-04	mg/kg-day	(4)	3E-04	mg/kg-day	Liver	3000	NCEA	01/31/08
Vinyl Chloride	Subchronic	3E-03	mg/kg-day	(4)	3E-03	mg/kg-day	Liver	30	IRIS	01/31/08
Xylene (Total)	Subchronic	2E-01	mg/kg-day	(4)	2E-01	mg/kg-day	General Toxicity	1000	IRIS	01/31/08
2-Methylnaphthalene	Subchronic	4E-03	mg/kg-day	(4)	4E-03	mg/kg-day	Respiratory	1000	IRIS	01/31/08
3-Nitroaniline	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Atrazine	Subchronic	3.5E-02	mg/kg-day	(4)	3.5E-02	mg/kg-day	General Toxicity/Cardiovascular	100	IRIS	01/31/08
Bis(2-chloroethyl)ether	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)anthracene	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Subchronic	2E-01	mg/kg-day	(4)	2E-01	mg/kg-day	General Toxicity	300	IRIS	01/31/08
Phenanthrene	Subchronic	2E-01	mg/kg-day	(4)	2E-01	mg/kg-day	General Toxicity	300	IRIS	01/31/08
Dieldrin	Subchronic	5E-05	mg/kg-day	(4)	5E-05	mg/kg-day	Liver	100	IRIS	01/31/08
Aluminum	Subchronic	1E+00	mg/kg-day	0.01	1.0E-02	mg/kg-day	Developmental	100	STSC	01/31/08

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

IRON HORSE PARK SUPERFUND SITE - OU4

Chemical of Potential Concern (3)	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Antimony	Subchronic	4E-04	mg/kg-day	0.15	6.0E-05	mg/kg-day	General Toxicity	1000	IRIS	01/31/08
Arsenic	Subchronic	3E-04	mg/kg-day	(4)	3E-04	mg/kg-day	Skin	3	IRIS	01/31/08
Barium	Subchronic	2E-01	mg/kg-day	0.07	1.4E-02	mg/kg-day	Kidney	300	IRIS	01/31/08
Cadmium (drinking water)	Subchronic	5E-04	mg/kg-day	0.05	2.5E-05	mg/kg-day	Kidney	10	IRIS	01/31/08
Chromium (VI)	Subchronic	9E-03	mg/kg-day	0.025	2.3E-04	mg/kg-day	GI System	100	IRIS	01/31/08
Cobalt	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	Subchronic	N/A	N/A	N/A	N/A	N/A	CNS	N/A	IRIS	01/31/08
Manganese (drinking water	Subchronic	2.4E-02	mg/kg-day	0.04	9.6E-04	mg/kg-day	CNS	9	IRIS	01/31/08
Manganese (other media)	Subchronic	7E-02	mg/kg-day	0.04	2.8E-03	mg/kg-day	CNS	3	IRIS	01/31/08
Nickel	Subchronic	2E-02	mg/kg-day	0.04	8.0E-04	mg/kg-day	General Toxicity	300	IRIS	01/31/08
Silver	Subchronic	5E-03	mg/kg-day	0.04	2.0E-04	mg/kg-day	Skin	3	IRIS	01/31/08
Vanadium	Subchronic	4.9E-03	mg/kg-day	0.026	1.3E-04	mg/kg-day	Kidney	30	STSC	01/31/08

(1) Oral absorption efficiencies from RAGS, Part E (USEPA, 2004a).

(2) Calculated as: (oral RfD) x (oral to dermal adjustment factor).

(3)

RfDs for managanese are based on total allowable intake (10 mg/day) minus the background intake (5 mg/day). The remaining intake (5 mg/day) is divided by 70 kg.

RfD for naphthalene used as a surrogate for phenanthrene.

RfD for nickel is based on nickel, soluble salts.

RfD for vanadium is based on vanadium pentoxide (IRIS, 2008), adjusted for percent vanadium as recommended by STSC.

RfD for trichloroethene is draft NCEA value.

(4) Oral absorption efficiency exceeds 50%. No adjustment of the oral reference dose is necessary.

(5) Permeability constants (Kp) used for water absorption calculations: 2E-03 cm/hr for chromium (VI), 4E-04 cm/hr for cobalt, 2E-04 cm/hr for nickel, 6E-04 cm/hr for silver, and 1E-03 cm/hr for

IRIS = Integrated Risk Information System

STSC = Superfund Technical Support Center

NCEA = National Center for Environmental Assessment

N/A = Not Applicable

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

IRON HORSE PARK SUPERFUND SITE - OU4

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD(1)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
1,1,2,2-Tetrachloroethane	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethane	Chronic	5E+02	ug/m^3	N/A	N/A	Kidney	1000	HEAST	July 1997
1,2,3-Trichlorobenzene	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloropropane	Chronic	4E+00	ug/m^3	N/A	N/A	Respiratory	300	IRIS	01/31/08
1,4-Dichlorobenzene	Chronic	8E+02	ug/m^3	N/A	N/A	Liver	100	IRIS	01/31/08
Benzene	Chronic	3E+01	ug/m^3	N/A	N/A	Immune System	300	IRIS	01/31/08
Bromochloromethane	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	Chronic	4.0E+01	ug/m^3	N/A	N/A	GI System/ Developmental/CNS	N/A	CalEPA	01/31/08
Chlorobenzene	Chronic	6E+01	ug/m^3	N/A	N/A	Liver	1000	STSC	01/31/08
Chloroethane	Chronic	1E+04	ug/m^3	N/A	N/A	Developmental	300	IRIS	01/31/08
Chloromethane	Chronic	9E+01	ug/m^3	N/A	N/A	CNS	1000	IRIS	01/31/08
cis-1,2-Dichloroethene	Chronic	2E+02	ug/m^3	N/A	N/A	Liver	30	IRIS	01/31/08
cis-1,3-Dichloropropene	Chronic	2E+01	ug/m^3	N/A	N/A	Respiratory	30	IRIS	01/31/08
Methyl tert-butyl ether	Chronic	3E+03	ug/m^3	N/A	N/A	Liver/Kidney	100	IRIS	01/31/08
Tetrachloroethene	Chronic	2.7E+02	ug/m^3	N/A	N/A	CNS	100	ATSDR	01/31/08
trans-1,2-Dichloroethene	Chronic	6E+01	ug/m^3	N/A	N/A	Respiratory/Liver	3000	STSC	01/31/08
Trichloroethene	Chronic	4E+01	ug/m^3	N/A	N/A	Liver/CNS	3000	NCEA	01/31/08
Vinyl Chloride	Chronic	1E+02	ug/m^3	N/A	N/A	Liver	30	IRIS	01/31/08
Xylene (Total)	Chronic	1E+02	ug/m^3	N/A	N/A	CNS	300	IRIS	01/31/08
2-Methylnaphthalene	Chronic	3E+00	ug/m^3	N/A	N/A	Respiratory	3000	IRIS	01/31/08
Bis(2-chloroethyl)ether	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	3E+00	ug/m^3	N/A	N/A	Respiratory	3000	IRIS	01/31/08
Phenanthrene	Chronic	3E+00	ug/m^3	N/A	N/A	Respiratory	3000	IRIS	01/31/08

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

STSC = Superfund Technical Support Center

NCEA = National Center for Environmental Assessment

CalEPA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment

ATSDR = Agency for Toxic Substances and Disease Registry

N/A = Not Applicable

(1) RfC for naphthalene used as a surrogate for all noncarcinogenic PAHs.

(2) RfC for trichloroethene is draft NCEA value.

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

IRON HORSE PARK SUPERFUND SITE - OU4

Chemical of Potential Concern (3)	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
1,1,2,2-Tetrachloroethane	2.0E-01	(mg/kg-day) $^{-1}$	(1)	2.0E-01	(mg/kg-day) $^{-1}$	C	IRIS	01/31/08
1,2-Dichloroethane	9.1E-02	(mg/kg-day) $^{-1}$	(1)	9.1E-02	(mg/kg-day) $^{-1}$	B2	IRIS	01/31/08
1,2-Dichloropropane	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
1,4-Dichlorobenzene	2.4E-02	(mg/kg-day) $^{-1}$	(1)	2.4E-02	(mg/kg-day) $^{-1}$	C	HEAST	July 1997
Benzene	5.5E-02	(mg/kg-day) $^{-1}$	(1)	5.5E-02	(mg/kg-day) $^{-1}$	A	IRIS	01/31/08
Bromochloromethane	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Carbon tetrachloride	1.3E-01	(mg/kg-day) $^{-1}$	(1)	1.3E-01	(mg/kg-day) $^{-1}$	B2	IRIS	01/31/08
Chlorobenzene	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Chloroethane	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
cis-1,3-Dichloropropene	1.0E-01	(mg/kg-day) $^{-1}$	(1)	1.0E-01	(mg/kg-day) $^{-1}$	B2	IRIS	01/31/08
Tetrachloroethene	5.4E-01	(mg/kg-day) $^{-1}$	(1)	5.4E-01	(mg/kg-day) $^{-1}$	B2	CalEPA	01/31/08
Trichloroethene	4E-01	(mg/kg-day) $^{-1}$	(1)	4E-01	(mg/kg-day) $^{-1}$	C-B2	NCEA	01/31/08
Vinyl Chloride	7.5E-01	(mg/kg-day) $^{-1}$	(1)	7.5E-01	(mg/kg-day) $^{-1}$	A	IRIS	01/31/08
Xylene (Total)	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
2-Methylnaphthalene	N/A	N/A	N/A	N/A	N/A	C	IRIS	01/31/08
3-Nitroaniline	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Atrazine	2.2E-01	(mg/kg-day) $^{-1}$	(1)	2.2E-01	(mg/kg-day) $^{-1}$	C	HEAST	July 1997
Bis(2-chloroethyl)ether	1.1E+00	(mg/kg-day) $^{-1}$	(1)	1.1E+00	(mg/kg-day) $^{-1}$	B2	IRIS	01/31/08
Dibenz(a,h)anthracene	7.3E+00	(mg/kg-day) $^{-1}$	(1)	7.3E+00	(mg/kg-day) $^{-1}$	B2	IRIS	01/31/08
Naphthalene	N/A	N/A	N/A	N/A	N/A	C	IRIS	01/31/08
Phenanthrene	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Dieldrin	1.6E+01	(mg/kg-day) $^{-1}$	(1)	1.6E+01	(mg/kg-day) $^{-1}$	B2	IRIS	01/31/08
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Arsenic	1.5E+00	(mg/kg-day) $^{-1}$	(1)	1.5E+00	(mg/kg-day) $^{-1}$	A	IRIS	01/31/08
Barium	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Cadmium (drinking water)	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Chromium (VI)	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

IRON HORSE PARK SUPERFUND SITE - OU4

Chemical of Potential Concern (3)	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Lead	N/A	N/A	N/A	N/A	N/A	B2	IRIS	01/31/08
Manganese (drinking water)	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Manganese (other media)	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Nickel	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Silver	N/A	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

STSC = Superfund Technical Support Center

CalEPA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment

NCEA = National Center for Environmental Assessment

N/A = Not Applicable

Slope factor for benzo(a)pyrene, along with the appropriate relative potency factor (USEPA, 1993), used for the other carcinogenic PAHs.

Slope factor for trichloroethene is draft NCEA value.

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen (by the oral route)

E - Evidence of noncarcinogenicity

(1) Oral absorption efficiency exceeds 50%. Therefore, no adjustment of the oral slope factor is necessary.

(2) Calculated as: (oral slope factor) / (oral to dermal adjustment factor)

(3) Benzene has range of values: high-end = 0.055, low-end = 0.015

Trichloroethene has range of values: high-end = 0.4, low-end = 0.2, CalEPA = 0.013

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

IRON HORSE PARK SUPERFUND SITE - OU4

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
1,1,2,2-Tetrachloroethane	5.8E-05	$(ug/m^3)^{-1}$	N/A	N/A	C	IRIS	01/31/08
1,1-Dichloroethane	N/A	N/A	N/A	N/A	C	IRIS	01/31/08
1,2,3-Trichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	2.6E-05	$(ug/m^3)^{-1}$	N/A	N/A	B2	IRIS	01/31/08
1,2-Dichloropropane	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	C	HEAST	July 1997
Benzene	7.8E-06	$(ug/m^3)^{-1}$	N/A	N/A	A	IRIS	01/31/08
Bromochloromethane	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Carbon tetrachloride	1.5E-05	$(ug/m^3)^{-1}$	N/A	N/A	B2	IRIS	01/31/08
Chlorobenzene	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Chloroethane	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Chloromethane	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
cis-1,2-Dichloroethene	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
cis-1,3-Dichloropropene	4.0E-06	$(ug/m^3)^{-1}$	N/A	N/A	B2	IRIS	01/31/08
Methyl tert-butyl ether	4.5E-08	$(ug/m^3)^{-1}$	N/A	N/A	B2	CalEPA	01/31/08
Tetrachloroethene	5.9E-06	$(ug/m^3)^{-1}$	N/A	N/A	B2	CalEPA	01/31/08
trans-1,2-Dichloroethene	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
Trichloroethene	1.1E-04	$(ug/m^3)^{-1}$	N/A	N/A	C-B2	NCEA	01/31/08
Vinyl Chloride	4.4E-06	$(ug/m^3)^{-1}$	N/A	N/A	A	IRIS	01/31/08
Xylene (Total)	N/A	N/A	N/A	N/A	D	IRIS	01/31/08
2-Methylnaphthalene	N/A	N/A	N/A	N/A	C	IRIS	01/31/08
Bis(2-chloroethyl)ether	3.3E-04	$(ug/m^3)^{-1}$	N/A	N/A	B2	IRIS	01/31/08
Naphthalene	N/A	N/A	N/A	N/A	C	IRIS	01/31/08
Phenanthrene	N/A	N/A	N/A	N/A	D	IRIS	01/31/08

IRIS = Integrated Risk Information System

STSC = Superfund Technical Support Center

CalEPA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment

HEAST = Health Effects Assessment Summary Tables

N/A = Not Applicable

NCEA = National Center for Environmental Assessment

Unit risk for trichloroethene is draft NCEA value.

Benzene has range of values: high-end = 7.8E-06, low-end = 2.2E-06

Trichloroethene has range of values: high-end = 1.1E-04, low-end = 5.7E-06, CalEPA = 2E-06

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen (by the oral route)

E - Evidence of noncarcinogenicity

TABLE 7.1.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Current / Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Indoor Air (Vapor Intrusion)	Site-Wide Overburden	Inhalation of Volatiles													
				Carbon Tetrachloride	2E+00	ug/m^3	1.8E-01	ug/m3	1.5E-05	$(ug/m3)^{-1}$	2.8E-06	5.1E-01	ug/m3	4.0E+01	ug/m3	1.3E-02
				Tetrachloroethene	4E-01	ug/m^3	3.1E-02	ug/m3	5.9E-06	$(ug/m3)^{-1}$	1.8E-07	8.7E-02	ug/m3	2.7E+02	ug/m3	3.2E-04
				Trichloroethene	4E-02	ug/m^3	3.6E-03	ug/m3	1.1E-04	$(ug/m3)^{-1}$	4.0E-07	1.0E-02	ug/m3	4.0E+01	ug/m3	2.5E-04
			Exp. Route Total								3E-06					1E-02
		Exposure Point Total									3E-06					1E-02
	Exposure Medium Total										3E-06					1E-02
Medium Total											3E-06					1E-02
										Total of Receptor Risks Across All Media	3E-06				Total of Receptor Hazards Across All Media	1E-02

TABLE 7.2.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site-Wide Overburden	Ingestion													
				1,1,2,2-Tetrachloroethane	8E-02	ug/L	2.7E-10	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	5.4E-11	1.9E-08	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloroethane	1E+01	ug/L	3.8E-08	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	3.5E-09	2.7E-06	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloropropane	8E-01	ug/L	2.8E-09	mg/kg-day	N/A	N/A	N/A	2.0E-07	mg/kg-day	2.0E-02	mg/kg-day	9.9E-06
				1,4-Dichlorobenzene	8E+00	ug/L	2.6E-08	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	6.3E-10	1.8E-06	mg/kg-day	N/A	N/A	N/A
				Benzene	6E+01	ug/L	2.1E-07	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	1.1E-08	1.4E-05	mg/kg-day	1.2E-02	mg/kg-day	1.2E-03
				Bromochloromethane	3E-01	ug/L	9.1E-10	mg/kg-day	N/A	N/A	N/A	6.4E-08	mg/kg-day	N/A	N/A	N/A
				Carbon Tetrachloride	1E+02	ug/L	4.2E-07	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	5.5E-08	2.9E-05	mg/kg-day	7.0E-03	mg/kg-day	4.2E-03
				Chlorobenzene	5E+01	ug/L	1.6E-07	mg/kg-day	N/A	N/A	N/A	1.1E-05	mg/kg-day	2.0E-01	mg/kg-day	5.6E-05
				cis-1,3-Dichloropropene	9E+00	ug/L	3.0E-08	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	3.0E-09	2.1E-06	mg/kg-day	3.0E-02	mg/kg-day	7.0E-05
				Tetrachloroethene	4E+01	ug/L	1.4E-07	mg/kg-day	5.4E-01	(mg/kg-day) $^{-1}$	7.4E-08	9.5E-06	mg/kg-day	1.0E-01	mg/kg-day	9.5E-05
				Trichloroethene	7E+00	ug/L	2.4E-08	mg/kg-day	4.0E-01	(mg/kg-day) $^{-1}$	9.8E-09	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	5.7E-03
				Vinyl Chloride	7E-01	ug/L	2.3E-09	mg/kg-day	7.5E-01	(mg/kg-day) $^{-1}$	1.7E-09	1.6E-07	mg/kg-day	3.0E-03	mg/kg-day	5.4E-05
				Xylene (total)	3E+02	ug/L	8.7E-07	mg/kg-day	N/A	N/A	N/A	6.1E-05	mg/kg-day	2.0E-01	mg/kg-day	3.1E-04
				2-Methylnaphthalene	1E+00	ug/L	4.2E-09	mg/kg-day	N/A	N/A	N/A	2.9E-07	mg/kg-day	4.0E-03	mg/kg-day	7.3E-05
				Atrazine	2E+00	ug/L	6.6E-09	mg/kg-day	2.2E-01	(mg/kg-day) $^{-1}$	1.5E-09	4.6E-07	mg/kg-day	3.5E-02	mg/kg-day	1.3E-05
				Bis(2-chloroethyl)ether	7E-01	ug/L	2.4E-09	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	2.7E-09	1.7E-07	mg/kg-day	N/A	N/A	N/A
				Dibenz(a,h)anthracene	5E-02	ug/L	1.7E-10	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.3E-09	1.2E-08	mg/kg-day	N/A	N/A	N/A
				Naphthalene	1E+00	ug/L	3.8E-09	mg/kg-day	N/A	N/A	N/A	2.7E-07	mg/kg-day	2.0E-01	mg/kg-day	1.3E-06
				Phenanthrene	2E+00	ug/L	7.3E-09	mg/kg-day	N/A	N/A	N/A	5.1E-07	mg/kg-day	2.0E-01	mg/kg-day	2.6E-06
				Dieldrin	1E-02	ug/L	4.5E-11	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	7.3E-10	3.2E-09	mg/kg-day	5.0E-05	mg/kg-day	6.4E-05
				Aluminum	7E+03	ug/L	2.5E-05	mg/kg-day	N/A	N/A	N/A	1.7E-03	mg/kg-day	1.0E+00	mg/kg-day	1.7E-03
				Antimony	4E+00	ug/L	1.5E-08	mg/kg-day	N/A	N/A	N/A	1.0E-06	mg/kg-day	4.0E-04	mg/kg-day	2.6E-03
				Arsenic	3E+02	ug/L	9.8E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.5E-06	6.9E-05	mg/kg-day	3.0E-04	mg/kg-day	2.3E-01
				Barium	8E+02	ug/L	2.9E-06	mg/kg-day	N/A	N/A	N/A	2.0E-04	mg/kg-day	2.0E-01	mg/kg-day	1.0E-03
				Cadmium (drinking water)	2E+01	ug/L	7.8E-08	mg/kg-day	N/A	N/A	N/A	5.5E-06	mg/kg-day	5.0E-04	mg/kg-day	1.1E-02
				Chromium (VI)	3E+01	ug/L	1.1E-07	mg/kg-day	N/A	N/A	N/A	7.9E-06	mg/kg-day	9.0E-03	mg/kg-day	8.8E-04
				Cobalt	2E+02	ug/L	7.8E-07	mg/kg-day	N/A	N/A	N/A	5.5E-05	mg/kg-day	N/A	N/A	N/A
				Manganese (other media)	2E+04	ug/L	7.8E-05	mg/kg-day	N/A	N/A	N/A	5.5E-03	mg/kg-day	7.0E-02	mg/kg-day	7.8E-02
				Vanadium	2E+01	ug/L	5.6E-08	mg/kg-day	N/A	N/A	N/A	3.9E-06	mg/kg-day	4.9E-03	mg/kg-day	8.0E-04
			Exp. Route Total								2E-06					3E-01

TABLE 7.2.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal													
				1,1,2,2-Tetrachloroethane	8E-02	ug/L	3.3E-10	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	6.5E-11	2.3E-08	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloroethane	1E+01	ug/L	1.9E-08	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	1.7E-09	1.3E-06	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloropropane	8E-01	ug/L	2.7E-09	mg/kg-day	N/A	N/A	N/A	1.9E-07	mg/kg-day	2.0E-02	mg/kg-day	9.4E-06
				1,4-Dichlorobenzene	8E+00	ug/L	1.7E-07	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	4.0E-09	1.2E-05	mg/kg-day	N/A	N/A	N/A
				Benzene	6E+01	ug/L	3.1E-07	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	1.7E-08	2.2E-05	mg/kg-day	1.2E-02	mg/kg-day	1.8E-03
				Bromochloromethane	3E-01	ug/L	4.6E-11	mg/kg-day	N/A	N/A	N/A	3.2E-09	mg/kg-day	N/A	N/A	N/A
				Carbon Tetrachloride	1E+02	ug/L	1.1E-06	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	1.4E-07	7.6E-05	mg/kg-day	7.0E-03	mg/kg-day	1.1E-02
				Chlorobenzene	5E+01	ug/L	5.5E-07	mg/kg-day	N/A	N/A	N/A	3.9E-05	mg/kg-day	2.0E-01	mg/kg-day	1.9E-04
				cis-1,3-Dichloropropene	9E+00	ug/L	2.8E-08	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	2.8E-09	2.0E-06	mg/kg-day	3.0E-02	mg/kg-day	6.6E-05
				Tetrachloroethene	4E+01	ug/L	7.8E-07	mg/kg-day	5.4E-01	(mg/kg-day) $^{-1}$	4.2E-07	5.5E-05	mg/kg-day	1.0E-01	mg/kg-day	5.5E-04
				Trichloroethene	7E+00	ug/L	3.9E-08	mg/kg-day	4.0E-01	(mg/kg-day) $^{-1}$	1.6E-08	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	9.2E-03
				Vinyl Chloride	7E-01	ug/L	1.2E-09	mg/kg-day	7.5E-01	(mg/kg-day) $^{-1}$	9.3E-10	8.7E-08	mg/kg-day	3.0E-03	mg/kg-day	2.9E-05
				Xylene (total)	3E+02	ug/L	5.2E-06	mg/kg-day	N/A	N/A	N/A	3.6E-04	mg/kg-day	2.0E-01	mg/kg-day	1.8E-03
				2-Methylnaphthalene	1E+00	ug/L	8.6E-08	mg/kg-day	N/A	N/A	N/A	6.0E-06	mg/kg-day	4.0E-03	mg/kg-day	1.5E-03
				Atrazine	2E+00	ug/L	8.3E-09	mg/kg-day	2.2E-01	(mg/kg-day) $^{-1}$	1.8E-09	5.8E-07	mg/kg-day	3.5E-02	mg/kg-day	1.7E-05
				Bis(2-chloroethyl)ether	7E-01	ug/L	6.5E-10	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	7.1E-10	4.5E-08	mg/kg-day	N/A	N/A	N/A
				Naphthalene	1E+00	ug/L	2.4E-08	mg/kg-day	N/A	N/A	N/A	1.7E-06	mg/kg-day	2.0E-01	mg/kg-day	8.5E-06
				Dieldrin	1E-02	ug/L	3.1E-10	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	4.9E-09	2.1E-08	mg/kg-day	5.0E-05	mg/kg-day	4.3E-04
				Aluminum	7E+03	ug/L	1.6E-06	mg/kg-day	N/A	N/A	N/A	1.1E-04	mg/kg-day	1.0E-02	mg/kg-day	1.1E-02
				Antimony	4E+00	ug/L	9.7E-10	mg/kg-day	N/A	N/A	N/A	6.8E-08	mg/kg-day	6.0E-05	mg/kg-day	1.1E-03
				Arsenic	3E+02	ug/L	6.5E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	9.7E-08	4.5E-06	mg/kg-day	3.0E-04	mg/kg-day	1.5E-02
				Barium	8E+02	ug/L	1.9E-07	mg/kg-day	N/A	N/A	N/A	1.4E-05	mg/kg-day	1.4E-02	mg/kg-day	9.7E-04
				Cadmium (drinking water)	2E+01	ug/L	5.1E-09	mg/kg-day	N/A	N/A	N/A	3.6E-07	mg/kg-day	2.5E-05	mg/kg-day	1.4E-02
				Chromium (VI)	3E+01	ug/L	1.5E-08	mg/kg-day	N/A	N/A	N/A	1.0E-06	mg/kg-day	2.3E-04	mg/kg-day	4.6E-03
				Cobalt	2E+02	ug/L	2.1E-08	mg/kg-day	N/A	N/A	N/A	1.4E-06	mg/kg-day	N/A	N/A	N/A
				Manganese (other media)	2E+04	ug/L	5.2E-06	mg/kg-day	N/A	N/A	N/A	3.6E-04	mg/kg-day	2.8E-03	mg/kg-day	1.3E-01
				Vanadium	2E+01	ug/L	3.7E-09	mg/kg-day	N/A	N/A	N/A	2.6E-07	mg/kg-day	1.3E-04	mg/kg-day	2.0E-03
			Exp. Route Total								7E-07					2E-01
		Exposure Point Total									2E-06					5E-01
	Exposure Medium Total										2E-06					5E-01
Medium Total											2E-06					5E-01
										Total of Receptor Risks Across All Media	2E-06				Total of Receptor Hazards Across All Media	5E-01

TABLE 7.3.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site-Wide (Overburden and Bedrock Combined)	Ingestion													
				1,1,2,2-Tetrachloroethane	8E-02	ug/L	7.2E-07	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	1.4E-07	2.1E-06	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloroethane	2E+01	ug/L	2.2E-04	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	2.0E-05	6.3E-04	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloropropane	8E-01	ug/L	7.6E-06	mg/kg-day	N/A	N/A	N/A	2.2E-05	mg/kg-day	2.0E-02	mg/kg-day	1.1E-03
				1,4-Dichlorobenzene	8E+00	ug/L	7.0E-05	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	1.7E-06	2.1E-04	mg/kg-day	N/A	N/A	N/A
				Benzene	6E+01	ug/L	5.5E-04	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	3.0E-05	1.6E-03	mg/kg-day	4.0E-03	mg/kg-day	4.0E-01
				Bromochloromethane	1E+00	ug/L	1.3E-05	mg/kg-day	N/A	N/A	N/A	3.8E-05	mg/kg-day	N/A	N/A	N/A
				Carbon Tetrachloride	1E+02	ug/L	1.1E-03	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	1.5E-04	3.3E-03	mg/kg-day	7.0E-04	mg/kg-day	4.7E+00
				Chlorobenzene	5E+01	ug/L	4.3E-04	mg/kg-day	N/A	N/A	N/A	1.3E-03	mg/kg-day	2.0E-02	mg/kg-day	6.3E-02
				Chloroethane	7E+00	ug/L	6.8E-05	mg/kg-day	N/A	N/A	N/A	2.0E-04	mg/kg-day	N/A	N/A	N/A
				cis-1,3-Dichloropropene	9E+00	ug/L	8.1E-05	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	8.1E-06	2.4E-04	mg/kg-day	3.0E-02	mg/kg-day	7.9E-03
				Tetrachloroethene	4E+01	ug/L	3.7E-04	mg/kg-day	5.4E-01	(mg/kg-day) $^{-1}$	2.0E-04	1.1E-03	mg/kg-day	1.0E-02	mg/kg-day	1.1E-01
				Trichloroethene	8E+01	ug/L	7.0E-04	mg/kg-day	4.0E-01	(mg/kg-day) $^{-1}$	2.8E-04	2.1E-03	mg/kg-day	3.0E-04	mg/kg-day	6.8E+00
				Vinyl Chloride	7E-01	ug/L	7.0E-06	mg/kg-day	7.5E-01	(mg/kg-day) $^{-1}$	5.2E-06	2.0E-05	mg/kg-day	3.0E-03	mg/kg-day	6.8E-03
				Xylene (total)	3E+02	ug/L	2.3E-03	mg/kg-day	N/A	N/A	N/A	6.8E-03	mg/kg-day	2.0E-01	mg/kg-day	3.4E-02
				2-Methylnaphthalene	1E+00	ug/L	1.1E-05	mg/kg-day	N/A	N/A	N/A	3.3E-05	mg/kg-day	4.0E-03	mg/kg-day	8.2E-03
				3-Nitroaniline	6E+00	ug/L	5.8E-05	mg/kg-day	N/A	N/A	N/A	1.7E-04	mg/kg-day	N/A	N/A	N/A
				Atrazine	2E+00	ug/L	1.8E-05	mg/kg-day	2.2E-01	(mg/kg-day) $^{-1}$	3.9E-06	5.2E-05	mg/kg-day	3.5E-02	mg/kg-day	1.5E-03
				Bis(2-chloroethyl)ether	7E-01	ug/L	6.6E-06	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	7.2E-06	1.9E-05	mg/kg-day	N/A	N/A	N/A
				Dibenz(a,h)anthracene	5E-02	ug/L	4.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.4E-06	1.4E-06	mg/kg-day	N/A	N/A	N/A
				Naphthalene	1E+00	ug/L	1.0E-05	mg/kg-day	N/A	N/A	N/A	3.0E-05	mg/kg-day	2.0E-02	mg/kg-day	1.5E-03
				Phenanthrene	2E+00	ug/L	2.0E-05	mg/kg-day	N/A	N/A	N/A	5.8E-05	mg/kg-day	2.0E-02	mg/kg-day	2.9E-03
				Dieldrin	1E-02	ug/L	1.2E-07	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	2.0E-06	3.6E-07	mg/kg-day	5.0E-05	mg/kg-day	7.1E-03
				Aluminum	7E+03	ug/L	6.6E-02	mg/kg-day	N/A	N/A	N/A	1.9E-01	mg/kg-day	1.0E+00	mg/kg-day	1.9E-01
				Antimony	4E+00	ug/L	3.9E-05	mg/kg-day	N/A	N/A	N/A	1.2E-04	mg/kg-day	4.0E-04	mg/kg-day	2.9E-01
				Arsenic	3E+02	ug/L	2.6E-03	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	4.0E-03	7.7E-03	mg/kg-day	3.0E-04	mg/kg-day	2.6E+01
				Barium	8E+02	ug/L	7.9E-03	mg/kg-day	N/A	N/A	N/A	2.3E-02	mg/kg-day	2.0E-01	mg/kg-day	1.1E-01
				Cadmium (drinking water)	2E+01	ug/L	2.1E-04	mg/kg-day	N/A	N/A	N/A	6.1E-04	mg/kg-day	5.0E-04	mg/kg-day	1.2E+00
				Chromium (VI)	3E+01	ug/L	3.0E-04	mg/kg-day	N/A	N/A	N/A	8.8E-04	mg/kg-day	3.0E-03	mg/kg-day	2.9E-01
				Cobalt	3E+02	ug/L	3.2E-03	mg/kg-day	N/A	N/A	N/A	9.3E-03	mg/kg-day	N/A	N/A	N/A
				Lead	3E+01	ug/L	2.7E-04	mg/kg-day	N/A	N/A	N/A	7.9E-04	mg/kg-day	N/A	N/A	N/A
				Manganese (drinking water)	2E+04	ug/L	2.1E-01	mg/kg-day	N/A	N/A	N/A	6.2E-01	mg/kg-day	2.4E-02	mg/kg-day	2.6E+01
				Nickel	3E+02	ug/L	2.7E-03	mg/kg-day	N/A	N/A	N/A	7.8E-03	mg/kg-day	2.0E-02	mg/kg-day	3.9E-01
				Silver	2E+01	ug/L	2.2E-04	mg/kg-day	N/A	N/A	N/A	6.4E-04	mg/kg-day	5.0E-03	mg/kg-day	1.3E-01
				Vanadium	2E+01	ug/L	1.5E-04	mg/kg-day	N/A	N/A	N/A	4.4E-04	mg/kg-day	4.9E-03	mg/kg-day	8.9E-02
			Exp. Route Total								5E-03					7E+01

TABLE 7.3.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal													
				1,1,2,2-Tetrachloroethane	8E-02	ug/L	9.1E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	1.8E-08	2.7E-07	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloroethane	2E+01	ug/L	1.1E-05	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	9.6E-07	3.1E-05	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloropropane	8E-01	ug/L	7.5E-07	mg/kg-day	N/A	N/A	N/A	2.2E-06	mg/kg-day	2.0E-02	mg/kg-day	1.1E-04
				1,4-Dichlorobenzene	8E+00	ug/L	4.7E-05	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	1.1E-06	1.4E-04	mg/kg-day	N/A	N/A	N/A
				Benzene	6E+01	ug/L	8.4E-05	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	4.6E-06	2.4E-04	mg/kg-day	4.0E-03	mg/kg-day	6.1E-02
				Bromochloromethane	1E+00	ug/L	6.9E-08	mg/kg-day	N/A	N/A	N/A	2.0E-07	mg/kg-day	N/A	N/A	N/A
				Carbon Tetrachloride	1E+02	ug/L	3.0E-04	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	4.0E-05	8.9E-04	mg/kg-day	7.0E-04	mg/kg-day	1.3E+00
				Chlorobenzene	5E+01	ug/L	1.5E-04	mg/kg-day	N/A	N/A	N/A	4.5E-04	mg/kg-day	2.0E-02	mg/kg-day	2.3E-02
				Chloroethane	7E+00	ug/L	3.9E-06	mg/kg-day	N/A	N/A	N/A	1.1E-05	mg/kg-day	N/A	N/A	N/A
				cis-1,3-Dichloropropene	9E+00	ug/L	7.8E-06	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	7.8E-07	2.3E-05	mg/kg-day	3.0E-02	mg/kg-day	7.6E-04
				Tetrachloroethene	4E+01	ug/L	2.2E-04	mg/kg-day	5.4E-01	(mg/kg-day) $^{-1}$	1.2E-04	6.4E-04	mg/kg-day	1.0E-02	mg/kg-day	6.4E-02
				Trichloroethene	8E+01	ug/L	1.2E-04	mg/kg-day	4.0E-01	(mg/kg-day) $^{-1}$	4.7E-05	3.4E-04	mg/kg-day	3.0E-04	mg/kg-day	1.1E+00
				Vinyl Chloride	7E-01	ug/L	3.7E-07	mg/kg-day	7.5E-01	(mg/kg-day) $^{-1}$	2.8E-07	1.1E-06	mg/kg-day	3.0E-03	mg/kg-day	3.6E-04
				Xylene (total)	3E+02	ug/L	1.4E-03	mg/kg-day	N/A	N/A	N/A	4.1E-03	mg/kg-day	2.0E-01	mg/kg-day	2.1E-02
				2-Methylnaphthalene	1E+00	ug/L	2.4E-05	mg/kg-day	N/A	N/A	N/A	7.0E-05	mg/kg-day	4.0E-03	mg/kg-day	1.8E-02
				3-Nitroaniline	6E+00	ug/L	1.9E-06	mg/kg-day	N/A	N/A	N/A	5.4E-06	mg/kg-day	N/A	N/A	N/A
				Atrazine	2E+00	ug/L	2.3E-06	mg/kg-day	2.2E-01	(mg/kg-day) $^{-1}$	5.1E-07	6.7E-06	mg/kg-day	3.5E-02	mg/kg-day	1.9E-04
				Bis(2-chloroethyl)ether	7E-01	ug/L	1.8E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	2.0E-07	5.3E-07	mg/kg-day	N/A	N/A	N/A
				Naphthalene	1E+00	ug/L	6.8E-06	mg/kg-day	N/A	N/A	N/A	2.0E-05	mg/kg-day	2.0E-02	mg/kg-day	9.9E-04
				Dieldrin	1E-02	ug/L	8.6E-08	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	1.4E-06	2.5E-07	mg/kg-day	5.0E-05	mg/kg-day	5.0E-03
				Aluminum	7E+03	ug/L	3.5E-04	mg/kg-day	N/A	N/A	N/A	1.0E-03	mg/kg-day	1.0E-02	mg/kg-day	1.0E-01
				Antimony	4E+00	ug/L	2.1E-07	mg/kg-day	N/A	N/A	N/A	6.0E-07	mg/kg-day	6.0E-05	mg/kg-day	1.0E-02
				Arsenic	3E+02	ug/L	1.4E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.1E-05	4.0E-05	mg/kg-day	3.0E-04	mg/kg-day	1.3E-01
				Barium	8E+02	ug/L	4.1E-05	mg/kg-day	N/A	N/A	N/A	1.2E-04	mg/kg-day	1.4E-02	mg/kg-day	8.6E-03
				Cadmium (drinking water)	2E+01	ug/L	1.1E-06	mg/kg-day	N/A	N/A	N/A	3.2E-06	mg/kg-day	2.5E-05	mg/kg-day	1.3E-01
				Chromium (VI)	3E+01	ug/L	3.2E-06	mg/kg-day	N/A	N/A	N/A	9.2E-06	mg/kg-day	7.5E-05	mg/kg-day	1.2E-01
				Cobalt	3E+02	ug/L	6.7E-06	mg/kg-day	N/A	N/A	N/A	2.0E-05	mg/kg-day	N/A	N/A	N/A
				Lead	3E+01	ug/L	1.4E-07	mg/kg-day	N/A	N/A	N/A	4.1E-07	mg/kg-day	N/A	N/A	N/A
				Manganese (drinking water)	2E+04	ug/L	1.1E-03	mg/kg-day	N/A	N/A	N/A	3.2E-03	mg/kg-day	9.6E-04	mg/kg-day	3.4E+00
				Nickel	3E+02	ug/L	2.8E-06	mg/kg-day	N/A	N/A	N/A	8.2E-06	mg/kg-day	8.0E-04	mg/kg-day	1.0E-02
				Silver	2E+01	ug/L	6.9E-07	mg/kg-day	N/A	N/A	N/A	2.0E-06	mg/kg-day	2.0E-04	mg/kg-day	1.0E-02
				Vanadium	2E+01	ug/L	7.8E-07	mg/kg-day	N/A	N/A	N/A	2.3E-06	mg/kg-day	1.3E-04	mg/kg-day	1.8E-02
			Exp. Route Total								2E-04					7E+00

TABLE 7.3.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Inhalation (Bathing)													
				1,1,2,2-Tetrachloroethane	1E-01	ug/m^3	1.2E-03	ug/m3	5.8E-05	(ug/m3)$^{-1}$	6.8E-08	3.4E-03	ug/m3	N/A	N/A	N/A
				1,1-Dichloroethane	1E+02	ug/m^3	1.1E+00	ug/m3	N/A	N/A	N/A	3.1E+00	ug/m3	5.0E+02	ug/m3	6.3E-03
				1,2,3-Trichlorobenzene	6E-01	ug/m^3	4.6E-03	ug/m3	N/A	N/A	N/A	1.3E-02	ug/m3	N/A	N/A	N/A
				1,2-Dichloroethane	7E+01	ug/m^3	5.7E-01	ug/m3	2.6E-05	(ug/m3)$^{-1}$	1.5E-05	1.7E+00	ug/m3	N/A	N/A	N/A
				1,2-Dichloropropane	3E+00	ug/m^3	2.1E-02	ug/m3	N/A	N/A	N/A	6.2E-02	ug/m3	4.0E+00	ug/m3	1.5E-02
				1,4-Dichlorobenzene	2E+01	ug/m^3	1.7E-01	ug/m3	N/A	N/A	N/A	5.1E-01	ug/m3	8.0E+02	ug/m3	6.4E-04
				Benzene	2E+02	ug/m^3	1.8E+00	ug/m3	7.8E-06	(ug/m3)$^{-1}$	1.4E-05	5.3E+00	ug/m3	3.0E+01	ug/m3	1.8E-01
				Bromochloromethane	4E+00	ug/m^3	3.3E-02	ug/m3	N/A	N/A	N/A	9.6E-02	ug/m3	N/A	N/A	N/A
				Carbon Tetrachloride	4E+02	ug/m^3	3.0E+00	ug/m3	1.5E-05	(ug/m3)$^{-1}$	4.4E-05	8.6E+00	ug/m3	4.0E+01	ug/m3	2.2E-01
				Chlorobenzene	2E+02	ug/m^3	1.2E+00	ug/m3	N/A	N/A	N/A	3.6E+00	ug/m3	6.0E+01	ug/m3	5.9E-02
				Chloroethane	3E+01	ug/m^3	2.4E-01	ug/m3	N/A	N/A	N/A	7.0E-01	ug/m3	1.0E+04	ug/m3	7.0E-05
				Chloromethane	3E+01	ug/m^3	2.6E-01	ug/m3	N/A	N/A	N/A	7.5E-01	ug/m3	9.0E+01	ug/m3	8.3E-03
				cis-1,2-Dichloroethene	9E+00	ug/m^3	6.8E-02	ug/m3	N/A	N/A	N/A	2.0E-01	ug/m3	2.0E+02	ug/m3	9.9E-04
				cis-1,3-Dichloropropene	3E+01	ug/m^3	2.2E-01	ug/m3	4.0E-06	(ug/m3)$^{-1}$	8.9E-07	6.5E-01	ug/m3	2.0E+01	ug/m3	3.3E-02
				Methyl tert-butyl ether	1E+01	ug/m^3	8.0E-02	ug/m3	4.5E-08	(ug/m3)$^{-1}$	3.6E-09	2.3E-01	ug/m3	3.0E+03	ug/m3	7.8E-05
				Tetrachloroethene	1E+02	ug/m^3	9.3E-01	ug/m3	5.9E-06	(ug/m3)$^{-1}$	5.5E-06	2.7E+00	ug/m3	2.7E+02	ug/m3	1.0E-02
				trans-1,2-Dichloroethene	8E+00	ug/m^3	6.1E-02	ug/m3	N/A	N/A	N/A	1.8E-01	ug/m3	6.0E+01	ug/m3	2.9E-03
				Trichloroethene	2E+02	ug/m^3	1.9E+00	ug/m3	1.1E-04	(ug/m3)$^{-1}$	2.1E-04	5.6E+00	ug/m3	4.0E+01	ug/m3	1.4E-01
				Vinyl Chloride	3E+00	ug/m^3	2.5E-02	ug/m3	4.4E-06	(ug/m3)$^{-1}$	1.1E-07	7.4E-02	ug/m3	1.0E+02	ug/m3	7.4E-04
				Xylene (total)	9E+02	ug/m^3	6.9E+00	ug/m3	N/A	N/A	N/A	2.0E+01	ug/m3	1.0E+02	ug/m3	2.0E-01
				2-Methylnaphthalene	3E+00	ug/m^3	2.2E-02	ug/m3	N/A	N/A	N/A	6.5E-02	ug/m3	3.0E+00	ug/m3	2.2E-02
				Bis(2-chloroethyl)ether	2E-01	ug/m^3	1.5E-03	ug/m3	3.3E-04	(ug/m3)$^{-1}$	4.9E-07	4.3E-03	ug/m3	N/A	N/A	N/A
				Naphthalene	3E+00	ug/m^3	2.1E-02	ug/m3	N/A	N/A	N/A	6.1E-02	ug/m3	3.0E+00	ug/m3	2.0E-02
				Phenanthrene	9E-01	ug/m^3	7.4E-03	ug/m3	N/A	N/A	N/A	2.2E-02	ug/m3	3.0E+00	ug/m3	7.2E-03
			Exp. Route Total								3E-04					9E-01
		Exposure Point Total									5E-03					7E+01
	Exposure Medium Total										5E-03					7E+01

TABLE 7.3.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
	Indoor Air (Vapor Intrusion)	Site-Wide Overburden	Inhalation													
				Carbon Tetrachloride	2E+00	ug/m^3	7.4E-01	ug/m3	1.5E-05	(ug/m3)$^{-1}$	1.1E-05	2.2E+00	ug/m3	4.0E+01	ug/m3	5.4E-02
				Tetrachloroethene	4E-01	ug/m^3	1.2E-01	ug/m3	5.9E-06	(ug/m3)$^{-1}$	7.4E-07	3.6E-01	ug/m3	2.7E+02	ug/m3	1.3E-03
				Trichloroethene	4E-02	ug/m^3	1.5E-02	ug/m3	1.1E-04	(ug/m3)$^{-1}$	1.6E-06	4.3E-02	ug/m3	4.0E+01	ug/m3	1.1E-03
			Exp. Route Total								1E-05					6E-02
		Exposure Point Total									1E-05					6E-02
	Exposure Medium Total										1E-05					6E-02
Medium Total											5E-03					7E+01
										Total of Receptor Risks Across All Media	5E-03				Total of Receptor Hazards Across All Media	7E+01

TABLE 7.4.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site-Wide (Overburden and Bedrock Combined)	Ingestion													
				1,1,2,2-Tetrachloroethane	8E-02	ug/L	6.3E-07	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	1.3E-07	7.4E-06	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloroethane	2E+01	ug/L	1.9E-04	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	1.7E-05	2.2E-03	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloropropane	8E-01	ug/L	6.7E-06	mg/kg-day	N/A	N/A	N/A	7.8E-05	mg/kg-day	2.0E-02	mg/kg-day	3.9E-03
				1,4-Dichlorobenzene	8E+00	ug/L	6.2E-05	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	1.5E-06	7.2E-04	mg/kg-day	N/A	N/A	N/A
				Benzene	6E+01	ug/L	4.8E-04	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	2.7E-05	5.7E-03	mg/kg-day	4.0E-03	mg/kg-day	1.4E+00
				Bromochloromethane	1E+00	ug/L	1.2E-05	mg/kg-day	N/A	N/A	N/A	1.3E-04	mg/kg-day	N/A	N/A	N/A
				Carbon Tetrachloride	1E+02	ug/L	9.9E-04	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	1.3E-04	1.2E-02	mg/kg-day	7.0E-04	mg/kg-day	1.6E+01
				Chlorobenzene	5E+01	ug/L	3.8E-04	mg/kg-day	N/A	N/A	N/A	4.4E-03	mg/kg-day	2.0E-02	mg/kg-day	2.2E-01
				Chloroethane	7E+00	ug/L	5.9E-05	mg/kg-day	N/A	N/A	N/A	6.9E-04	mg/kg-day	N/A	N/A	N/A
				cis-1,3-Dichloropropene	9E+00	ug/L	7.1E-05	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	7.1E-06	8.2E-04	mg/kg-day	3.0E-02	mg/kg-day	2.7E-02
				Tetrachloroethene	4E+01	ug/L	3.2E-04	mg/kg-day	5.4E-01	(mg/kg-day) $^{-1}$	1.7E-04	3.7E-03	mg/kg-day	1.0E-02	mg/kg-day	3.7E-01
				Trichloroethene	8E+01	ug/L	6.2E-04	mg/kg-day	4.0E-01	(mg/kg-day) $^{-1}$	2.5E-04	7.2E-03	mg/kg-day	3.0E-04	mg/kg-day	2.4E+01
				Vinyl Chloride	7E-01	ug/L	6.1E-06	mg/kg-day	7.5E-01	(mg/kg-day) $^{-1}$	6.0E-05	7.1E-05	mg/kg-day	3.0E-03	mg/kg-day	2.4E-02
				Xylene (total)	3E+02	ug/L	2.1E-03	mg/kg-day	N/A	N/A	N/A	2.4E-02	mg/kg-day	2.0E-01	mg/kg-day	1.2E-01
				2-Methylnaphthalene	1E+00	ug/L	9.9E-06	mg/kg-day	N/A	N/A	N/A	1.2E-04	mg/kg-day	4.0E-03	mg/kg-day	2.9E-02
				3-Nitroaniline	6E+00	ug/L	5.1E-05	mg/kg-day	N/A	N/A	N/A	5.9E-04	mg/kg-day	N/A	N/A	N/A
				Atrazine	2E+00	ug/L	1.6E-05	mg/kg-day	2.2E-01	(mg/kg-day) $^{-1}$	3.4E-06	1.8E-04	mg/kg-day	3.5E-02	mg/kg-day	5.2E-03
				Bis(2-chloroethyl)ether	7E-01	ug/L	5.8E-06	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	6.3E-06	6.7E-05	mg/kg-day	N/A	N/A	N/A
				Dibenz(a,h)anthracene	5E-02	ug/L	4.1E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.0E-06	4.8E-06	mg/kg-day	N/A	N/A	N/A
				Naphthalene	1E+00	ug/L	9.0E-06	mg/kg-day	N/A	N/A	N/A	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	5.3E-03
				Phenanthrene	2E+00	ug/L	1.7E-05	mg/kg-day	N/A	N/A	N/A	2.0E-04	mg/kg-day	2.0E-02	mg/kg-day	1.0E-02
				Dieldrin	1E-02	ug/L	1.1E-07	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	1.7E-06	1.2E-06	mg/kg-day	5.0E-05	mg/kg-day	2.5E-02
				Aluminum	7E+03	ug/L	5.8E-02	mg/kg-day	N/A	N/A	N/A	6.8E-01	mg/kg-day	1.0E+00	mg/kg-day	6.8E-01
				Antimony	4E+00	ug/L	3.5E-05	mg/kg-day	N/A	N/A	N/A	4.0E-04	mg/kg-day	4.0E-04	mg/kg-day	1.0E+00
				Arsenic	3E+02	ug/L	2.3E-03	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.5E-03	2.7E-02	mg/kg-day	3.0E-04	mg/kg-day	9.0E+01
				Barium	8E+02	ug/L	6.9E-03	mg/kg-day	N/A	N/A	N/A	8.0E-02	mg/kg-day	2.0E-01	mg/kg-day	4.0E-01
				Cadmium (drinking water)	2E+01	ug/L	1.8E-04	mg/kg-day	N/A	N/A	N/A	2.1E-03	mg/kg-day	5.0E-04	mg/kg-day	4.3E+00
				Chromium (VI)	3E+01	ug/L	2.6E-04	mg/kg-day	N/A	N/A	N/A	3.1E-03	mg/kg-day	3.0E-03	mg/kg-day	1.0E+00
				Cobalt	3E+02	ug/L	2.8E-03	mg/kg-day	N/A	N/A	N/A	3.3E-02	mg/kg-day	N/A	N/A	N/A
				Lead	3E+01	ug/L	2.4E-04	mg/kg-day	N/A	N/A	N/A	2.8E-03	mg/kg-day	N/A	N/A	N/A
				Manganese (drinking water)	2E+04	ug/L	1.9E-01	mg/kg-day	N/A	N/A	N/A	2.2E+00	mg/kg-day	2.4E-02	mg/kg-day	9.0E+01
				Nickel	3E+02	ug/L	2.4E-03	mg/kg-day	N/A	N/A	N/A	2.7E-02	mg/kg-day	2.0E-02	mg/kg-day	1.4E+00
				Silver	2E+01	ug/L	1.9E-04	mg/kg-day	N/A	N/A	N/A	2.2E-03	mg/kg-day	5.0E-03	mg/kg-day	4.5E-01
				Vanadium	2E+01	ug/L	1.3E-04	mg/kg-day	N/A	N/A	N/A	1.5E-03	mg/kg-day	4.9E-03	mg/kg-day	3.1E-01
			Exp. Route Total								4E-03					2E+02

TABLE 7.4.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal													
				1,1,2,2-Tetrachloroethane	8E-02	ug/L	5.1E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	1.0E-08	6.0E-07	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloroethane	2E+01	ug/L	6.1E-06	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	5.6E-07	7.1E-05	mg/kg-day	N/A	N/A	N/A
				1,2-Dichloropropane	8E-01	ug/L	4.2E-07	mg/kg-day	N/A	N/A	N/A	4.9E-06	mg/kg-day	2.0E-02	mg/kg-day	2.5E-04
				1,4-Dichlorobenzene	8E+00	ug/L	2.6E-05	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	6.3E-07	3.1E-04	mg/kg-day	N/A	N/A	N/A
				Benzene	6E+01	ug/L	4.9E-05	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	2.7E-06	5.8E-04	mg/kg-day	4.0E-03	mg/kg-day	1.4E-01
				Bromochloromethane	1E+00	ug/L	3.9E-08	mg/kg-day	N/A	N/A	N/A	4.5E-07	mg/kg-day	N/A	N/A	N/A
				Carbon Tetrachloride	1E+02	ug/L	1.7E-04	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	2.2E-05	2.0E-03	mg/kg-day	7.0E-04	mg/kg-day	2.9E+00
				Chlorobenzene	5E+01	ug/L	8.7E-05	mg/kg-day	N/A	N/A	N/A	1.0E-03	mg/kg-day	2.0E-02	mg/kg-day	5.1E-02
				Chloroethane	7E+00	ug/L	2.3E-06	mg/kg-day	N/A	N/A	N/A	2.7E-05	mg/kg-day	N/A	N/A	N/A
				cis-1,3-Dichloropropene	9E+00	ug/L	4.4E-06	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	4.4E-07	5.1E-05	mg/kg-day	3.0E-02	mg/kg-day	1.7E-03
				Tetrachloroethene	4E+01	ug/L	1.2E-04	mg/kg-day	5.4E-01	(mg/kg-day) $^{-1}$	6.6E-05	1.4E-03	mg/kg-day	1.0E-02	mg/kg-day	1.4E-01
				Trichloroethene	8E+01	ug/L	6.6E-05	mg/kg-day	4.0E-01	(mg/kg-day) $^{-1}$	2.6E-05	7.7E-04	mg/kg-day	3.0E-04	mg/kg-day	2.6E+00
				Vinyl Chloride	7E-01	ug/L	2.2E-07	mg/kg-day	7.5E-01	(mg/kg-day) $^{-1}$	2.2E-06	2.6E-06	mg/kg-day	3.0E-03	mg/kg-day	8.5E-04
				Xylene (total)	3E+02	ug/L	8.1E-04	mg/kg-day	N/A	N/A	N/A	9.5E-03	mg/kg-day	2.0E-01	mg/kg-day	4.7E-02
				2-Methylnaphthalene	1E+00	ug/L	1.4E-05	mg/kg-day	N/A	N/A	N/A	1.6E-04	mg/kg-day	4.0E-03	mg/kg-day	3.9E-02
				3-Nitroaniline	6E+00	ug/L	1.0E-06	mg/kg-day	N/A	N/A	N/A	1.2E-05	mg/kg-day	N/A	N/A	N/A
				Atrazine	2E+00	ug/L	1.3E-06	mg/kg-day	2.2E-01	(mg/kg-day) $^{-1}$	2.9E-07	1.5E-05	mg/kg-day	3.5E-02	mg/kg-day	4.3E-04
				Bis(2-chloroethyl)ether	7E-01	ug/L	1.0E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	1.1E-07	1.2E-06	mg/kg-day	N/A	N/A	N/A
				Naphthalene	1E+00	ug/L	3.8E-06	mg/kg-day	N/A	N/A	N/A	4.4E-05	mg/kg-day	2.0E-02	mg/kg-day	2.2E-03
				Dieldrin	1E-02	ug/L	4.8E-08	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	7.7E-07	5.6E-07	mg/kg-day	5.0E-05	mg/kg-day	1.1E-02
				Aluminum	7E+03	ug/L	2.6E-04	mg/kg-day	N/A	N/A	N/A	3.0E-03	mg/kg-day	1.0E-02	mg/kg-day	3.0E-01
				Antimony	4E+00	ug/L	1.5E-07	mg/kg-day	N/A	N/A	N/A	1.8E-06	mg/kg-day	6.0E-05	mg/kg-day	3.0E-02
				Arsenic	3E+02	ug/L	1.0E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.5E-05	1.2E-04	mg/kg-day	3.0E-04	mg/kg-day	4.0E-01
				Barium	8E+02	ug/L	3.0E-05	mg/kg-day	N/A	N/A	N/A	3.5E-04	mg/kg-day	1.4E-02	mg/kg-day	2.5E-02
				Cadmium (drinking water)	2E+01	ug/L	8.1E-07	mg/kg-day	N/A	N/A	N/A	9.4E-06	mg/kg-day	2.5E-05	mg/kg-day	3.8E-01
				Chromium (VI)	3E+01	ug/L	2.3E-06	mg/kg-day	N/A	N/A	N/A	2.7E-05	mg/kg-day	7.5E-05	mg/kg-day	3.6E-01
				Cobalt	3E+02	ug/L	4.9E-06	mg/kg-day	N/A	N/A	N/A	5.8E-05	mg/kg-day	N/A	N/A	N/A
				Lead	3E+01	ug/L	1.0E-07	mg/kg-day	N/A	N/A	N/A	1.2E-06	mg/kg-day	N/A	N/A	N/A
				Manganese (drinking water)	2E+04	ug/L	8.2E-04	mg/kg-day	N/A	N/A	N/A	9.5E-03	mg/kg-day	9.6E-04	mg/kg-day	9.9E+00
				Nickel	3E+02	ug/L	2.1E-06	mg/kg-day	N/A	N/A	N/A	2.4E-05	mg/kg-day	8.0E-04	mg/kg-day	3.0E-02
				Silver	2E+01	ug/L	5.1E-07	mg/kg-day	N/A	N/A	N/A	5.9E-06	mg/kg-day	2.0E-04	mg/kg-day	3.0E-02
				Vanadium	2E+01	ug/L	5.8E-07	mg/kg-day	N/A	N/A	N/A	6.8E-06	mg/kg-day	1.3E-04	mg/kg-day	5.3E-02
			Exp. Route Total								1E-04					2E+01

TABLE 7.4.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Inhalation (Bathing)													
				1,1,2,2-Tetrachloroethane	1E-01	ug/m^3	5.0E-04	ug/m3	5.8E-05	(ug/m3)$^{-1}$	2.9E-08	5.9E-03	ug/m3	N/A	N/A	N/A
				1,1-Dichloroethane	1E+02	ug/m^3	4.6E-01	ug/m3	N/A	N/A	N/A	5.4E+00	ug/m3	5.0E+02	ug/m3	1.1E-02
				1,2,3-Trichlorobenzene	6E-01	ug/m^3	2.0E-03	ug/m3	N/A	N/A	N/A	2.3E-02	ug/m3	N/A	N/A	N/A
				1,2-Dichloroethane	7E+01	ug/m^3	2.4E-01	ug/m3	2.6E-05	(ug/m3)$^{-1}$	6.3E-06	2.8E+00	ug/m3	N/A	N/A	N/A
				1,2-Dichloropropane	3E+00	ug/m^3	9.1E-03	ug/m3	N/A	N/A	N/A	1.1E-01	ug/m3	4.0E+00	ug/m3	2.7E-02
				1,4-Dichlorobenzene	2E+01	ug/m^3	7.5E-02	ug/m3	N/A	N/A	N/A	8.8E-01	ug/m3	8.0E+02	ug/m3	1.1E-03
				Benzene	2E+02	ug/m^3	7.8E-01	ug/m3	7.8E-06	(ug/m3)$^{-1}$	6.1E-06	9.1E+00	ug/m3	3.0E+01	ug/m3	3.0E-01
				Bromochloromethane	4E+00	ug/m^3	1.4E-02	ug/m3	N/A	N/A	N/A	1.6E-01	ug/m3	N/A	N/A	N/A
				Carbon Tetrachloride	4E+02	ug/m^3	1.3E+00	ug/m3	1.5E-05	(ug/m3)$^{-1}$	1.9E-05	1.5E+01	ug/m3	4.0E+01	ug/m3	3.7E-01
				Chlorobenzene	2E+02	ug/m^3	5.3E-01	ug/m3	N/A	N/A	N/A	6.1E+00	ug/m3	6.0E+01	ug/m3	1.0E-01
				Chloroethane	3E+01	ug/m^3	1.0E-01	ug/m3	N/A	N/A	N/A	1.2E+00	ug/m3	1.0E+04	ug/m3	1.2E-04
				Chloromethane	3E+01	ug/m^3	1.1E-01	ug/m3	N/A	N/A	N/A	1.3E+00	ug/m3	9.0E+01	ug/m3	1.4E-02
				cis-1,2-Dichloroethene	9E+00	ug/m^3	2.9E-02	ug/m3	N/A	N/A	N/A	3.4E-01	ug/m3	2.0E+02	ug/m3	1.7E-03
				cis-1,3-Dichloropropene	3E+01	ug/m^3	9.6E-02	ug/m3	4.0E-06	(ug/m3)$^{-1}$	3.9E-07	1.1E+00	ug/m3	2.0E+01	ug/m3	5.6E-02
				Methyl tert-butyl ether	1E+01	ug/m^3	3.5E-02	ug/m3	4.5E-08	(ug/m3)$^{-1}$	1.6E-09	4.0E-01	ug/m3	3.0E+03	ug/m3	1.3E-04
				Tetrachloroethene	1E+02	ug/m^3	4.0E-01	ug/m3	5.9E-06	(ug/m3)$^{-1}$	2.4E-06	4.7E+00	ug/m3	2.7E+02	ug/m3	1.7E-02
				trans-1,2-Dichloroethene	8E+00	ug/m^3	2.6E-02	ug/m3	N/A	N/A	N/A	3.1E-01	ug/m3	6.0E+01	ug/m3	5.1E-03
				Trichloroethene	2E+02	ug/m^3	8.3E-01	ug/m3	1.1E-04	(ug/m3)$^{-1}$	9.2E-05	9.7E+00	ug/m3	4.0E+01	ug/m3	2.4E-01
				Vinyl Chloride	3E+00	ug/m^3	1.1E-02	ug/m3	4.4E-06	(ug/m3)$^{-1}$	6.3E-07	1.3E-01	ug/m3	1.0E+02	ug/m3	1.3E-03
				Xylene (total)	9E+02	ug/m^3	3.0E+00	ug/m3	N/A	N/A	N/A	3.5E+01	ug/m3	1.0E+02	ug/m3	3.5E-01
				2-Methylnaphthalene	3E+00	ug/m^3	9.6E-03	ug/m3	N/A	N/A	N/A	1.1E-01	ug/m3	3.0E+00	ug/m3	3.7E-02
				Bis(2-chloroethyl)ether	2E-01	ug/m^3	6.4E-04	ug/m3	3.3E-04	(ug/m3)$^{-1}$	2.1E-07	7.5E-03	ug/m3	N/A	N/A	N/A
				Naphthalene	3E+00	ug/m^3	9.0E-03	ug/m3	N/A	N/A	N/A	1.1E-01	ug/m3	3.0E+00	ug/m3	3.5E-02
				Phenanthrene	9E-01	ug/m^3	3.2E-03	ug/m3	N/A	N/A	N/A	3.7E-02	ug/m3	3.0E+00	ug/m3	1.2E-02
			Exp. Route Total								1E-04					2E+00
		Exposure Point Total									4E-03					3E+02
	Exposure Medium Total										4E-03					3E+02

TABLE 7.4.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
	Indoor Air (Vapor Intrusion)	Site-Wide Overburden	Inhalation													
				Carbon Tetrachloride	2E+00	ug/m^3	1.8E-01	ug/m3	1.5E-05	$(ug/m3)^{-1}$	2.8E-06	2.2E+00	ug/m3	4.0E+01	ug/m3	5.4E-02
				Tetrachloroethene	4E-01	ug/m^3	3.1E-02	ug/m3	5.9E-06	$(ug/m3)^{-1}$	1.8E-07	3.6E-01	ug/m3	2.7E+02	ug/m3	1.3E-03
				Trichloroethene	4E-02	ug/m^3	3.7E-03	ug/m3	1.1E-04	$(ug/m3)^{-1}$	4.0E-07	4.3E-02	ug/m3	4.0E+01	ug/m3	1.1E-03
			Exp. Route Total								3E-06					6E-02
		Exposure Point Total									3E-06					6E-02
	Exposure Medium Total										3E-06					6E-02
Medium Total											4E-03					3E+02
										Total of Receptor Risks Across All Media	4E-03				Total of Receptor Hazards Across All Media	3E+02

Notes

Early-life cancer risk calculations for vinyl chloride added to standard cancer risk calculations [chronic daily intake (CDI) x CSF or Unit Risk]. Exposure parameters noted below are defined in Tables 4.2.RME for the young child (ages 1-6).

Inhalation early-life cancer risk = EPC (ug/m^3) x Unit Risk $(ug/m^3)^{-1}$ x ET (hr/day) / CF (24 hr/day)

Ingestion early-life cancer risk = EPC (ug/L) x CSF $(mg/kg\text{-}day)^{-1}$ x IR (L/day) x CF (0.001 mg/ug) / BW (kg)

Dermal early-life cancer risk = SA (cm^2) x DA_{event} $(mg/cm^2\text{-}event)$ x CSF $(mg/kg\text{-}day)^{-1}$ x EV (event/day) / BW (kg)

TABLE 9.1.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Current / Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Indoor Air (Vapor Intrusion)	Site-Wide Overburden											
			Carbon Tetrachloride	- -	3E-06	- -	- -	3E-06	Liver	- -	1E-02	- -	1E-02
			Tetrachloroethene	- -	2E-07	- -	- -	2E-07	Liver	- -	3E-04	- -	3E-04
			Trichloroethene	- -	4E-07	- -	- -	4E-07	Liver	- -	3E-04	- -	3E-04
			Chemical Total	- -	3E-06	- -	- -	3E-06		- -	1E-02	- -	1E-02
			Radionuclide Total										
		Exposure Point Total						3E-06					1E-02
	Exposure Medium Total							3E-06					1E-02
Medium Total								3E-06					1E-02
Receptor Total								3E-06					1E-02

- - = Not Evaluated
N/A = Not Applicable

Total Risk Across All Media: 3E-06

Total Hazard Across All Media: 1E-02

Using the NCEA low-end unit risk for TCE, the risk for this receptor would change to: 3E-06
Using the CalEPA unit risk for TCE, the risk for this receptor would change to: 3E-06

Total Blood HI =	N/A
Total Cardiovascular HI =	N/A
Total Reproductive HI =	N/A
Total General Toxicity HI =	N/A
Total GI System HI =	N/A
Total Immune System HI =	N/A
Total Kidney HI =	N/A
Total Liver HI =	1E-02
Total CNS HI =	N/A
Total Skin HI =	N/A
Total Eye HI =	N/A
Total Respiratory HI =	N/A
Total Developmental HI =	N/A

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Site-Wide Overburden											
			1,1,2,2-Tetrachloroethane	5E-11	- -	7E-11	- -	1E-10	N/A	N/A	- -	N/A	N/A
			1,2-Dichloroethane	3E-09	- -	2E-09	- -	5E-09	N/A	N/A	- -	N/A	N/A
			1,2-Dichloropropane	N/A	- -	N/A	- -	N/A	Blood	1E-05	- -	9E-06	2E-05
			1,4-Dichlorobenzene	6E-10	- -	4E-09	- -	5E-09	N/A	N/A	- -	N/A	N/A
			Benzene	1E-08	- -	2E-08	- -	3E-08	Immune System	1E-03	- -	2E-03	3E-03
			Bromochloromethane	N/A	- -	N/A	- -	N/A	N/A	N/A	- -	N/A	N/A
			Carbon Tetrachloride	5E-08	- -	1E-07	- -	2E-07	Liver	4E-03	- -	1E-02	2E-02
			Chlorobenzene	N/A	- -	N/A	- -	N/A	Liver	6E-05	- -	2E-04	3E-04
			cis-1,3-Dichloropropene	3E-09	- -	3E-09	- -	6E-09	GI System	7E-05	- -	7E-05	1E-04
			Tetrachloroethene	7E-08	- -	4E-07	- -	5E-07	Liver	1E-04	- -	5E-04	6E-04
			Trichloroethene	1E-08	- -	2E-08	- -	3E-08	Liver	6E-03	- -	9E-03	1E-02
			Vinyl Chloride	2E-09	- -	9E-10	- -	3E-09	Liver	5E-05	- -	3E-05	8E-05
			Xylene (total)	N/A	- -	N/A	- -	N/A	General Toxicity	3E-04	- -	2E-03	2E-03
			2-Methylnaphthalene	N/A	- -	N/A	- -	N/A	Respiratory	7E-05	- -	2E-03	2E-03
			Atrazine	1E-09	- -	2E-09	- -	3E-09	General Toxicity/Cardiovascular	1E-05	- -	2E-05	3E-05
			Bis(2-chloroethyl)ether	3E-09	- -	7E-10	- -	3E-09	N/A	N/A	- -	N/A	N/A
			Dibenz(a,h)anthracene	1E-09	- -	N/A	- -	1E-09	N/A	N/A	- -	N/A	N/A
			Naphthalene	N/A	- -	N/A	- -	N/A	General Toxicity	1E-06	- -	8E-06	1E-05
			Phenanthrene	N/A	- -	N/A	- -	N/A	General Toxicity	3E-06	- -	N/A	3E-06
			Dieldrin	7E-10	- -	5E-09	- -	6E-09	Liver	6E-05	- -	4E-04	5E-04
			Aluminum	N/A	- -	N/A	- -	N/A	Developmental	2E-03	- -	1E-02	1E-02
			Antimony	N/A	- -	N/A	- -	N/A	General Toxicity	3E-03	- -	1E-03	4E-03
			Arsenic	1E-06	- -	1E-07	- -	2E-06	Skin	2E-01	- -	2E-02	2E-01
			Barium	N/A	- -	N/A	- -	N/A	Kidney	1E-03	- -	1E-03	2E-03
			Cadmium (drinking water)	N/A	- -	N/A	- -	N/A	Kidney	1E-02	- -	1E-02	3E-02
			Chromium (VI)	N/A	- -	N/A	- -	N/A	GI System	9E-04	- -	5E-03	5E-03
			Cobalt	N/A	- -	N/A	- -	N/A	N/A	N/A	- -	N/A	N/A
			Manganese (other media)	N/A	- -	N/A	- -	N/A	CNS	8E-02	- -	1E-01	2E-01
			Vanadium	N/A	- -	N/A	- -	N/A	Kidney	8E-04	- -	2E-03	3E-03
			Chemical Total	2E-06	- -	7E-07	- -	2E-06		3E-01	- -	2E-01	5E-01
			Radionuclide Total										
		Exposure Point Total						2E-06					5E-01
	Exposure Medium Total							2E-06					5E-01
Medium Total								2E-06					5E-01

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Receptor Total								2E-06					5E-01

- - = Not Evaluated
N/A = Not Applicable

Total Risk Across All Media: 2E-06

Total Hazard Across All Media: 5E-01

Using the NCEA low-end slope factor for TCE, the risk for this receptor would change to	2E-06
Using the CalEPA slope factor for TCE, the risk for this receptor would change to	2E-06
Using the low-end slope factor for benzene, the risk for this receptor would change to	2E-06

Total Blood HI =	2E-05
Total Cardiovascular HI =	3E-05
Total Reproductive HI =	N/A
Total General Toxicity HI =	6E-03
Total GI System HI =	6E-03
Total Immune System HI =	3E-03
Total Kidney HI =	3E-02
Total Liver HI =	3E-02
Total CNS HI =	2E-01
Total Skin HI =	2E-01
Total Eye HI =	N/A
Total Respiratory HI =	2E-03
Total Developmental HI =	1E-02

TABLE 9.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk Young Child + Adult					Non-Carcinogenic Hazard Quotient Young Child				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Site-Wide (Overburden and Bedrock Combined)											
			1,1,2,2-Tetrachloroethane	3E-07	- -	3E-08	- -	3E-07	N/A	N/A	- -	N/A	N/A
			1,2-Dichloroethane	4E-05	- -	2E-06	- -	4E-05	N/A	N/A	- -	N/A	N/A
			1,2-Dichloropropane	N/A	- -	N/A	- -	N/A	Blood	4E-03	- -	2E-04	4E-03
			1,4-Dichlorobenzene	3E-06	- -	2E-06	- -	5E-06	N/A	N/A	- -	N/A	N/A
			Benzene	6E-05	- -	7E-06	- -	6E-05	Immune System	1E+00	- -	1E-01	2E+00
			Bromochloromethane	N/A	- -	N/A	- -	N/A	N/A	N/A	- -	N/A	N/A
			Carbon Tetrachloride	3E-04	- -	6E-05	- -	3E-04	Liver	2E+01	- -	3E+00	2E+01
			Chlorobenzene	N/A	- -	N/A	- -	N/A	Liver	2E-01	- -	5E-02	3E-01
			Chloroethane	N/A	- -	N/A	- -	N/A	N/A	N/A	- -	N/A	N/A
			cis-1,3-Dichloropropene	2E-05	- -	1E-06	- -	2E-05	GI System	3E-02	- -	2E-03	3E-02
			Tetrachloroethene	4E-04	- -	2E-04	- -	6E-04	Liver	4E-01	- -	1E-01	5E-01
			Trichloroethene	5E-04	- -	7E-05	- -	6E-04	Liver	2E+01	- -	3E+00	3E+01
			Vinyl Chloride	7E-05	- -	2E-06	- -	7E-05	Liver	2E-02	- -	9E-04	2E-02
			Xylene (total)	N/A	- -	N/A	- -	N/A	General Toxicity	1E-01	- -	5E-02	2E-01
			2-Methylnaphthalene	N/A	- -	N/A	- -	N/A	Respiratory	3E-02	- -	4E-02	7E-02
			3-Nitroaniline	N/A	- -	N/A	- -	N/A	N/A	N/A	- -	N/A	N/A
			Atrazine	7E-06	- -	8E-07	- -	8E-06	General Toxicity/Cardiovascular	5E-03	- -	4E-04	6E-03
			Bis(2-chloroethyl)ether	1E-05	- -	3E-07	- -	1E-05	N/A	N/A	- -	N/A	N/A
			Dibenz(a,h)anthracene	6E-06	- -	N/A	- -	6E-06	N/A	N/A	- -	N/A	N/A
			Naphthalene	N/A	- -	N/A	- -	N/A	General Toxicity	5E-03	- -	2E-03	7E-03
			Phenanthrene	N/A	- -	N/A	- -	N/A	General Toxicity	1E-02	- -	N/A	1E-02
			Dieldrin	4E-06	- -	2E-06	- -	6E-06	Liver	2E-02	- -	1E-02	4E-02

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk Young Child + Adult					Non-Carcinogenic Hazard Quotient Young Child				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Aluminum	N/A	- -	N/A	- -	N/A	Developmental	7E-01	- -	3E-01	1E+00
			Antimony	N/A	- -	N/A	- -	N/A	General Toxicity	1E+00	- -	3E-02	1E+00
			Arsenic	7E-03	- -	4E-05	- -	7E-03	Skin	9E+01	- -	4E-01	9E+01
			Barium	N/A	- -	N/A	- -	N/A	Kidney	4E-01	- -	3E-02	4E-01
			Cadmium (drinking water)	N/A	- -	N/A	- -	N/A	Kidney	4E+00	- -	4E-01	5E+00
			Chromium (VI)	N/A	- -	N/A	- -	N/A	GI System	1E+00	- -	4E-01	1E+00
			Cobalt	N/A	- -	N/A	- -	N/A	N/A	N/A	- -	N/A	N/A
			Lead	N/A	- -	N/A	- -	N/A	CNS	N/A	- -	N/A	N/A
			Manganese (drinking water	N/A	- -	N/A	- -	N/A	CNS	9E+01	- -	1E+01	1E+02
			Nickel	N/A	- -	N/A	- -	N/A	General Toxicity	1E+00	- -	3E-02	1E+00
			Silver	N/A	- -	N/A	- -	N/A	Skin	4E-01	- -	3E-02	5E-01
			Vanadium	N/A	- -	N/A	- -	N/A	Kidney	3E-01	- -	5E-02	4E-01
			Inhalation from Bathing										
			1,1,2,2-Tetrachloroethane	- -	1E-07	- -	- -	1E-07	N/A	- -	N/A	- -	N/A
			1,1-Dichloroethane	- -	N/A	- -	- -	N/A	Kidney	- -	1E-02	- -	1E-02
			1,2,3-Trichlorobenzene	- -	N/A	- -	- -	N/A	N/A	- -	N/A	- -	N/A
			1,2-Dichloroethane	- -	2E-05	- -	- -	2E-05	N/A	- -	N/A	- -	N/A
			1,2-Dichloropropane	- -	N/A	- -	- -	N/A	Respiratory	- -	3E-02	- -	3E-02
			1,4-Dichlorobenzene	- -	N/A	- -	- -	N/A	Liver	- -	1E-03	- -	1E-03
			Benzene	- -	2E-05	- -	- -	2E-05	Immune System	- -	3E-01	- -	3E-01
			Bromochloromethane	- -	N/A	- -	- -	N/A	N/A	- -	N/A	- -	N/A
			Carbon Tetrachloride	- -	6E-05	- -	- -	6E-05	GI System/ Developmental/CNS	- -	4E-01	- -	4E-01
			Chlorobenzene	- -	N/A	- -	- -	N/A	Liver	- -	1E-01	- -	1E-01
			Chloroethane	- -	N/A	- -	- -	N/A	Developmental	- -	1E-04	- -	1E-04
			Chloromethane	- -	N/A	- -	- -	N/A	CNS	- -	1E-02	- -	1E-02
			cis-1,2-Dichloroethene	- -	N/A	- -	- -	N/A	Liver	- -	2E-03	- -	2E-03
			cis-1,3-Dichloropropene	- -	1E-06	- -	- -	1E-06	Respiratory	- -	6E-02	- -	6E-02
			Methyl tert-butyl ether	- -	5E-09	- -	- -	5E-09	Liver/Kidney	- -	1E-04	- -	1E-04
			Tetrachloroethene	- -	8E-06	- -	- -	8E-06	CNS	- -	2E-02	- -	2E-02
			trans-1,2-Dichloroethene	- -	N/A	- -	- -	N/A	Respiratory/Liver	- -	5E-03	- -	5E-03
			Trichloroethene	- -	3E-04	- -	- -	3E-04	Liver/CNS	- -	2E-01	- -	2E-01
			Vinyl Chloride	- -	7E-07	- -	- -	7E-07	Liver	- -	1E-03	- -	1E-03
			Xylene (total)	- -	N/A	- -	- -	N/A	CNS	- -	3E-01	- -	3E-01
			2-Methylnaphthalene	- -	N/A	- -	- -	N/A	Respiratory	- -	4E-02	- -	4E-02
			Bis(2-chloroethyl)ether	- -	7E-07	- -	- -	7E-07	N/A	- -	N/A	- -	N/A
			Naphthalene	- -	N/A	- -	- -	N/A	Respiratory	- -	4E-02	- -	4E-02
			Phenanthrene	- -	N/A	- -	- -	N/A	Respiratory	- -	1E-02	- -	1E-02
			Chemical Total	9E-03	4E-04	4E-04	- -	1E-02		2E+02	2E+00	2E+01	3E+02

TABLE 9.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk Young Child + Adult					Non-Carcinogenic Hazard Quotient Young Child				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Radionuclide Total										
		Exposure Point Total						1E-02					3E+02
	Exposure Medium Total							1E-02					3E+02
	Indoor Air (Vapor Intrusion)	Site-Wide Overburden											
			Carbon Tetrachloride	- -	1E-05	- -	- -	1E-05	Liver	- -	5E-02	- -	5E-02
			Tetrachloroethene	- -	9E-07	- -	- -	9E-07	Liver	- -	1E-03	- -	1E-03
			Trichloroethene	- -	2E-06	- -	- -	2E-06	Liver	- -	1E-03	- -	1E-03
			Chemical Total	- -	2E-05	- -	- -	2E-05		- -	6E-02	- -	6E-02
			Radionuclide Total										
		Exposure Point Total						2E-05					6E-02
	Exposure Medium Total							2E-05					6E-02
Medium Total								1E-02					3E+02
Receptor Total								1E-02					3E+02

- - = Not Evaluated
N/A = Not Applicable

Total Risk Across All Media: 1E-02

Total Hazard Across All Media: 3E+02

Using the NCEA low-end slope factor and unit risk for TCE, the risk for this receptor would change to	9E-03
Using the CalEPA slope factor and unit risk for TCE, the risk for this receptor would change to	9E-03
Using the low-end slope factor and unit risk for benzene, the risk for this receptor would change to	1E-02

Total Blood HI =	4E-03
Total Cardiovascular HI =	6E-03
Total Reproductive HI =	N/A
Total General Toxicity HI =	3E+00
Total GI System HI =	2E+00
Total Immune System HI =	2E+00
Total Kidney HI =	5E+00
Total Liver HI =	5E+01
Total CNS HI =	1E+02
Total Skin HI =	9E+01
Total Eye HI =	N/A
Total Respiratory HI =	2E-01
Total Developmental HI =	1E+00

TABLE 10.1.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Young Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk Young Child + Adult					Non-Carcinogenic Hazard Quotient Young Child				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Site-Wide (Overburden and Bedrock Combined)											
			1,2-Dichloroethane	4E-05	2E-05	2E-06	- -	6E-05					
			1,4-Dichlorobenzene	3E-06	N/A	2E-06	- -	5E-06					
			Benzene	6E-05	2E-05	7E-06	- -	8E-05	Immune System	1E+00	3E-01	1E-01	2E+00
			Carbon Tetrachloride	3E-04	6E-05	6E-05	- -	4E-04	Liver	2E+01	4E-01	3E+00	2E+01
			cis-1,3-Dichloropropene	2E-05	1E-06	1E-06	- -	2E-05					
			Tetrachloroethene	4E-04	8E-06	2E-04	- -	6E-04					
			Trichloroethene	5E-04	3E-04	7E-05	- -	9E-04	Liver	2E+01	2E-01	3E+00	3E+01
			Vinyl Chloride	7E-05	7E-07	2E-06	- -	7E-05					
			Atrazine	7E-06	- -	8E-07	- -	8E-06					
			Bis(2-chloroethyl)ether	1E-05	7E-07	3E-07	- -	1E-05					
			Dibenz(a,h)anthracene	6E-06	- -	N/A	- -	6E-06					
			Dieldrin	4E-06	- -	2E-06	- -	6E-06					
			Arsenic	7E-03	- -	4E-05	- -	7E-03	Skin	9E+01	- -	4E-01	9E+01
			Cadmium (drinking water)						Kidney	4E+00	- -	4E-01	5E+00
			Manganese (drinking water)						CNS	9E+01	- -	1E+01	1E+02
			Chemical Total	9E-03	4E-04	4E-04	- -	1E-02		2E+02	9E-01	2E+01	2E+02
			Radionuclide Total										
		Exposure Point Total						1E-02					2E+02
	Exposure Medium Total							1E-02					2E+02
Medium Total								1E-02					2E+02
Receptor Total								1E-02					2E+02

- - = Not Evaluated
N/A = Not Applicable

Total Risk Across All Media: 1E-02

Total Hazard Across All Media: 2E+02

Total Blood HI =	N/A
Total Cardiovascular HI =	N/A
Total Reproductive HI =	N/A
Total General Toxicity HI =	N/A
Total GI System HI =	N/A
Total Immune System HI =	2E+00
Total Kidney HI =	5E+00
Total Liver HI =	5E+01
Total CNS HI =	1E+02
Total Skin HI =	9E+01
Total Eye HI =	N/A
Total Respiratory HI =	N/A
Total Developmental HI =	N/A

ATTACHMENTS

ATTACHMENT 1

DATA TABLES

- **WINTER 2005/2006 GROUNDWATER DETECTIONS**
- **HISTORICAL VERSUS WINTER 2005/2006 GROUNDWATER RESULTS**
- **WINTER 2005/2006 VOC TICs**
- **WINTER 2005/2006 SVOC TICs**

WINTER 2005/2006
GROUNDWATER DETECTIONS

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	MW-01 NX 12/14/2005	MW-01A NX 12/15/2005	MW-01B NX 12/14/2005	MW-01C NX 12/14/2005	MW-202B NX 2/20/2006	MW-202D NX 2/20/2006	MW-202S NX 2/20/2006	MW-203B NX 12/15/2005	MW-203D NX 12/15/2005	MW-203S NX 12/15/2005	MW-204S NX 12/15/2005	MW-205S NX 12/15/2005	MW-206D NX 12/13/2005	MW-206S NX 12/13/2005	MW-207B AV 12/13/2005	MW-208B NX 12/16/2005
VOCs (ug/L)																	
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.16 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.3	0.5 U
1,1,2,2-Tetrachloroethane	0.055	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.077 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.6	0.063 J
1,1-Dichloroethene	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	4.6	0.5 U
1,2,3-Trichlorobenzene	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	37	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.27 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.3 J	0.5 U
1,2-Dichloroethane	0.12	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.095 J	0.5 U	0.5 U	0.5 U	0.5 U	2.6	1.7
1,2-Dichloropropane	0.16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.68	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.16 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	7.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.15 J	0.5 U
Acetone	550	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	0.35	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Benzene, (1-methylethyl)-	0.84	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.17	0.5 U	0.5 U	0.5 U	0.5 U	0.16 J	0.5 U	120	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.10 J	0.5 U
Chlorobenzene	11	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.16 J	0.5 U
Chloroethane	4.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Chloromethane	6.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
cis-1,2-Dichloroethene	6.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.36 J	0.5 U
cis-1,3-Dichloropropene	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cyclohexane	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.23 J	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Ethylbenzene	130	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.98 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl acetate	610	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	1.8 J	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	11	0.5 U	0.16 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 J	1.4	0.5 U	0.5 U	0.5 U	0.44 J	0.69	0.15 J	0.5 U
Methylcyclohexane	71	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.25 J	0.5 U	0.86	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	4.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.065 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.23 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12	0.5 U
Toluene	72	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	12	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.028	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	9.1	0.5 U
Trichlorofluoromethane	18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.71	0.5 U
Vinyl Chloride	0.02	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene (total)	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.29 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SVOCs (ug/L)																	
2,4-Dimethylphenol	73	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
2,4-Dinitrotoluene	7.3	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
2,6-Dinitrotoluene	3.6	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
2-Methylnaphthalene	0.62	0.2 U	0.21 U	0.23 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.23 U	0.21 U	0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U
2-Methylphenol	180	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
3-Nitroaniline	1.1	20 U	21 U	23 U	20 U	20 U	20 U	20 UJ	23 U	21 U	21 U	21 U	21 U	20 U	20 U	20 U	21 U
4,6-Dinitro-2-methylphenol	0.36	20 U	21 U	23 U	20 U	20 U	20 U	20 UJ	23 U	21 U	0.11 J	21 U	21 U	20 U	20 U	20 U	21 U
4-Methylphenol	18	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Acenaphthene	37	0.2 U	0.21 U	0.044 J	0.2 U	0.2 U	0.2 U	0.25 J	0.23 U	0.035 J	0.21 U	0.038 J	0.033 J	0.2 U	0.2 U	0.2 U	0.21 U
Acenaphthylene	0.62	0.012 J	0.21 U	0.23 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.23 U	0.21 U	0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U
Anthracene	180	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Atrazine	0.3	1 U	0.19 J	1.1 U	1 U	-- R	1.9 J	-- R	1.1 U	0.27 J	1 U	1.1 U	1.1 U	1 U	1 U	0.26 J	1 U
Benzaldehyde	360	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Benzo(g,h,i)perylene	0.62	0.2 U	0.21 U	0.23 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.23 U	0.21 U	0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.2 U	0.035 J
Bis(2-chloroethyl)ether	0.01	0.05 U	0.53 U	0.57 U	0.05 U	0.5 U	0.5 U	0.5 UJ	0.57 U	0.53 U	0.52 U	0.53 U	0.53 U	0.05 U	0.05 U	0.40 J	0.52 U
Bis(2-ethylhexyl)phthalate	4.8	0.2 U	2.1 UJ	2.3 UJ	0.2 U	2 UJ	2 UJ	2 UJ	2.3 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ	0.2 U	0.2 U	0.2 U	2.1 UJ
Butylbenzylphthalate	730	5 U	5.3 U	5.7 U	5 U	5 U	5 U	0.5 J	5.7 UJ	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 UJ
Dibenz(a,h)anthracene	0.0092	0.1 U	0.11 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.11 U	0.11 U	0.1 U	0.11 U	0.11 U	0.1 U	0.1 U	0.1 U	0.026 J
Dibenzofuran	1.2	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Dimethylphthalate	36000	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 UJ	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 UJ
Di-n-octylphthalate	150	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 UJ	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 UJ
Fluoranthene	150	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	0.13 J	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Fluorene	24	5 U	5.3 U	5.7 U	5 U	5 UJ	5 UJ	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Indeno(1,2,3-cd)pyrene	0.092	0.1 U	0.11 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.11 U	0.11 U	0.1 U	0.11 U	0.11 U	0.1 U	0.1 U	0.1 U	0.03 J
Isophorone	71	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Naphthalene	0.62	0.2 U	0.21 U	0.23 U	0.2 U	0.2 U	0.2 U	0.24 J	0.23 U	0.21 U	0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U
N-Nitrosodiphenylamine	N/A	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Phenanthrene	0.62	0.012 J	0.21 U	0.012 J	0.2 U	0.2 U	0.2 U	0.2 UJ	0.23 U	0.015 J	0.21 U	0.21 U	0.011 J	0.2 U	0.2 U	0.2 U	0.21 U

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	MW-01 NX 12/14/2005	MW-01A NX 12/15/2005	MW-01B NX 12/14/2005	MW-01C NX 12/14/2005	MW-202B NX 2/20/2006	MW-202D NX 2/20/2006	MW-202S NX 2/20/2006	MW-203B NX 12/15/2005	MW-203D NX 12/15/2005	MW-203S NX 12/15/2005	MW-204S NX 12/15/2005	MW-205S NX 12/15/2005	MW-206D NX 12/13/2005	MW-206S NX 12/13/2005	MW-207B AV 12/13/2005	MW-208B NX 12/16/2005
Phenol	1100	5 U	5.3 U	5.7 U	5 U	5 U	5 U	5 UJ	5.7 U	5.3 U	5.2 U	5.3 U	5.3 U	5 U	5 U	5 U	5.2 U
Pyrene	18	0.2 U	0.21 U	0.23 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.23 U	0.31	0.21 U	0.21 U	0.21 U	0.2 U	0.2 U	0.2 U	0.21 U
Pesticides/PCBs (ug/L)																	
4,4'-DDT	0.2	NA	NA	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	NA	0.01 U	NA	0.01 U	0.01 UJ	NA
alpha-Chlordane	0.19	NA	NA	NA	NA	NA	NA	0.005 UJ	NA	NA	0.005 UJ	NA	0.005 U	NA	0.005 U	0.005 UJ	NA
delta-BHC	0.011	NA	NA	NA	NA	NA	NA	0.005 UJ	NA	NA	0.005 UJ	NA	0.005 U	NA	0.005 U	0.005 UJ	NA
Dieldrin	0.0042	NA	NA	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	NA	0.01 U	NA	0.01 U	0.01 UJ	NA
Endosulfan II	22	NA	NA	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	NA	0.01 U	NA	0.01 U	0.01 UJ	NA
Endrin Ketone	1.1	NA	NA	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	NA	0.01 U	NA	0.01 U	0.01 UJ	NA
Metals (ug/L)																	
Aluminum	50	2660 J	5390 J	176	23.4 J	1380	70.2	88.4	52.2 J	42.3 J	22.6 J	171 J	50 UJ	50 UJ	21.2 J	1455 J	66.7
Antimony	1.5	2 U	2 U	2 U	2 U	2 UJ	2 UJ	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	2 U
Arsenic	0.045	4.3	5.8	0.21 J	0.054 J	3.5	0.5 U	17.2	0.86	1.5	5.8	2.5	0.39 J	0.25 J	0.62	5.8 J	4.2
Barium	260	33.5	44	15.1	26.9	7.2 J	18	12.3	22.5	23.8	32.1	353	13.2	52.3	52.4	174	29.1
Beryllium	4	0.29 J	0.48 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.38 J	1 U	1 U	1 U	10 U	1 U
Cadmium	1.8	7.1	1.8	22.3	0.15 J	0.28 J	0.063 J	0.14 J	0.65 J	0.088 J	1 U	0.97 J	0.11 J	0.19 J	0.59 J	0.83 J	1 U
Calcium	N/A	14300	16800	17000	13400	13800	15800	19300	22400	30000	11700	126000	3120 J	29700	25800	1775000	43200
Chromium	11	2.1	8.2	0.9 J	2 U	0.81 J	0.21 J	1.8 J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	0.31 J
Cobalt	73	1.8	2	1.2	1 U	1 U	1 U	1 U	0.51 J	0.92 J	2.8	224	0.59 J	1.8	0.68 J	10 U	5
Copper	150	24	11.7	14.6	2 U	2 U	2 U	2 U	2 U	2.1 U	2 U	4.4	7.6	2 U	2 U	20 U	2 UJ
Iron	300	10400 J	1990 J	20500	100 UJ	324 J	100 UJ	6360	30.6 J	568 J	20400 J	29800 J	280 J	100 UJ	226 UJ	1290 J	276
Lead	15	28.8	10.5	6	1 U	0.83 J	0.86 J	0.58 J	0.51 J	0.36 J	1 U	7.4	6.3	1 U	1 U	5.5 J	0.37 J
Magnesium	N/A	3740 J	3610 J	2950 J	1780 J	2290 J	2800 J	2830 J	3560 J	5900	2570 J	26200	5000 U	7030	5260	196000	8190
Manganese	50	287 J	93.9 J	290	106 J	81.8	12.2	220	29.7 J	256 J	1010 J	22400 J	397 J	57.8 J	532 J	431 J	281
Mercury	1.1	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.083 J	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.895 J	0.2 UJ
Nickel	73	7.9	6.6	9.2	1 U	1 U	1 UJ	1 U	1 U	1.1 U	1.4	41.1	4.7	2.1	3.2	10 U	1.4 J
Potassium	N/A	1720 J	2070 J	1920 J	1840 J	910 J	2160 J	3250 J	3440 J	3310 J	2920 J	8140	1080 J	5140	5010	39100	3630 J
Selenium	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.61 J	5 U	5 U	5 U	50 U	5 UJ
Silver	18	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	23	1 U
Sodium	N/A	9660	18700	18500	11600	17600	16700	22300	12300	14600	38400	141000	32600	97200	97400	2955000	17400
Vanadium	3.6	2.4 J	8.2 J	0.94 J	0.19 UJ	2.2 J	0.2 J	0.42 J	0.75 J	0.14 J	0.89 J	0.41 J	0.046 J	0.073 J	0.15 J	2.4 J	0.31 J
Zinc	1100	88.2 J	23.4 J	69.2	4.1 UJ	7 U	2.4 U	4.4 U	29.7 J	8.2 UJ	4.6 UJ	21.1 J	8.1 UJ	9.8 UJ	3.1 UJ	27.5 UJ	4.6 J
1,4-Dioxanes (ug/L)																	
1,4-Dioxane	3	NA	2 U	NA	2 U	NA	NA	NA	NA	2.9	2 U	NA	NA	2 U	NA	1.3 J	NA

Notes
NX - Normal Field Sample
AV - Average of Field Duplicates
PAL - Project Action Limit
Shaded values indicate exceedance of PAL
NA - Not Analyzed

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	MW-208D NX 12/16/2005	MW-208S NX 12/16/2005	MW-209B NX 12/21/2005	MW-210S NX 12/20/2005	MW-211D NX 12/20/2005	MW-211S NX 12/20/2005	MW-212B NX 12/20/2005	MW-212D AV 12/20/2005	MW-213B NX 12/19/2005	MW-213D NX 12/19/2005	MW-213S AV 12/19/2005	MW-214S NX 12/19/2005	MW-215B NX 12/19/2005	MW-301B NX 2/23/2006	MW-301D NX 2/23/2006	MW-301S NX 2/23/2006
VOCs (ug/L)																	
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.055	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.39 J	0.5 U	1.3	0.5 U	0.5 U	0.5 U	1.4	0.5 U	1.8	1.4	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5	0.57 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	37	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.62 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.12	0.5 U	0.5 U	21	0.5 U	0.5 U	0.5 U	1.6	0.5 U	4.6	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	0.5 U	0.5 U	0.5 U	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Acetone	550	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U
Benzene	0.35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene, (1-methylethyl)-	0.84	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.17	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	11	0.5 U	0.5 U	0.5 U	5.7	1.2	0.5 U	0.5 U	0.5 U	1.2	0.68	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	4.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.74 U	1.5 U	0.5 U
Chloromethane	6.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	6.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.9	0.98	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.4	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Cyclohexane	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.35 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Dichlorodifluoromethane	1.4	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	130	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl acetate	610	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	11	0.5 U	0.5 U	2.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.21 J	3.4
Methylcyclohexane	71	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	4.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	72	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 J	0.13 J	0.5 U
trans-1,2-Dichloroethene	12	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.028	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	16	4.8	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.02	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene (total)	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SVOCs (ug/L)																	
2,4-Dimethylphenol	73	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 U	5 U
2,4-Dinitrotoluene	7.3	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 U	5 U
2,6-Dinitrotoluene	3.6	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 U	5 U
2-Methylnaphthalene	0.62	0.22 U	0.22 U	0.2 UJ	0.26 UJ	0.2 UJ	0.33 UJ	0.2 UJ	0.2 UJ	0.21 U	0.2 UJ	5.8 U	0.077 J	0.23 U	0.2 U	0.2 U	0.2 U
2-Methylphenol	180	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 U	5 U
3-Nitroaniline	1.1	22 U	22 U	20 U	20 U	20 U	20 U	20 U	20 U	21 U	20 U	20 U	21 U	23 U	20 U	20 U	20 U
4,6-Dinitro-2-methylphenol	0.36	22 U	22 U	20 U	20 U	20 U	20 U	20 U	20 U	21 U	20 U	20 U	21 U	23 U	20 U	20 U	20 U
4-Methylphenol	18	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 U	5 U
Acenaphthene	37	0.22 U	0.22 U	0.2 UJ	0.26 UJ	0.2 UJ	0.33 UJ	0.2 UJ	0.2 UJ	0.21 U	0.2 UJ	0.94 J	1	0.23 U	0.2 U	0.2 UJ	0.2 U
Acenaphthylene	0.62	0.22 U	0.22 U	0.2 UJ	0.26 UJ	0.2 UJ	0.33 UJ	0.2 UJ	0.2 UJ	0.21 U	0.2 UJ	5 UJ	0.015 J	0.23 U	0.2 U	0.2 U	0.2 U
Anthracene	180	5.4 U	5.6 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5.2 U	5 UJ	0.74 J	0.49 J	5.7 U	5 U	5 U	5 U
Atrazine	0.3	1.1 U	1.1 U	-- R	5 U	5 U	5 U	5 U	5 U	1 U	5 U	5 U	0.36 J	1.1 U	-- R	-- R	-- R
Benzaldehyde	360	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	1.8 J	5.3 U	5.7 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	0.62	0.074 J	0.066 J	0.2 UJ	0.26 UJ	0.2 UJ	0.33 UJ	0.2 UJ	0.2 UJ	0.024 J	0.2 UJ	5 U	0.033 J	0.036 J	0.2 U	0.2 U	0.2 U
Bis(2-chloroethyl)ether	0.01	0.54 U	0.56 U	0.32 J	0.66 UJ	0.5 UJ	0.82 UJ	0.1 J	0.51 UJ	0.31 J	0.5 UJ	-- R	0.53 U	0.57 U	0.5 U	0.5 U	0.5 U
Bis(2-ethylhexyl)phthalate	4.8	2.2 UJ	2.2 UJ	0.5 UJ	2.6 UJ	2 UJ	3.3 UJ	2 UJ	1.9 J	2.1 UJ	2 UJ	5 U	2.1 UJ	2.3 UJ	2 UJ	2 UJ	2 UJ
Butylbenzylphthalate	730	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 UJ	5 U
Dibenz(a,h)anthracene	0.0092	0.05 J	0.05 J	0.1 UJ	0.13 UJ	0.1 UJ	0.16 UJ	0.1 UJ	0.1 UJ	0.019 J	0.1 UJ	5 U	0.024 J	0.027 J	0.1 U	0.1 U	0.1 U
Dibenzofuran	1.2	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	0.90 J	5.3 U	5.7 U	5 U	5 U	5 U
Dimethylphthalate	36000	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 UJ	5 U
Di-n-octylphthalate	150	5.4 U	5.6 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5.2 U	5 UJ	5 UJ	5.3 U	5.7 U	5 U	5 UJ	5 U
Fluoranthene	150	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	0.98 J	5.7 U	5 U	5 U	5 U
Fluorene	24	5.4 U	5.6 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5.2 U	5 UJ	1.2 J	1.8 J	5.7 U	5 UJ	5 UJ	5 UJ
Indeno(1,2,3-cd)pyrene	0.092	0.051 J	0.057 J	0.1 UJ	0.13 UJ	0.1 UJ	0.16 UJ	0.1 UJ	0.1 UJ	0.021 J	0.1 UJ	5 U	0.025 J	0.027 J	0.1 U	0.1 U	0.1 U
Isophorone	71	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 U	5 U
Naphthalene	0.62	0.22 U	0.22 U	0.2 UJ	0.065 J	0.2 UJ	0.33 UJ	0.2 UJ	0.2 UJ	0.21 U	0.2 UJ	-- R	0.2 U	0.23 U	0.2 U	0.2 U	0.2 U
N-Nitrosodiphenylamine	N/A	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	0.4 J	5.3 U	5.7 U	5 U	5 U	5 U
Phenanthrene	0.62	0.22 U	0.22 U	0.2 UJ	0.26 UJ	0.2 UJ	0.33 UJ	0.2 UJ	0.2 UJ	0.017 J	0.2 UJ	0.32 J	2.1	0.016 J	0.2 U	0.2 U	0.2 U

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	MW-208D NX 12/16/2005	MW-208S NX 12/16/2005	MW-209B NX 12/21/2005	MW-210S NX 12/20/2005	MW-211D NX 12/20/2005	MW-211S NX 12/20/2005	MW-212B NX 12/20/2005	MW-212D AV 12/20/2005	MW-213B NX 12/19/2005	MW-213D NX 12/19/2005	MW-213S AV 12/19/2005	MW-214S NX 12/19/2005	MW-215B NX 12/19/2005	MW-301B NX 2/23/2006	MW-301D NX 2/23/2006	MW-301S NX 2/23/2006
Phenol	1100	5.4 U	5.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5.3 U	5.7 U	5 U	5 U	5 U
Pyrene	18	0.22 U	0.22 U	0.2 UJ	0.26 UJ	0.2 UJ	0.33 UJ	0.2 UJ	0.2 UJ	0.21 U	0.2 UJ	0.12 J	0.46	0.23 U	0.2 U	0.2 UJ	0.2 U
Pesticides/PCBs (ug/L)																	
4,4'-DDT	0.2	NA	NA	NA	NA	NA	0.01 U	NA	NA	NA	NA	0.013 J	0.01 UJ	NA	NA	NA	0.01 U
alpha-Chlordane	0.19	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA	NA	-- R	0.005 UJ	NA	NA	NA	0.005 UJ
delta-BHC	0.011	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA	NA	-- R	0.005 UJ	NA	NA	NA	0.005 U
Dieldrin	0.0042	NA	NA	NA	NA	NA	0.01 U	NA	NA	NA	NA	-- R	0.01 UJ	NA	NA	NA	0.01 UJ
Endosulfan II	22	NA	NA	NA	NA	NA	0.01 U	NA	NA	NA	NA	0.016 J	0.01 UJ	NA	NA	NA	0.01 U
Endrin Ketone	1.1	NA	NA	NA	NA	NA	0.01 U	NA	NA	NA	NA	0.020 J	0.01 UJ	NA	NA	NA	0.01 U
Metals (ug/L)																	
Aluminum	50	50 U	89.8	50 U	50 U	50 U	50 U	25.5 J	50 U	610	56.8	50 U	50 U	117	3740	7070	46.4 J
Antimony	1.5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	0.045	0.11 J	101	4.4	66.1	281	99.5	32.9	20	5.1	0.42 J	1.7	88.8	4.2	2.7	7	22.1
Barium	260	36.2	38.9	36.4	40.4	44.1	32.1	13.8	62	16.3	57.3	837	41.2	3.9 J	23.9	84.8	104
Beryllium	4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.37 J	0.43 J	1 U
Cadmium	1.8	0.1 J	1 U	1 U	1 U	1 U	1 U	1 U	0.079 J	1.2	1 U	0.075 J	1 U	0.088 J	1 U	0.061 J	1 U
Calcium	N/A	20400	9980	62600	44900	80800	30700	55800	23750	44100	39600	125500	8000	16800	9010	13500	58800
Chromium	11	2 U	0.77 J	2 U	0.24 J	2 U	0.38 J	2 U	0.21 J	5.1	0.17 J	4.1	0.083 J	0.27 J	7	32.2	0.35 J
Cobalt	73	0.73 J	3.5	2.6	3.5	10.6	1.6	8	2.6	7.7	2.7	0.74 J	2.3	1 U	1.3	4.3	0.5 J
Copper	150	2 UJ	2.9 UJ	0.52 J	2 UJ	2 U	2 UJ	3	2 UJ	11.2 J	2.2 UJ	3.4 UJ	2 UJ	2 UJ	3.7 U	9.8	2 U
Iron	300	100 U	21400	2250	21100	53800	37000	2560	5105	2150	400	12000	57400	100 U	1570	13300	15400
Lead	15	1 UJ	1.9 J	1 U	1 UJ	1 U	1 UJ	0.37 J	0.38 J	17.3 J	0.32 J	3.35 J	0.36 J	0.37 J	2.8	4.3	1 U
Magnesium	N/A	3050 J	1740 J	22600	4480 J	12000	3600 J	5420	3770 J	6140	7280	23750	1360 J	4040 J	2640 J	5200	6590
Manganese	50	1690	1050	1290	2770	5140	1180	2770	1041	270	224	774	4550	30.7	130	238	599
Mercury	1.1	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ
Nickel	73	1 J	3.3 J	0.35 J	2 J	4.4	1.3 J	3.4	1.4 J	5.5 J	3.1 J	9.7 J	1 J	0.44 J	4.1	10.9	1 UJ
Potassium	N/A	1560 J	2680 J	6020	6540 J	12600	5220 J	3290 J	3250 J	3460 J	4500 J	21800 J	878 J	2460 J	2060 J	6240	4300 J
Selenium	18	5 UJ	5 UJ	5 U	5 UJ	0.18 J	5 UJ	5 U	5 UJ	5 UJ	5 UJ	2.7 J	5 UJ	5 UJ	5 U	5 U	5 U
Silver	18	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	N/A	24000	13700	25500	11000	22800	4900 J	63500	73450	54700	79200	203500	8000	15900	22300	27900	15300
Vanadium	3.6	1 UJ	2 J	1 UJ	1 UJ	1 UJ	0.36 J	1 J	0.58 J	1.6 J	1 UJ	1 J	1 UJ	1.3 J	5.2	16	0.27 J
Zinc	1100	2 U	8.3 J	1.2 J	2 U	1.9 J	2 U	5.2	2.6 U	32.9 J	2.2 U	31 J	86.3 J	9.6 J	11.2	24.2	2 U
1,4-Dioxanes (ug/L)																	
1,4-Dioxane	3	NA	NA	NA	NA	NA	NA	NA	NA	1.5 J	NA	NA	NA	NA	NA	2 U	2 U

Notes
NX - Normal Field Sample
AV - Average of Field Duplicates
PAL - Project Action Limit
Shaded values indicate exceedance of PAL
NA - Not Analyzed

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	MW-302S NX 2/20/2006	MW-303S NX 2/20/2006	MW-304B NX 2/21/2006	MW-304D AV 2/21/2006	MW-304S NX 2/21/2006	MW-305D NX 2/21/2006	MW-305S NX 2/21/2006	MW-306S NX 2/23/2006	MW-307B NX 2/22/2006	MW-307D NX 2/22/2006	MW-307S NX 2/22/2006	MW-308B NX 2/22/2006	OW-01 NX 12/20/2005	OW-02 NX 12/20/2005	OW-07 NX 2/22/2006	OW-08 NX 2/22/2006
VOCs (ug/L)																	
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.072 J	0.5 U	0.5 U	0.5 U	22
1,1,2,2-Tetrachloroethane	0.055	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.47 J	0.5 U	0.5 U	3.5 J	0.066 J	0.5 U	1	3.8	0.089 J	2.7	1.4	0.5 U	0.34 J	38
1,1-Dichloroethene	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.23 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	37	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.52	0.5 U	0.5 U	0.5 U	0.95	0.5 U	0.38 J	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.12	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4.8	0.5 U	0.5 U	23	11	0.5 U	8.5	0.74	0.5 U	0.54 U	2.7 U
1,2-Dichloropropane	0.16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.21 J
1,3-Dichlorobenzene	18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.37 J	0.5 U	0.5 U	0.5 U	0.42 J	0.5 U	0.26 J	0.5 U	0.5 U	0.5 U	1.6
Acetone	550	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.4	5 U	5 U	5 U	5 U	5 U
Benzene	0.35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.29 J	0.5 U	0.5 U	0.5 U	0.5 U	6.6 J	0.2 J	0.5 U	0.5 U	0.5 U	59
Benzene, (1-methylethyl)-	0.84	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	N/A	0.5 U	0.5 U	0.27 J	0.057 J	0.5 U	0.26 J	0.5 U	0.5 U	0.25 J	0.5 U	0.5 U	1.4	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.17	0.5 U	0.39 J	0.5 U	0.5 U	0.5 U	0.23 J	0.5 U	0.5 U	0.5 U	0.22 J	0.42 J	0.27 J	0.5 U	0.5 U	0.5 U	0.36 J
Chlorobenzene	11	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	46
Chloroethane	4.6	0.5 U	0.5 U	1.4 U	0.5 U	0.5 U	4.5 J	0.57 U	0.5 U	2.5	0.5 U	0.5 U	7.2	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	6.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3 J	0.5 U	0.5 U	0.5 U	1.2	0.22 J	7.1	0.5 U	0.5 U	1.6	0.58
cis-1,2-Dichloroethene	6.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.2 J	0.5 U	0.5 U	0.5 U	0.5 U	8.6
Cyclohexane	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.19 J	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3.5 J	0.5 U	0.5 U	0.5 U	0.5 U	0.39 J
Ethylbenzene	130	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.52
Methyl acetate	610	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	11	0.5 U	0.5 U	0.5 U	1.0	0.5 U	0.38 J	0.5 U	0.5 U	0.5 U	0.29 J	0.5 U	0.27 J	0.5 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	71	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.7 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	4.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.1	0.5 U	0.5 U	0.5 U	0.34 J	0.085 J	0.5 U	1.6	0.5 U	0.5 U	0.26 J	0.5 U	0.26 J	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	72	0.5 U	0.5 U	0.5 U	0.46 J	0.5 U	0.058 J	0.5 U	0.5 U	0.078 J	0.5 U	0.25 J	0.083 J	0.5 U	0.5 U	0.5 U	0.52
trans-1,2-Dichloroethene	12	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.52 J	0.5 U	0.5 U	0.5 U	0.14 J	0.5 U	2.1	0.5 U	0.5 U	0.58	0.5 U
Trichloroethene	0.028	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.37 J	0.4 J	0.5 U	0.5 U	0.96	0.5 U	75	1.5	0.5 U	4.6	0.13 J
Trichlorofluoromethane	18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.02	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.66	0.74	0.5 U	0.5 U	0.5 U	0.5 U
Xylene (total)	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	250 J	0.5 U	0.5 U	0.5 U	0.5 U	4.8
SVOCs (ug/L)																	
2,4-Dimethylphenol	73	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.52 J	5 U	5 U	1.1 J	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	3.6	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Methylnaphthalene	0.62	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24 UJ	0.23 UJ	0.2 U	0.2 U
2-Methylphenol	180	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.48 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitroaniline	1.1	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4,6-Dinitro-2-methylphenol	0.36	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methylphenol	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.97 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acenaphthene	37	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24 UJ	0.23 UJ	0.2 U	0.2 U
Acenaphthylene	0.62	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24 UJ	0.23 UJ	0.2 U	0.2 U
Anthracene	180	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 U
Atrazine	0.3	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	5 U	5 UJ	-- R	-- R
Benzaldehyde	360	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	0.62	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24 UJ	0.23 UJ	0.2 U	0.2 U
Bis(2-chloroethyl)ether	0.01	0.5 U	0.5 U	0.058 J	0.5 U	0.5 U	0.55	0.059 J	0.5 U	0.53	0.7	0.5 U	0.66	0.065 J	0.58 UJ	0.093 J	0.5 U
Bis(2-ethylhexyl)phthalate	4.8	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2.4 UJ	2.3 UJ	2 UJ	2 UJ
Butylbenzylphthalate	730	5 U	5 U	0.19 J	5 U	5 UJ	0.71 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibenz(a,h)anthracene	0.0092	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.12 UJ	0.12 UJ	0.1 U	0.1 U
Dibenzofuran	1.2	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dimethylphthalate	36000	5 U	5 U	5 UJ	5 U	5 UJ	5 U	5 U	0.54 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Di-n-octylphthalate	150	5 U	5 U	5 UJ	5 U	5 UJ	5 U	5 U	0.58 J	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 U
Fluoranthene	150	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.64 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Fluorene	24	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	0.56 J	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Indeno(1,2,3-cd)pyrene	0.092	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.12 UJ	0.12 UJ	0.1 U	0.1 U
Isophorone	71	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	0.62	0.2 U	0.2 U	0.028 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.53	0.2 U	0.24 UJ	0.23 UJ	0.2 U	0.2 U
N-Nitrosodiphenylamine	N/A	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Phenanthrene	0.62	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.049 J	0.2 U	0.24 UJ	0.23 UJ	0.2 U	0.2 U

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	MW-302S NX 2/20/2006	MW-303S NX 2/20/2006	MW-304B NX 2/21/2006	MW-304D AV 2/21/2006	MW-304S NX 2/21/2006	MW-305D NX 2/21/2006	MW-305S NX 2/21/2006	MW-306S NX 2/23/2006	MW-307B NX 2/22/2006	MW-307D NX 2/22/2006	MW-307S NX 2/22/2006	MW-308B NX 2/22/2006	OW-01 NX 12/20/2005	OW-02 NX 12/20/2005	OW-07 NX 2/22/2006	OW-08 NX 2/22/2006
Phenol	1100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.7
Pyrene	18	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24 UJ	0.23 UJ	0.2 U	0.2 U
Pesticides/PCBs (ug/L)																	
4,4'-DDT	0.2	NA	NA	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.0066 J	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	0.01 UJ
alpha-Chlordane	0.19	NA	NA	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	NA	NA	NA	NA	0.005 UJ	NA	NA	0.005 UJ	0.005 UJ
delta-BHC	0.011	NA	NA	0.005 UJ	0.005 UJ	0.0054	0.005 UJ	0.005 UJ	NA	NA	NA	NA	0.005 UJ	NA	NA	0.005 UJ	0.005 UJ
Dieldrin	0.0042	NA	NA	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.013	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	0.01 UJ
Endosulfan II	22	NA	NA	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	0.01 UJ
Endrin Ketone	1.1	NA	NA	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	NA	NA	NA	NA	0.01 UJ	NA	NA	0.01 UJ	0.01 UJ
Metals (ug/L)																	
Aluminum	50	275	77.6	11.2 J	151	50 U	25.7 J	55.8	13.3 J	149	42.9 J	74.9	87.5	50 U	50 U	60.6	28 J
Antimony	1.5	3.7 J	2.6 J	2 UJ	3.3 J	4.2 J	2 UJ	2 UJ	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 U	2 UJ	2 UJ
Arsenic	0.045	1.1	16.1	6.4	0.56	0.5 U	3.8	3.3	14.5	10.6	2.8	8.6	1.4	2.4	11.9	7.2	14.4
Barium	260	43.4	75.4	14.5	20	12.2	22.9	68.2	15.5	11.1	35.8	41.3	26.5	2.6 J	26.1	32.4	23.7
Beryllium	4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	1.8	0.061 J	1 U	1 U	0.077 J	0.082 J	0.15 J	1 U	1 U	1 U	1 U	1 U	0.12 J	0.18 J	0.38 J	1 U	1 U
Calcium	N/A	31200	26000	87000	13750	6510	46100	97300	62400	14000	41300	86800	45900	71300	36700	44200	37700
Chromium	11	0.5 J	0.31 J	2 U	0.33 J	2 U	0.22 J	0.25 J	0.36 J	2 U	2 U	0.45 J	0.29 J	0.095 J	0.15 J	2 U	0.48 J
Cobalt	73	1 U	1.1 U	1 U	1 U	1 U	2 U	2.7	0.23 J	1 U	4.5	1.3 U	3.1	0.4 J	2.2	1.2 U	1 U
Copper	150	2.7 U	2 U	2 U	2 U	2 U	5 U	2.5 U	2.1 U	2 U	3.1 U	2 U	2.7 U	2 UJ	2 UJ	2.2 U	2 U
Iron	300	881	12100	100 UJ	100 UJ	100 UJ	100 UJ	100 UJ	645	100 UJ	100 UJ	161 J	100 UJ	100 U	1280	1270	3160
Lead	15	2.5	7.9	0.16 J	0.35 J	1 U	1 U	1 U	1 U	0.13 J	1 U	0.12 J	0.15 J	1 UJ	0.24 J	0.25 J	0.11 J
Magnesium	N/A	1040 J	2070 J	10900	2300 J	1040 J	6030	4140 J	2010 J	4080 J	8530	4940 J	7890	6700	5110	7870	6580
Manganese	50	45.1	346	75.7	138	6.6	6440	1730	205	37.3	133	409	149	158	2320	2110	567
Mercury	1.1	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ
Nickel	73	1.9 U	1 U	2.2 U	1.4 U	1 U	4.6	2.8	1 UJ	1 U	3.6	11.8	3.9	1.2 J	2.5 J	1 U	1 U
Potassium	N/A	1880 J	3130 J	9100 J	3310 J	1110 J	7940 J	4800 J	2830 J	2720 J	5680 J	3820 J	6620 J	2090 J	3050 J	4600 J	5850 J
Selenium	18	5 U	5 U	5 U	0.93 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 U
Silver	18	1 U	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Sodium	N/A	9470	15200	193000	18150	5090	195000	22100	8640	26400	135000	7680	104000	36000	77700	48400	39500
Vanadium	3.6	0.46 J	0.27 J	0.38 J	0.37 J	1 U	0.41 J	3.3 J	0.38 J	0.53 J	0.49 J	12.4	0.33 J	0.31 J	0.51 J	0.31 J	0.43 J
Zinc	1100	10	24.3	2 U	4.8 U	62.2	2.1 U	2 U	2 U	2 U	2 U	3 U	3.6 U	2 U	2 U	2 U	2 U
1,4-Dioxanes (ug/L)																	
1,4-Dioxane	3	NA	NA	NA	2 U	NA	1.7 J	2 U	NA	NA	NA	NA	2	NA	NA	NA	NA

Notes
NX - Normal Field Sample
AV - Average of Field Duplicates
PAL - Project Action Limit
Shaded values indicate exceedance of PAL
NA - Not Analyzed

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	OW-09 NX 12/15/2005	OW-10 NX 12/15/2005	OW-12 NX 12/15/2005	OW-20 NX 12/21/2005	OW-25 NX 12/13/2005	OW-26 NX 12/13/2005	OW-35 NX 12/21/2005	OW-37 NX 12/21/2005	OW-38 NX 12/21/2005	OW-49 NX 12/14/2005	OW-50 NX 12/14/2005	OW-51 NX 12/14/2005
VOCs (ug/L)													
1,1,1-Trichloroethane	200	0.66	0.64	0.5 U	9.1	0.94	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.055	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	4.8	4.7	0.5 U	11	1.6	0.28 J	0.5 U	1.7	15	1.3	0.23 J	0.5 U
1,1-Dichloroethene	7	0.5 U	0.5 U	0.5 U	4.8 J	0.5 U	0.5 U	0.5 U	0.26 J	1.7	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	37	1.4	1.5	0.5 U	0.46 J	0.29 J	0.41 J	0.5 U	0.5 U	0.5 U	0.35 J	0.5 U	0.5 U
1,2-Dichloroethane	0.12	2.6	2.6	0.5 U	0.66	1.3	0.5 U	0.5 U	0.47 J	0.5 U	5	0.5 U	0.5 U
1,2-Dichloropropane	0.16	0.5 U	0.5 U	0.5 U	0.56	0.81	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	0.32 J	0.31 J	0.5 U	0.6	0.5 U	0.27 J	0.5 U	0.5 U	1.7	0.14 J	0.5 U	0.5 U
Acetone	550	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	0.35	0.5 U	0.5 U	0.37 J	0.26 J	0.5 U	0.5 U	0.5 U	0.5 U	0.63	0.5 U	0.5 U	0.5 U
Benzene, (1-methylethyl)-	0.84	0.5 U	0.5 U	0.34 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.17	0.5 U	0.5 U	0.5 U	7.8 J	0.5 U	0.5 U	0.5 U	0.56	37	0.5 U	0.5 U	0.5 U
Chlorobenzene	11	0.86	0.87	0.5 U	0.5 U	0.17 J	0.41 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	4.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	6.7	0.5 U	0.5 U	0.5 U	3.2	0.5 U	0.5 U	0.5 U	0.11 J	0.48 J	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	6.1	0.87	0.85	0.24 J	0.5 UJ	0.6	0.31 J	0.5 U	0.5 U	0.5 U	2.4	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.4	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Cyclohexane	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	130	0.5 U	0.5 U	0.43 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 J	0.5 U	0.5 U	0.5 U
Methyl acetate	610	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	11	0.089 J	0.5 U	0.093 J	0.98	0.25 J	0.5 U	0.5 U	0.5 U	0.11 J	0.26 J	1.4	0.62
Methylcyclohexane	71	0.5 U	0.5 U	0.16 J	0.76	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	4.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.1	3.2	3.2	0.5 U	39	4.4	0.5 U	0.5 U	1.3	14	0.5 U	0.5 U	0.5 U
Toluene	72	0.5 U	0.5 U	0.32 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	12	0.093 J	0.076 J	0.5 U	0.21 J	0.5 U	0.096 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.028	2.2	2.2	0.5 U	7 J	3.2	0.08 J	0.5 U	0.28 J	2	7.8	0.18 J	0.5 U
Trichlorofluoromethane	18	0.5 U	0.5 U	0.5 U	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.02	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene (total)	21	0.5 U	0.5 U	1.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SVOCs (ug/L)													
2,4-Dimethylphenol	73	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	7.3	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	6.7	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	3.6	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	1.3 J	5 U	5 U	5 U	5 U
2-Methylnaphthalene	0.62	0.23 U	0.23 U	1.2	0.1 J	0.2 U	0.2 U	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U
2-Methylphenol	180	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitroaniline	1.1	23 U	23 U	23 U	20 U	20 U	20 U	20 U	6.2 J	20 U	20 U	20 U	20 U
4,6-Dinitro-2-methylphenol	0.36	23 U	23 U	23 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methylphenol	18	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acenaphthene	37	0.044 J	0.035 J	0.23 U	0.2 UJ	0.2 U	0.2 U	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U
Acenaphthylene	0.62	0.23 U	0.23 U	0.23 U	0.2 UJ	0.2 U	0.2 U	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U
Anthracene	180	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Atrazine	0.3	1.1 U	0.13 J	1.1 U	-- R	0.28 J	1 U	-- R	-- R	-- R	1 U	1 U	1 U
Benzaldehyde	360	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	2 J	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	0.62	0.23 U	0.23 U	0.23 U	0.2 UJ	0.097 J	0.2 U	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U
Bis(2-chloroethyl)ether	0.01	0.44 J	0.058 J	0.57 U	0.5 UJ	0.02 J	0.11 J	0.5 UJ	0.5 UJ	0.5 UJ	0.21 J	0.034 J	0.058 J
Bis(2-ethylhexyl)phthalate	4.8	2.3 UJ	2.3 UJ	2.3 UJ	0.5 UJ	0.2 U	0.38 U	0.5 UJ	0.5 UJ	0.5 UJ	0.2 U	0.2 U	0.23 U
Butylbenzylphthalate	730	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibenz(a,h)anthracene	0.0092	0.11 U	0.11 U	0.11 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.1 U
Dibenzofuran	1.2	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dimethylphthalate	36000	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.015 J
Di-n-octylphthalate	150	5.7 U	5.7 U	5.7 U	5 UJ	5 U	5 U	5 UJ	5 UJ	5 UJ	5 U	5 U	5 U
Fluoranthene	150	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Fluorene	24	5.7 U	5.7 U	0.46 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	0.092	0.11 U	0.11 U	0.11 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.1 U
Isophorone	71	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	0.77 J	5 U	5 U	5 U	5 U
Naphthalene	0.62	0.23 U	0.23 U	1.1	0.2 UJ	0.2 U	0.2 U	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U
N-Nitrosodiphenylamine	N/A	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Phenanthrene	0.62	0.23 U	0.23 U	0.23 U	0.04 J	0.083 J	0.031 J	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U

GROUNDWATER SAMPLING RESULTS - WINTER 2005-2006 - DETECTS ONLY

ANALYTE	PAL	OW-09 NX 12/15/2005	OW-10 NX 12/15/2005	OW-12 NX 12/15/2005	OW-20 NX 12/21/2005	OW-25 NX 12/13/2005	OW-26 NX 12/13/2005	OW-35 NX 12/21/2005	OW-37 NX 12/21/2005	OW-38 NX 12/21/2005	OW-49 NX 12/14/2005	OW-50 NX 12/14/2005	OW-51 NX 12/14/2005
Phenol	1100	5.7 U	5.7 U	5.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pyrene	18	0.039 J	0.23 U	0.23 U	0.2 UJ	0.095 J	0.2 U	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U
Pesticides/PCBs (ug/L)													
4,4'-DDT	0.2	0.01 U	NA	NA	0.01 U	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA
alpha-Chlordane	0.19	0.0051 J	NA	NA	0.005 U	NA	0.005 U	0.005 U	NA	NA	NA	NA	NA
delta-BHC	0.011	0.005 U	NA	NA	0.005 U	NA	0.005 U	0.005 U	NA	NA	NA	NA	NA
Dieldrin	0.0042	0.01 U	NA	NA	0.01 U	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA
Endosulfan II	22	0.01 U	NA	NA	0.01 U	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA
Endrin Ketone	1.1	0.01 U	NA	NA	0.01 U	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA
Metals (ug/L)													
Aluminum	50	3200	1870	419	50 U	61.7 J	81.7 J	50 U	50 U	50 U	50 UJ	643 J	23.2 J
Antimony	1.5	2 U	2 U	2 U	2 U	20 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	0.045	1.5	0.25 J	13.6	10.7	2 J	24.7	8.3	7.4	8.1	0.48 J	6.9	23.1
Barium	260	105	62.4	11.8	69.8	313	5.1 J	21.8	107	19.8	36.3	25.8	30
Beryllium	4	3.1 J	1.6 J	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	0.1 J	1 U
Cadmium	1.8	18.3	0.96 J	0.051 J	0.056 J	1.3 J	1 U	1 U	1 U	0.41 J	0.43 J	0.18 J	1 U
Calcium	N/A	304000	51900	25700	34700	563000	19800	43300	105000	25200	52100	22600	25000
Chromium	11	1.4 J	0.32 J	0.16 J	2 U	20 U	1.1 J	2 U	2 U	2 U	2 U	1.4 J	2 U
Cobalt	73	341	41.5	0.28 J	24.7	12.2	1 U	0.53 J	5.3	1.5	2.1	4.4	2
Copper	150	135 J	8.6 J	2 UJ	1 J	20 U	2 U	0.77 J	0.66 J	0.66 J	2 U	3.2 U	2 U
Iron	300	770	443	293	9160	489 J	100 UJ	536	8000	619	606 J	1230 J	8750 J
Lead	15	6.1 J	0.6 J	1 UJ	1 U	10 U	0.78 J	0.73 J	1 U	1 U	1 U	1.1	1 U
Magnesium	N/A	60800	9500	5000 U	5350	74700	1190 J	12500	19700	5440	10600	4550 J	4460 J
Manganese	50	22600	2820	82.2	3480	5970 J	7.6 J	327	1390	1700	516 J	1350 J	1470 J
Mercury	1.1	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ
Nickel	73	286 J	36.2 J	2.2 J	11.4	10 U	1.6	1	1.4	0.48 J	1.7	1.7	1 U
Potassium	N/A	17900 J	3150 J	18800 J	6660	47300	3620 J	3280 J	11400	3270 J	4600 J	4150 J	3600 J
Selenium	18	5 UJ	0.15 J	5 UJ	5 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	18	0.63 J	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	N/A	311000	68800	39800	111000	4070000	141000	15400	122000	23200	34400	36000	41700
Vanadium	3.6	1.4 J	1 UJ	1.1 J	1 UJ	1.4 J	0.64 J	1 UJ	1 UJ	0.35 J	0.25 J	2.6 J	1.2 J
Zinc	1100	357 J	80.9 J	2 U	4.6	45.9 UJ	10.2 UJ	2.3	2.4	2.9	6.4 UJ	14.8 J	8.7 UJ
1,4-Dioxanes (ug/L)													
1,4-Dioxane	3	NA	NA	NA	NA	NA	NA	NA	NA	2 U	NA	0.59 J	NA

Notes
NX - Normal Field Sample
AV - Average of Field Duplicates
PAL - Project Action Limit
Shaded values indicate exceedance of PAL
NA - Not Analyzed

HISTORICAL VERSUS WINTER 2005/2006 GROUNDWATER RESULTS

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-01A NX 4/10/1995	MW-01A NX 7/28/1995	MW-01A NX 12/15/2005	MW-01C NX 4/10/1995	MW-01C NX 7/28/1995	MW-01C NX 12/14/2005	MW-202B NX 3/30/1995	MW-202B NX 7/19/1995	MW-202B NX 2/20/2006	MW-202D NX 3/29/1995	MW-202D AV 7/19/1995	MW-202D NX 2/20/2006	MW-202S NX 3/29/1995	MW-202S NX 7/19/1995	MW-202S NX 2/20/2006
VOCs (ug/L)															
1,1,1-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.077 J
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 UJ	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.27 J
1,2-Dichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.16 J
1,4-Dichlorobenzene	10 UJ	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	7.5
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Acetone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	1.1 J
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ
Bromoform	10 UJ	10 U	0.5 U	10 UJ	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Bromomethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.16 J	10 U	10 U	0.5 U	10 U	10 U	120
Chlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	3 J	10 U	0.5 U
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.23 J
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.98 J
Methyl acetate	NA	NA	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methyl tert-butyl ether	NA	NA	0.16 J	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.25 J
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
trans-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Trichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.29 J
SVOCs (ug/L)															
1,1'-Biphenyl	NA	NA	5.3 UJ	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 UJ
1,2,4,5-Tetrachlorobenzene	NA	NA	5.3 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 UJ
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5.3 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
2,4,5-Trichlorophenol	25 U	25 U	21 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 UJ
2,4,6-Trichlorophenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
2,4-Dichlorophenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
2,4-Dimethylphenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 UJ	5 U	10 U	10 UJ	5 U	10 U	10 UJ	5 UJ
2,4-Dinitrophenol	25 U	25 U	21 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 UJ
2,4-Dinitrotoluene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
2,6-Dinitrotoluene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-01A NX 4/10/1995	MW-01A NX 7/28/1995	MW-01A NX 12/15/2005	MW-01C NX 4/10/1995	MW-01C NX 7/28/1995	MW-01C NX 12/14/2005	MW-202B NX 3/30/1995	MW-202B NX 7/19/1995	MW-202B NX 2/20/2006	MW-202D NX 3/29/1995	MW-202D AV 7/19/1995	MW-202D NX 2/20/2006	MW-202S NX 3/29/1995	MW-202S NX 7/19/1995	MW-202S NX 2/20/2006
2-Chloronaphthalene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
2-Chlorophenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
2-Methylnaphthalene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 UJ	10 U	0.2 U	10 UJ	10 U	0.2 UJ
2-Methylphenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
2-Nitroaniline	25 U	25 U	21 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 UJ
2-Nitrophenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
3,3'-Dichlorobenzidine	10 U	10 U	5.3 U	10 U	10 U	5 UJ	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
3-Nitroaniline	25 U	25 U	21 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 UJ
4,6-Dinitro-2-methylphenol	25 U	25 U	21 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 UJ
4-Bromophenyl-phenylether	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
4-Chloro-3-methylphenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
4-Chloroaniline	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
4-Chlorophenyl-phenylether	10 U	10 U	5.3 UJ	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
4-Methylphenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 UJ
4-Nitroaniline	25 U	25 U	21 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 UJ
4-Nitrophenol	25 U	25 U	21 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 UJ
Acenaphthene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.25 J
Acenaphthylene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 UJ
Acetophenone	NA	NA	5.3 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 UJ
Anthracene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 UJ	10 UJ	5 U	10 U	10 UJ	5 U	10 U	10 UJ	5 UJ
Atrazine	NA	NA	0.19 J	NA	NA	1 U	NA	NA	R	NA	NA	1.9 J	NA	NA	R
Benzaldehyde	NA	NA	5.3 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 UJ
Benzo(a)anthracene	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 UJ
Benzo(a)pyrene	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 UJ
Benzo(b)fluoranthene	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 UJ
Benzo(g,h,i)perylene	10 UJ	10 U	0.21 U	10 UJ	10 U	0.2 U	10 U	10 U	0.2 U	10 UJ	10 U	0.2 U	10 UJ	10 U	0.2 UJ
Benzo(k)fluoranthene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 UJ
Bis(2-chloroethoxy)methane	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Bis(2-chloroethyl)ether	10 U	10 U	0.53 U	10 U	10 U	0.05 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ
Bis(2-ethylhexyl)phthalate	10 U	10 U	2.1 UJ	10 U	10 U	0.2 U	10 U	10 U	2 UJ	10 U	10 U	2 UJ	10 U	3 J	2 UJ
Butylbenzylphthalate	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	0.5 J
Caprolactam	NA	NA	5.3 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 UJ
Carbazole	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
Chrysene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ
Dibenz(a,h)anthracene	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 UJ
Dibenzofuran	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Diethylphthalate	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Dimethylphthalate	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Di-n-butylphthalate	10 U	10 U	5.3 UJ	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Di-n-octylphthalate	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Fluoranthene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Fluorene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ
Hexachlorobenzene	10 U	10 U	1.1 U	10 U	10 U	1 U	10 U	10 U	1 U	10 U	10 U	1 U	10 U	10 U	1 UJ
Hexachlorobutadiene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Hexachlorocyclopentadiene	10 U	10 U	5.3 U	10 U	10 U	5 U	R	10 UJ	5 U	10 UJ	10 UJ	5 U	10 UJ	10 UJ	5 UJ
Hexachloroethane	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 UJ
Isophorone	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Naphthalene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.24 J
Nitrobenzene	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
N-Nitroso-di-n-propylamine	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
N-Nitrosodiphenylamine	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Pentachlorophenol	25 U	25 U	1.1 U	25 U	25 U	1 U	25 U	25 U	1 U	25 U	25 U	1 U	25 U	25 U	1 UJ
Phenanthrene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 UJ
Phenol	10 U	10 U	5.3 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ
Pyrene	10 U	10 U	0.21 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 UJ
Pesticides/PCBs (ug/L)															
4,4'-DDD	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.0008 J	0.005 U	0.01 UJ
4,4'-DDE	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.006 U	0.005 U	0.01 UJ
4,4'-DDT	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.006 U	0.005 U	0.01 UJ
Aldrin	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
alpha-BHC	0.003 U	0.003 UJ	NA	0.003 U	0.003 UJ	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-01A NX 4/10/1995	MW-01A NX 7/28/1995	MW-01A NX 12/15/2005	MW-01C NX 4/10/1995	MW-01C NX 7/28/1995	MW-01C NX 12/14/2005	MW-202B NX 3/30/1995	MW-202B NX 7/19/1995	MW-202B NX 2/20/2006	MW-202D NX 3/29/1995	MW-202D AV 7/19/1995	MW-202D NX 2/20/2006	MW-202S NX 3/29/1995	MW-202S NX 7/19/1995	MW-202S NX 2/20/2006
alpha-Chlordane	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
beta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
delta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
Dieldrin	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.006 U	0.005 U	0.01 UJ
Endosulfan I	0.003 UJ	0.003 UJ	NA	0.003 UJ	0.003 UJ	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
Endosulfan II	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.006 U	0.005 U	0.01 UJ
Endosulfan Sulfate	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.006 U	0.005 U	0.01 UJ
Endrin	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.005 U	0.006 U	NA	0.006 U	0.005 U	0.01 UJ
Endrin Aldehyde	0.009 U	0.009 U	NA	0.008 U	0.009 U	NA	0.008 U	0.009 U	NA	0.0009 J	0.009 U	NA	0.009 U	0.008 U	0.01 UJ
Endrin Ketone	0.006 U	0.007 U	NA	0.006 U	0.007 U	NA	0.006 U	0.007 U	NA	0.006 U	0.007 U	NA	0.007 U	0.006 U	0.01 UJ
gamma-BHC(Lindane)	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
gamma-Chlordane	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
Heptachlor	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
Heptachlor Epoxide	0.003 UJ	0.003 UJ	NA	0.003 UJ	0.003 UJ	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
Methoxychlor	0.03 U	0.03 U	NA	0.03 U	0.03 U	NA	0.03 U	0.04 U	NA	0.03 U	0.03 U	NA	0.03 U	0.03 U	0.05 UJ
Toxaphene	0.32 U	0.33 U	NA	0.32 U	0.33 U	NA	0.31 U	0.35 U	NA	0.31 U	0.33 U	NA	0.34 U	0.31 U	0.5 UJ
Aroclor-1016	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.06 U	0.05 U	0.1 U
Aroclor-1221	0.11 U	0.11 U	NA	0.11 U	0.11 U	NA	0.1 U	0.12 U	NA	0.1 U	0.11 U	NA	0.11 U	0.1 U	0.2 U
Aroclor-1232	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.06 U	0.05 U	0.1 U
Aroclor-1242	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.06 U	0.05 U	0.1 U
Aroclor-1248	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.06 U	0.05 U	0.1 U
Aroclor-1254	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.06 U	0.05 U	0.1 U
Aroclor-1260	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA	0.02 J	0.05 U	0.1 U
Metals (ug/L)															
Aluminum	25 U	77.3 U	5390 J	246	235 U	23.4 J	178 U	649	1380	25 U	131 U	70.2	157 U	234 U	88.4
Antimony	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 UJ	3 U	1.9 U	2.0 UJ	3 U	1.9 U	2.0 UJ
Arsenic	8 U	2.7 U	5.8	8 U	2.7 U	0.054 J	8 U	3.3	3.5	8 U	2.7 U	0.50 U	8 U	2.7 U	17.2
Barium	5.9	5.9 U	44.0	35.9	27 U	26.9	5.1 U	7.5 U	7.2 J	31.7	29.85	18.0	11.7	12.6	12.3
Beryllium	1 U	0.17 U	0.48 J	1 U	0.24 U	1.0 U	1 U	0.53 U	1.0 U	1 U	0.47 U	1.0 U	1 U	0.53 U	1.0 U
Cadmium	2 U	0.5 U	1.8	2 U	0.5 U	0.15 J	2 U	0.5 U	0.28 J	2 U	0.5 U	0.063 J	2 U	0.5 U	0.14 J
Calcium	10600	10800	16800	8230	6280	13400	12000	11000	13800	24800	21050	15800	12500	11100	19300
Chromium	5 U	0.7 U	8.2	5 U	0.7 U	2.0 U	5 U	1.1 U	0.81 J	5 U	0.7 U	0.21 J	5 U	1.2 U	1.8 J
Cobalt	2 U	0.5 U	2.0	2 U	0.5 U	1.0 U	2 U	0.5 U	1.0 U	2 U	1.3 U	1.0 U	2 U	0.8 U	1.0 U
Copper	3 U	0.5 U	11.7	3 U	0.5 U	2.0 U	3 U	1.4 U	2.0 U	3 U	0.83 U	2.0 U	3 U	1.6 U	2.0 U
Iron	30 U	14.5 U	1990 J	205	39.6 U	100 UJ	158	403	324 J	30 U	15.075 J	100 UJ	1950	1780	6360
Lead	3 UJ	1.6 U	10.5	3 UJ	1.6 U	1.0 U	3 UJ	1.6 UJ	0.83 J	3 UJ	1.6 UJ	0.86 J	3 UJ	1.6 UJ	0.58 J
Magnesium	2220	2200	3610 J	1330	953	1780 J	1980	1760	2290 J	3630	3215	2800 J	4550	3680	2830 J
Manganese	1.9	1.8 U	93.9 J	218	184	106 J	64.5	210	81.8	262	65.8	12.2	72.5	56.4	220
Mercury	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ
Nickel	10 U	2.4 U	6.6	10 U	2.4 U	1.0 U	10 U	2.4 U	1.0 U	10 U	3.9	1.0 UJ	10 U	2.4 U	1.0 U
Potassium	1190	1310	2070 J	589	602 U	1840 J	1210	1260	910 J	3700	3200	2160 J	3120	2990	3250 J
Selenium	5 U	3.4 U	5.0 U	5 U	3.4 U	5.0 U	5 UJ	3.4 U	5.0 U	5 UJ	3.4 U	5.0 U	5 UJ	3.4 U	5.0 U
Silver	R	0.6 U	1.0 U	R	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U
Sodium	11700	13700 J	18700	9430	8210 J	11600	17300	18400	17600	28900	30700	16700	15900	14600	22300
Thallium	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 U	8 UJ	3.6 U	0.50 U	8 UJ	3.6 U	0.50 U	8 UJ	3.6 U	0.50 U
Vanadium	2 U	0.6 U	8.2 J	2 U	0.6 U	0.19 UJ	2 U	1.1	2.2 J	2 U	0.59 J	0.20 J	2 U	1.5	0.42 J
Zinc	4.8	1.2 U	23.4 J	4 U	1.2 U	4.1 UJ	4 U	44.9	7.0 U	4 U	11.5 U	2.4 U	4 U	10 U	4.4 U
1,4-Dioxanes (ug/L)															
1,4-Dioxane	NA	NA	2.0 U	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-203B NX 3/30/1995	MW-203B NX 7/19/1995	MW-203B NX 12/15/2005	MW-203D NX 3/29/1995	MW-203D NX 7/19/1995	MW-203D NX 12/15/2005	MW-203S NX 3/29/1995	MW-203S NX 7/19/1995	MW-203S NX 12/15/2005	MW-204S NX 3/31/1995	MW-204S NX 7/21/1995	MW-204S NX 12/15/2005	MW-205S NX 4/3/1995	MW-205S NX 7/21/1995	MW-205S NX 12/15/2005
VOCs (ug/L)															
1,1,1-Trichloroethane	10 U	10 U	0.5 U	4 J	6 J	0.16 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	3 J	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethane	10 U	10 U	0.5 U	3 J	3 J	1.5	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 U	NA	NA	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.095 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	16	5 U	10 UJ	10 U	5 U
Acetone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Bromoform	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.62 U
Bromomethane	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroform	3 J	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Methyl acetate	NA	NA	0.5 UJ	NA	NA	1.8 J	NA	NA	0.5 U	NA	NA	0.5 UJ	NA	NA	0.5 UJ
Methyl tert-butyl ether	NA	NA	0.1 J	NA	NA	1.4	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.86	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.065 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	10 U	10 U	0.23 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
trans-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U
Trichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
SVOCs (ug/L)															
1,1'-Biphenyl	NA	NA	5.7 UJ	NA	NA	5.3 UJ	NA	NA	5.2 UJ	NA	NA	5.3 UJ	NA	NA	5.3 UJ
1,2,4,5-Tetrachlorobenzene	NA	NA	5.7 U	NA	NA	5.3 U	NA	NA	5.2 U	NA	NA	5.3 U	NA	NA	5.3 U
2,2'-Oxybis(1-chloropropane)	10 UJ	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
2,4,5-Trichlorophenol	25 U	25 U	23 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U
2,4,6-Trichlorophenol	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
2,4-Dichlorophenol	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
2,4-Dimethylphenol	10 U	10 UJ	5.7 U	10 U	10 UJ	5.3 U	10 U	10 UJ	5.2 U	10 U	10 UJ	5.3 U	10 U	10 UJ	5.3 U
2,4-Dinitrophenol	25 U	25 U	23 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U
2,4-Dinitrotoluene	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
2,6-Dinitrotoluene	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-203B NX 3/30/1995	MW-203B NX 7/19/1995	MW-203B NX 12/15/2005	MW-203D NX 3/29/1995	MW-203D NX 7/19/1995	MW-203D NX 12/15/2005	MW-203S NX 3/29/1995	MW-203S NX 7/19/1995	MW-203S NX 12/15/2005	MW-204S NX 3/31/1995	MW-204S NX 7/21/1995	MW-204S NX 12/15/2005	MW-205S NX 4/3/1995	MW-205S NX 7/21/1995	MW-205S NX 12/15/2005
2-Chloronaphthalene	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
2-Chlorophenol	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
2-Methylnaphthalene	10 U	10 U	0.23 U	10 UJ	10 U	0.21 U	10 UJ	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U
2-Methylphenol	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
2-Nitroaniline	25 U	25 U	23 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U
2-Nitrophenol	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
3,3'-Dichlorobenzidine	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
3-Nitroaniline	25 U	25 U	23 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U
4,6-Dinitro-2-methylphenol	25 U	25 U	23 U	25 U	25 U	21 U	25 U	25 U	0.11 J	25 U	25 U	21 U	25 U	25 U	21 U
4-Bromophenyl-phenylether	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
4-Chloro-3-methylphenol	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
4-Chloroaniline	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
4-Chlorophenyl-phenylether	10 U	10 U	5.7 UJ	10 U	10 U	5.3 UJ	10 U	10 U	5.2 UJ	10 U	10 U	5.3 UJ	10 U	10 U	5.3 UJ
4-Methylphenol	10 U	10 U	5.7 U	10 UJ	10 U	5.3 U	10 UJ	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
4-Nitroaniline	25 U	25 U	23 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U
4-Nitrophenol	25 U	25 U	23 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U	25 U	25 U	21 U
Acenaphthene	10 U	10 U	0.23 U	10 U	10 U	0.035 J	10 U	10 U	0.21 U	10 U	10 U	0.038 J	10 U	10 U	0.033 J
Acenaphthylene	10 U	10 U	0.23 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U
Acetophenone	NA	NA	5.7 U	NA	NA	5.3 U	NA	NA	5.2 U	NA	NA	5.3 U	NA	NA	5.3 U
Anthracene	10 UJ	10 UJ	5.7 U	10 U	10 UJ	5.3 U	10 U	10 UJ	5.2 U	10 UJ	10 UJ	5.3 U	10 UJ	10 UJ	5.3 U
Atrazine	NA	NA	1.1 U	NA	NA	0.27 J	NA	NA	1 U	NA	NA	1.1 U	NA	NA	1.1 U
Benzaldehyde	NA	NA	5.7 U	NA	NA	5.3 U	NA	NA	5.2 U	NA	NA	5.3 U	NA	NA	5.3 U
Benzo(a)anthracene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U	10 U	10 U	0.11 U
Benzo(a)pyrene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U	10 U	10 U	0.11 U
Benzo(b)fluoranthene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U	10 U	10 U	0.11 U
Benzo(g,h,i)perylene	10 U	10 U	0.23 U	10 UJ	10 U	0.21 U	10 UJ	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U
Benzo(k)fluoranthene	10 U	10 U	0.23 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U
Bis(2-chloroethoxy)methane	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Bis(2-chloroethyl)ether	10 U	10 U	0.57 U	10 U	10 U	0.53 U	10 U	10 U	0.52 U	10 U	10 U	0.53 U	10 U	10 U	0.53 U
Bis(2-ethylhexyl)phthalate	10 U	10 U	2.3 UJ	10 U	10 U	2.1 UJ	10 U	10 U	2.1 UJ	10 U	10 U	2.1 UJ	10 U	10 U	2.1 UJ
Butylbenzylphthalate	10 U	10 U	5.7 UJ	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Caprolactam	NA	NA	5.7 UJ	NA	NA	5.3 U	NA	NA	5.2 U	NA	NA	5.3 U	NA	NA	5.3 U
Carbazole	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
Chrysene	10 U	10 U	0.23 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U
Dibenz(a,h)anthracene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U	10 U	10 U	0.11 U
Dibenzofuran	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Diethylphthalate	10 U	10 U	5.7 UJ	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Dimethylphthalate	10 U	10 U	5.7 UJ	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Di-n-butylphthalate	10 U	10 U	5.7 UJ	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Di-n-octylphthalate	10 U	10 U	5.7 UJ	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Fluoranthene	10 U	10 U	5.7 U	10 U	10 U	0.13 J	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Fluorene	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Hexachlorobenzene	10 U	10 U	1.1 U	10 U	10 U	1.1 U	10 U	10 U	1 U	10 U	10 U	1.1 U	10 U	10 U	1.1 U
Hexachlorobutadiene	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Hexachlorocyclopentadiene	R	10 UJ	5.7 U	10 UJ	10 UJ	5.3 U	10 UJ	10 UJ	5.2 U	R	10 UJ	5.3 U	10 U	10 UJ	5.3 U
Hexachloroethane	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U	10 U	10 U	0.11 U
Isophorone	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Naphthalene	10 U	10 U	0.23 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U
Nitrobenzene	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
N-Nitroso-di-n-propylamine	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
N-Nitrosodiphenylamine	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Pentachlorophenol	25 U	25 U	1.1 U	25 U	25 U	1.1 U	25 U	25 U	1 U	25 U	25 U	1.1 U	25 U	25 U	1.1 U
Phenanthrene	10 U	10 U	0.23 U	10 U	10 U	0.015 J	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.011 J
Phenol	10 U	10 U	5.7 U	10 U	10 U	5.3 U	10 U	10 U	5.2 U	10 U	10 U	5.3 U	10 U	10 U	5.3 U
Pyrene	10 U	10 U	0.23 U	10 U	10 U	0.31	10 U	10 U	0.21 U	10 U	10 U	0.21 U	10 U	10 U	0.21 U
Pesticides/PCBs (ug/L)															
4,4'-DDD	0.005 U	0.005 U	NA	0.005 U	0.006 U	NA	0.005 U	0.005 U	-- R	0.005 U	0.005 U	NA	0.005 U	0.005 U	-- R
4,4'-DDE	0.005 U	0.005 U	NA	0.005 U	0.003 J	NA	0.005 U	0.005	0.01 UJ	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U
4,4'-DDT	0.005 U	0.005 U	NA	0.005 U	0.006 U	NA	0.005 U	0.005 U	0.01 UJ	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U
Aldrin	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
alpha-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-203B NX 3/30/1995	MW-203B NX 7/19/1995	MW-203B NX 12/15/2005	MW-203D NX 3/29/1995	MW-203D NX 7/19/1995	MW-203D NX 12/15/2005	MW-203S NX 3/29/1995	MW-203S NX 7/19/1995	MW-203S NX 12/15/2005	MW-204S NX 3/31/1995	MW-204S NX 7/21/1995	MW-204S NX 12/15/2005	MW-205S NX 4/3/1995	MW-205S NX 7/21/1995	MW-205S NX 12/15/2005
alpha-Chlordane	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	NA	0.0004 J	0.003 U	0.005 U
beta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
delta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.002 J	0.005 UJ	0.003 U	0.001 J	NA	0.003 U	0.003 U	0.005 U
Dieldrin	0.005 U	0.005 U	NA	0.005 U	0.006 U	NA	0.005 U	0.005 U	0.01 UJ	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U
Endosulfan I	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003	0.003 UJ	NA	0.003 U	0.003 UJ	0.005 U
Endosulfan II	0.005 U	0.005 U	NA	0.005 U	0.006 U	NA	0.005 U	0.005 U	0.01 UJ	0.004 J	0.005 U	NA	0.005 U	0.005 U	0.01 U
Endosulfan Sulfate	0.005 U	0.005 U	NA	0.0007 J	0.006 U	NA	0.005 U	0.005 U	0.01 UJ	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U
Endrin	0.005 U	0.005 U	NA	0.005 U	0.0008 J	NA	0.005 U	0.005 U	0.01 UJ	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 UJ
Endrin Aldehyde	0.009 U	0.009 U	NA	0.009 U	0.009 U	NA	0.008 U	0.008 U	0.01 UJ	0.008 U	0.008 U	NA	0.008 U	0.008 U	0.01 U
Endrin Ketone	0.006 U	0.006 U	NA	0.006 U	0.007 U	NA	0.006 U	0.006 U	0.01 UJ	0.006 U	0.006 U	NA	0.006 U	0.006 U	0.01 U
gamma-BHC(Lindane)	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ
gamma-Chlordane	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.001 J	0.005 UJ	0.003 U	0.003 U	NA	0.003 U	0.0004 J	0.005 U
Heptachlor	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
Heptachlor Epoxide	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003	0.003 U	NA	0.003 U	0.003 U	0.005 U
Methoxychlor	0.03 U	0.03 U	NA	0.03 U	0.03 U	NA	0.03 U	0.03 U	0.05 UJ	0.03 U	0.03 U	NA	0.03 U	0.03 U	0.05 U
Toxaphene	0.33 U	0.33 U	NA	0.33 U	0.33 U	NA	0.32 U	0.31 U	0.5 UJ	0.32 U	0.32 U	NA	0.3 U	0.32 U	0.5 U
Aroclor-1016	0.05 U	0.05 U	NA	0.05 U	0.06 U	NA	0.05 U	0.05 U	0.1 UJ	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1221	0.11 U	0.11 U	NA	0.11 U	0.11 U	NA	0.11 U	0.1 U	0.2 UJ	0.11 U	0.1 U	NA	0.1 U	0.11 U	0.2 U
Aroclor-1232	0.05 U	0.05 U	NA	0.05 U	0.06 U	NA	0.05 U	0.05 U	0.1 UJ	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1242	0.05 U	0.05 U	NA	0.05 U	0.06 U	NA	0.05 U	0.05 U	0.1 UJ	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1248	0.05 U	0.05 U	NA	0.05 U	0.06 U	NA	0.05 U	0.05 U	0.1 UJ	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1254	0.05 U	0.05 U	NA	0.05 U	0.06 U	NA	0.05 U	0.05 U	0.1 UJ	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1260	0.05 U	0.05 U	NA	0.05 U	0.06 U	NA	0.01 J	0.05 U	0.1 UJ	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Metals (ug/L)															
Aluminum	50.7 U	380 U	52.2 J	25 U	154 U	42.3 J	40.4 U	171 U	22.6 J	73.2 U	149 U	171 J	27.1 U	181 U	50.0 UJ
Antimony	3 U	2.2 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U
Arsenic	8 U	9.6 J	0.86	8 U	2.7 UJ	1.5	8 U	11.4 J	5.8	8 U	2.7 U	2.5	8 U	4.3 J	0.39 J
Barium	17.6	16.4 J	22.5	18.1	15.8 J	23.8	7 U	19.8 J	32.1	33.8	37.2	353	47.2	6.4 U	13.2
Beryllium	1 U	0.54 U	1.0 U	1 U	0.36 U	1.0 U	1 U	0.37 U	1.0 U	1 U	0.1 U	0.38 J	1 U	0.37 U	1.0 U
Cadmium	2 U	0.5 U	0.65 J	2 U	0.5 U	0.088 J	2 U	0.5 U	1.0 U	2 U	0.5 U	0.97 J	2 U	0.5 U	0.11 J
Calcium	17700	17900 J	22400	28300	26000 J	30000	8820	10000 J	11700	38900	38800 J	126000	152000	12700 J	3120 J
Chromium	5 U	2 U	2.0 U	5 U	0.7 U	2.0 U	5 U	1.8 U	2.0 U	5 U	2.4 U	2.0 U	5 U	0.7 U	2.0 U
Cobalt	2 U	1 U	0.51 J	2 U	1.3 U	0.92 J	2 U	4.3	2.8	16.8	55.3	224	4.6	0.5 U	0.59 J
Copper	3 U	60.9	2.0 U	3 U	0.6 U	2.1 U	3 U	0.5 U	2.0 U	3 U	3.1 U	4.4	7 J	0.5 U	7.6
Iron	30 U	371 J	30.6 J	30 U	44.4 U	568 J	15500	11000 J	20400 J	3890	1570	29800 J	2370 J	9.7 U	280 J
Lead	3 UJ	2.8	0.51 J	3 UJ	1.6 U	0.36 J	3 UJ	1.6 U	1.0 U	3 UJ	4.4 U	7.4	3.8 J	1.6 U	6.3
Magnesium	3050	3570 J	3560 J	5340	4890 J	5900	1720	2300 J	2570 J	7780	8270 J	26200	30100	1050 J	5000 U
Manganese	21.3	29.6 J	29.7 J	466	297 J	256 J	755	505 J	1010 J	5010	11000	22400 J	1140	10.5 J	397 J
Mercury	0.2 U	0.2 U	0.083 J	0.22	0.2 U	0.20 UJ	0.37	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ
Nickel	10 U	3.1	1.0 U	10 U	2.4 U	1.1 U	10 U	2.4 U	1.4	10 U	14.7	41.1	10 U	2.4 U	4.7
Potassium	3200	2340	3440 J	3000	2690	3310 J	1160	2800	2920 J	2490	1790	8140	9490	1470	1080 J
Selenium	5 UJ	3.4 U	5.0 U	5 UJ	3.4 U	5.0 U	5 UJ	3.4 U	5.0 U	5 UJ	3.4 U	0.61 J	5 U	3.4 U	5.0 U
Silver	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U
Sodium	13900	11900 J	12300	9440	10000 J	14600	5110	15000 J	38400	13300	13700 J	141000	17100	24000 J	32600
Thallium	8 UJ	3.6 U	0.50 U	8 UJ	3.6 U	0.50 U	8 UJ	3.6 U	0.50 U	8 UJ	3.6 U	0.50 U	8 U	3.6 U	0.50 U
Vanadium	2 U	1.9 U	0.75 J	2 U	0.6 U	0.14 J	2 U	2.8 U	0.89 J	2 U	0.6 U	0.41 J	2 U	0.6 U	0.046 J
Zinc	4 U	14.1 U	29.7 J	4 U	4.6 U	8.2 UJ	4 U	7.4 U	4.6 UJ	15.1	9 U	21.1 J	18.9	1.2 U	8.1 UJ
1,4-Dioxanes (ug/L)															
1,4-Dioxane	NA	NA	NA	NA	NA	2.9	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-206D NX 4/3/1995	MW-206D NX 7/26/1995	MW-206D NX 12/13/2005	MW-206S NX 4/3/1995	MW-206S AV 7/26/1995	MW-206S NX 12/13/2005	MW-207B NX 4/7/1995	MW-207B AV 7/27/1995	MW-207B NX 12/13/2005	MW-207B FD 12/13/2005	MW-208B NX 4/5/1995	MW-208B NX 7/25/1995	MW-208B NX 12/16/2005	MW-208D NX 4/5/1995	MW-208D AV 7/25/1995	MW-208D NX 12/16/2005
VOCs (ug/L)																
1,1,1-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	3 J	10 U	2.3	2.3	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	2 J	10 U	1.6	1.6	10 U	10 U	0.063 J	2 J	10 U	0.39 J
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	2 J	10 U	4.6	4.5	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 UJ	10 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.3 J	0.3 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	6 J	5.5 J	2.6	2.6	4 J	3 J	1.7	10 U	10 U	0.5 U
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	10 U	10 U	NA	10 U	10 U	NA
1,2-Dichloropropane	10 U	10 U	0.68	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.15 J	0.14 J	10 U	10 U	0.5 U	10 UJ	10 U	0.5 U
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Acetone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Bromoform	10 U	10 UJ	0.5 UJ	10 U	10 UJ	0.73 U	10 U	10 UJ	0.63 U	0.61 U	10 U	10 U	0.62 UJ	10 U	10 UJ	0.5 UJ
Bromomethane	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 UJ	10 U	10 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.096 J	0.11 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.16 J	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.37 J	0.35 J	NA	NA	0.5 U	NA	NA	0.5 U
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 U	NA	NA	0.5 UJ	NA	NA	0.5 U	0.5 U	NA	NA	0.5 UJ	NA	NA	0.5 UJ
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Methyl acetate	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methyl tert-butyl ether	NA	NA	0.44 J	NA	NA	0.69	NA	NA	0.15 J	0.15 J	NA	NA	0.5 U	NA	NA	0.5 U
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	3 J	3 J	12	12	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
trans-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U
Trichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	3 J	3 J	9.1	9	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.64	0.77	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
SVOCs (ug/L)																
1,1'-Biphenyl	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 UJ	NA	NA	5.4 UJ
1,2,4,5-Tetrachlorobenzene	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 U	NA	NA	5.4 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 UJ	10 U	5.4 U
2,4,5-Trichlorophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	20 U	25 U	25 U	21 U	25 U	25 U	22 U
2,4,6-Trichlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
2,4-Dichlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
2,4-Dimethylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 UJ	5.4 U
2,4-Dinitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	20 U	25 UJ	25 U	21 U	25 U	25 U	22 U
2,4-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
2,6-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-206D NX 4/3/1995	MW-206D NX 7/26/1995	MW-206D NX 12/13/2005	MW-206S NX 4/3/1995	MW-206S AV 7/26/1995	MW-206S NX 12/13/2005	MW-207B NX 4/7/1995	MW-207B AV 7/27/1995	MW-207B NX 12/13/2005	MW-207B FD 12/13/2005	MW-208B NX 4/5/1995	MW-208B NX 7/25/1995	MW-208B NX 12/16/2005	MW-208D NX 4/5/1995	MW-208D AV 7/25/1995	MW-208D NX 12/16/2005
2-Chloronaphthalene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
2-Chlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
2-Methylnaphthalene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
2-Methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
2-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	20 U	25 U	25 U	21 U	25 UJ	25 U	22 U
2-Nitrophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
3,3'-Dichlorobenzidine	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	5 UJ	10 UJ	10 U	5.2 U	10 U	10 U	5.4 U
3-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	20 U	25 U	25 U	21 U	25 U	25 U	22 U
4,6-Dinitro-2-methylphenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	20 U	25 U	25 U	21 U	25 U	25 U	22 U
4-Bromophenyl-phenylether	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
4-Chloro-3-methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
4-Chloroaniline	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
4-Chlorophenyl-phenylether	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 UJ	10 U	10 U	5.4 UJ
4-Methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
4-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	20 U	25 U	25 U	21 U	25 U	25 U	22 U
4-Nitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	20 U	25 U	25 U	21 U	25 U	25 U	22 U
Acenaphthene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
Acenaphthylene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
Acetophenone	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 U	NA	NA	5.4 U
Anthracene	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 UJ	10 UJ	5.4 U
Atrazine	NA	NA	1 U	NA	NA	1 U	NA	NA	0.27 J	0.24 J	NA	NA	1 U	NA	NA	1.1 U
Benzaldehyde	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 U	NA	NA	5.4 U
Benzo(a)anthracene	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Benzo(a)pyrene	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Benzo(b)fluoranthene	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Benzo(g,h,i)perylene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.035 J	10 U	10 U	0.074 J
Benzo(k)fluoranthene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
Bis(2-chloroethoxy)methane	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Bis(2-chloroethyl)ether	10 U	10 U	0.05 U	10 U	10 U	0.05 U	10 U	10 U	0.41 J	0.38 J	10 U	10 U	0.52 U	10 U	10 U	0.54 U
Bis(2-ethylhexyl)phthalate	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	17 J	10 U	2.1 UJ	13	10 U	2.2 UJ
Butylbenzylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 UJ	10 U	10 U	5.4 U
Caprolactam	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 UJ	NA	NA	5.4 U
Carbazole	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	10 U	10 U	NA	10 U	10 U	NA
Chrysene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
Dibenz(a,h)anthracene	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	0.1 U	10 U	10 U	0.026 J	10 U	10 U	0.05 J
Dibenzofuran	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Diethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 UJ	10 U	10 U	5.4 U
Dimethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 UJ	10 U	10 U	5.4 U
Di-n-butylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 UJ	10 U	10 U	5.4 U
Di-n-octylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 UJ	10 U	10 U	5.4 U
Fluoranthene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Fluorene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Hexachlorobenzene	10 U	10 U	1 U	10 U	10 U	1 U	10 U	10 U	1 U	1 U	10 U	10 U	1 U	10 U	10 U	1.1 U
Hexachlorobutadiene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Hexachlorocyclopentadiene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	R	10 UJ	5.4 U
Hexachloroethane	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.1 U	0.1 U	10 U	10 U	0.03 J	10 U	10 U	0.051 J
Isophorone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Naphthalene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
Nitrobenzene	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
N-Nitroso-di-n-propylamine	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
N-Nitrosodiphenylamine	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Pentachlorophenol	25 U	25 U	1 U	25 U	25 U	1 U	25 U	25 U	1 U	1 U	25 U	25 U	1 U	25 U	25 U	1.1 U
Phenanthrene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
Phenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	5.2 U	10 U	10 U	5.4 U
Pyrene	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.2 U	0.2 U	10 U	10 U	0.21 U	10 U	10 U	0.22 U
Pesticides/PCBs (ug/L)																
4,4'-DDD	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.01 UJ	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.005 U	NA
4,4'-DDE	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.01 UJ	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.005 U	NA
4,4'-DDT	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.01 UJ	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.005 U	NA
Aldrin	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.003 U	0.005 UJ	0.005 U	0.004 U	0.004 U	NA	0.003 U	0.003 U	NA
alpha-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 UJ	0.003 UJ	0.005 UJ	0.005 U	0.004 U	0.004 U	NA	0.003 U	0.003 U	NA

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-206D NX 4/3/1995	MW-206D NX 7/26/1995	MW-206D NX 12/13/2005	MW-206S NX 4/3/1995	MW-206S AV 7/26/1995	MW-206S NX 12/13/2005	MW-207B NX 4/7/1995	MW-207B AV 7/27/1995	MW-207B NX 12/13/2005	MW-207B FD 12/13/2005	MW-208B NX 4/5/1995	MW-208B NX 7/25/1995	MW-208B NX 12/16/2005	MW-208D NX 4/5/1995	MW-208D AV 7/25/1995	MW-208D NX 12/16/2005
alpha-Chlordane	0.003 U	0.003 UJ	NA	0.003 U	0.003 UJ	0.005 U	0.003 U	0.003 U	0.005 UJ	0.005 U	0.004 U	0.004 UJ	NA	0.003 U	0.003 UJ	NA
beta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.003 U	0.005 UJ	0.005 U	0.004 U	0.004 U	NA	0.003 U	0.003 U	NA
delta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.003 U	0.005 UJ	0.005 U	0.004 U	0.004 U	NA	0.003 U	0.001 J	NA
Dieldrin	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.01 UJ	0.01 U	0.006 U	0.006 U	NA	0.0008 J	0.005 U	NA
Endosulfan I	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	R	0.003 UJ	0.005 UJ	0.005 U	0.004 U	0.004 U	NA	0.003 U	0.003 U	NA
Endosulfan II	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.01 UJ	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.005 U	NA
Endosulfan Sulfate	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.01 UJ	0.01 U	0.006 U	0.008 U	NA	0.006 U	0.007 U	NA
Endrin	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 UJ	0.005 U	0.005 U	0.01 UJ	0.01 UJ	0.006 U	0.006 U	NA	0.006 U	0.005 U	NA
Endrin Aldehyde	0.008 U	0.009 U	NA	0.008 U	0.008 U	0.01 U	0.008 U	0.008 U	0.01 UJ	0.01 U	0.01 U	0.009 U	NA	0.009 U	0.009 U	NA
Endrin Ketone	0.006 U	0.006 U	NA	0.006 U	0.006 U	0.01 U	0.006 U	0.006 U	0.01 UJ	0.01 U	0.008 U	0.007 U	NA	0.007 U	0.006 U	NA
gamma-BHC(Lindane)	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.003 U	0.005 UJ	0.005 U	0.004 UJ	0.004 U	NA	0.003 UJ	0.003 U	NA
gamma-Chlordane	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.003 U	0.005 UJ	0.005 U	0.004 UJ	0.004 U	NA	0.003 UJ	0.003 U	NA
Heptachlor	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.003 U	0.005 UJ	0.005 U	0.004 U	0.004 U	NA	0.003 U	0.003 U	NA
Heptachlor Epoxide	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 UJ	0.003 UJ	0.005 UJ	0.005 U	0.004 UJ	0.004 U	NA	0.002 J	0.003 U	NA
Methoxychlor	0.03 U	0.03 U	NA	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.05 UJ	0.05 U	0.04 U	0.04 U	NA	0.03 U	0.03 U	NA
Toxaphene	0.3 U	0.33 U	NA	0.31 U	0.32 U	0.5 U	0.32 U	0.31 U	0.5 UJ	0.5 U	0.38 U	0.35 U	NA	0.33 U	0.32 U	NA
Aroclor-1016	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.05 U	NA
Aroclor-1221	0.1 U	0.11 U	NA	0.1 U	0.11 U	0.4 U	0.1 U	0.1 U	0.4 U	0.4 U	0.12 U	0.12 U	NA	0.11 U	0.11 U	NA
Aroclor-1232	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.05 U	NA
Aroclor-1242	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.05 U	NA
Aroclor-1248	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.05 U	NA
Aroclor-1254	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	0.2 U	0.06 U	0.06 U	NA	0.008 J	0.05 U	NA
Aroclor-1260	0.009 J	0.05 U	NA	0.008 J	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.05 U	NA
Metals (ug/L)																
Aluminum	25 U	95.6 U	50.0 UJ	25 U	102 U	21.2 J	25 U	171 U	500 UJ	2660 J	25 U	82.2 U	66.7	25 U	73.6 U	50.0 U
Antimony	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	20.0 U	20.0 U	3 U	3 U	2.0 U	3 U	1.9 U	2.0 U
Arsenic	8 U	2.7 U	0.25 J	8 U	2.7 U	0.62	8 U	2.125 J	1.2 J	10.4	8 U	2.7 U	4.2	8 U	2.7 U	0.11 J
Barium	36.4	32.3 U	52.3	40.3	38.5 U	52.4	58.6	81.45	167	181	40.5	37.3 U	29.1	61.2	60.95 J	36.2
Beryllium	1 U	0.31 U	1.0 U	1 U	0.26 U	1.0 U	1 U	0.48 U	10.0 U	10.0 U	1 U	0.1 U	1.0 U	1 U	0.1 U	1.0 U
Cadmium	2 U	0.5 U	0.19 J	2 U	0.5 U	0.59 J	2 U	0.5 U	0.80 J	0.86 J	2 U	0.5 U	1.0 U	2 U	0.5 U	0.10 J
Calcium	73000	32000	29700	74200	54900	25800	1860000	1800000	1820000	1730000	53100	43400	43200	25200	26150	20400
Chromium	5 U	0.7 U	2.0 U	5 U	0.7 U	2.0 U	5 U	0.825 J	20.0 U	20.0 U	5 U	1.4 U	0.31 J	5 U	0.7 U	2.0 U
Cobalt	3.2	0.86	1.8	2.5	3.05	0.68 J	2 U	0.53	10.0 U	10.0 U	2 U	0.6	5.0	2 U	0.7	0.73 J
Copper	10.2 J	4.7 U	2.0 U	8.7 J	4.1 U	2.0 U	4.1 J	0.5 U	20.0 U	20.0 U	3 U	1.6 U	2.0 UJ	3 U	1.4 U	2.0 UJ
Iron	44.2 J	24.3 U	100 UJ	30 UJ	44 U	226 UJ	130	17.3 U	100 UJ	2530 J	753	517	276	79.1	88.4	100 U
Lead	4.7 J	1.6 U	1.0 U	3 UJ	1.6 U	1.0 U	3 UJ	1.6 U	10.0 U	5.5 J	3 U	2.1	0.37 J	3 UJ	1.6 J	1.0 UJ
Magnesium	11800	5450	7030	10900	7375	5260	134000	193500	201000	191000	10800	8490	8190	5060	5190	3050 J
Manganese	37.1 UJ	2.5 U	57.8 J	38.7 UJ	38.85	532 J	45.5	10.35	365 J	497 J	504	453	281	1620	1730	1690
Mercury	0.53	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.19 J	1.6 J	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ
Nickel	10 U	3.4	2.1	10 U	2.8	3.2	10 U	2.4 U	10.0 U	10.0 U	10 U	2.4 U	1.4 J	10 U	2.4 U	1.0 J
Potassium	7720	9160 J	5140	8070	8280 J	5010	37300	44200 J	39600	38600	5630	3820 J	3630 J	2620	2370 J	1560 J
Selenium	5 U	3.4 U	5.0 U	5 U	3.4 U	5.0 U	5 U	3.4 U	50.0 U	50.0 U	5 U	3.4 U	5.0 UJ	5 U	3.4 U	5.0 UJ
Silver	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	25.8 J	27.4	20.7	26.2	3 U	0.63	1.0 U	3 U	0.6 U	1.0 U
Sodium	25100	46400	97200	24700	37400	97400	1210000	1640000	2960000	2950000	20900	17700	17400	34500	36800	24000
Thallium	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 U	8 U	3.6 U	5.0 U	5.0 U	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 U
Vanadium	2 U	0.6 U	0.073 J	2 U	0.6 U	0.15 J	2 U	0.6 U	10.0 UJ	2.4 J	2 U	0.6 U	0.31 J	2 U	0.6 U	1.0 UJ
Zinc	4 U	1.2 U	9.8 UJ	4 U	1.2 U	3.1 UJ	4 U	1.2 U	27.5 UJ	34.5 UJ	4 U	2.4 U	4.6 J	4 U	1.2 U	2.0 U
1,4-Dioxanes (ug/L)																
1,4-Dioxane	NA	NA	2.0 U	NA	NA	NA	NA	NA	1.3 J	1.3 J	NA	NA	NA	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-208S NX 4/5/1995	MW-208S NX 7/25/1995	MW-208S NX 12/16/2005	MW-209B NX 4/4/1995	MW-209B NX 7/25/1995	MW-209B NX 12/21/2005	MW-210S AV 4/4/1995	MW-210S NX 7/24/1995	MW-210S NX 12/20/2005	MW-211D NX 3/28/1995	MW-211D AV 7/18/1995	MW-211D NX 12/20/2005	MW-211S NX 3/28/1995	MW-211S NX 7/18/1995	MW-211S NX 12/20/2005
VOCs (ug/L)															
1,1,1-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U
1,1-Dichloroethane	10 U	10 U	0.5 U	10 U	10 U	1.3	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 U	NA	NA	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethane	10 U	10 U	0.5 U	38	39	21	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	2	10 U	10 U	0.5 U	10 U	10 U	0.5 U
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 UJ	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Acetone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Bromoform	10 U	10 UJ	0.5 UJ	10 U	10 UJ	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Bromomethane	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	3 J	10 U	5.7	10 U	10 U	1.2	10 U	10 U	0.5 U
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.35 J	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Methyl acetate	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methyl tert-butyl ether	NA	NA	0.5 U	NA	NA	2.3	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
trans-1,3-Dichloropropene	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U
Trichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
SVOCs (ug/L)															
1,1'-Biphenyl	NA	NA	5.6 UJ	NA	NA	5 UJ	NA	NA	5 UJ	NA	NA	5 UJ	NA	NA	5 UJ
1,2,4,5-Tetrachlorobenzene	NA	NA	5.6 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5.6 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4,5-Trichlorophenol	25 U	25 U	22 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2,4,6-Trichlorophenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 UJ	5 U	10 U	10 UJ	5 U
2,4-Dichlorophenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4-Dimethylphenol	10 U	10 UJ	5.6 U	10 U	10 UJ	5 U	10 U	10 U	5 U	10 U	10 UJ	5 U	10 U	10 UJ	5 U
2,4-Dinitrophenol	25 UJ	25 U	22 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2,4-Dinitrotoluene	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,6-Dinitrotoluene	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-208S NX 4/5/1995	MW-208S NX 7/25/1995	MW-208S NX 12/16/2005	MW-209B NX 4/4/1995	MW-209B NX 7/25/1995	MW-209B NX 12/21/2005	MW-210S AV 4/4/1995	MW-210S NX 7/24/1995	MW-210S NX 12/20/2005	MW-211D NX 3/28/1995	MW-211D AV 7/18/1995	MW-211D NX 12/20/2005	MW-211S NX 3/28/1995	MW-211S NX 7/18/1995	MW-211S NX 12/20/2005
2-Chloronaphthalene	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Chlorophenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Methylnaphthalene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 UJ	10 U	0.2 UJ	10 UJ	10 U	0.33 UJ
2-Methylphenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Nitroaniline	25 U	25 U	22 U	25 UJ	25 U	20 U	25 UJ	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2-Nitrophenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
3,3'-Dichlorobenzidine	10 UJ	10 UJ	5.6 U	10 UJ	10 U	5 U	10 U	10 UJ	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
3-Nitroaniline	25 U	25 U	22 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4,6-Dinitro-2-methylphenol	25 U	25 U	22 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4-Bromophenyl-phenylether	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chloro-3-methylphenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chloroaniline	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chlorophenyl-phenylether	10 U	10 U	5.6 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ
4-Methylphenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Nitroaniline	25 U	25 U	22 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4-Nitrophenol	25 U	25 U	22 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
Acenaphthene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.33 UJ
Acenaphthylene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.33 UJ
Acetophenone	NA	NA	5.6 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Anthracene	10 U	10 UJ	5.6 U	10 UJ	10 UJ	5 U	10 UJ	10 U	5 UJ	10 U	10 UJ	5 UJ	10 U	10 UJ	5 UJ
Atrazine	NA	NA	1.1 U	NA	NA	R	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Benzaldehyde	NA	NA	5.6 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Benzo(a)anthracene	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.13 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.16 UJ
Benzo(a)pyrene	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.13 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.16 UJ
Benzo(b)fluoranthene	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.13 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.16 UJ
Benzo(g,h,i)perylene	10 U	10 U	0.066 J	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 UJ	10 U	0.2 UJ	10 UJ	10 U	0.33 UJ
Benzo(k)fluoranthene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.33 UJ
Bis(2-chloroethoxy)methane	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Bis(2-chloroethyl)ether	10 U	10 U	0.56 U	10 U	10 U	0.32 J	10 U	10 U	0.66 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.82 UJ
Bis(2-ethylhexyl)phthalate	10 U	10 U	2.2 UJ	10 U	10 U	0.5 UJ	10 U	10 U	2.6 UJ	10 U	10 U	2 UJ	10 U	10 U	3.3 UJ
Butylbenzylphthalate	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Caprolactam	NA	NA	5.6 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Carbazole	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
Chrysene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.33 UJ
Dibenz(a,h)anthracene	10 U	10 U	0.05 J	10 U	10 U	0.1 UJ	10 U	10 U	0.13 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.16 UJ
Dibenzofuran	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Diethylphthalate	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Dimethylphthalate	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Di-n-butylphthalate	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Di-n-octylphthalate	10 U	10 U	5.6 U	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ
Fluoranthene	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Fluorene	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ
Hexachlorobenzene	10 U	10 U	1.1 U	10 U	10 U	1 UJ	10 U	10 U	1.3 UJ	10 U	10 U	1 UJ	10 U	10 U	1.6 UJ
Hexachlorobutadiene	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 UJ	5 U	10 U	10 UJ	5 U
Hexachlorocyclopentadiene	10 U	10 UJ	5.6 U	R	10 UJ	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Hexachloroethane	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 UJ	5 U	10 U	10 UJ	5 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.057 J	10 U	10 U	0.1 UJ	10 U	10 U	0.13 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.16 UJ
Isophorone	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Naphthalene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.065 J	10 U	10 UJ	0.2 UJ	10 U	10 UJ	0.33 UJ
Nitrobenzene	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
N-Nitroso-di-n-propylamine	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
N-Nitrosodiphenylamine	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Pentachlorophenol	25 U	25 U	1.1 U	25 U	25 U	1 UJ	25 U	25 U	1.3 UJ	25 U	25 U	1 UJ	25 U	25 U	1.6 UJ
Phenanthrene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.33 UJ
Phenol	10 U	10 U	5.6 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Pyrene	10 U	10 U	0.22 U	10 U	10 U	0.2 UJ	10 U	10 U	0.26 UJ	10 U	10 UJ	0.2 UJ	10 U	10 UJ	0.33 UJ
Pesticides/PCBs (ug/L)															
4,4'-DDD	0.006 U	0.005 U	NA	0.005 U	0.005 U	NA	0.006 U	0.006 U	NA	0.005 U	0.005 U	NA	0.005 U	0.006 J	-- R
4,4'-DDE	0.006 U	0.005 U	NA	0.005 U	0.005 U	NA	0.006 U	0.006 U	NA	0.005 U	0.0035 J	NA	0.005 U	0.003 J	0.01 U
4,4'-DDT	0.006 U	0.005 U	NA	0.005 U	0.005 U	NA	0.006 U	0.006 U	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.01 U
Aldrin	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
alpha-BHC	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-208S NX 4/5/1995	MW-208S NX 7/25/1995	MW-208S NX 12/16/2005	MW-209B NX 4/4/1995	MW-209B NX 7/25/1995	MW-209B NX 12/21/2005	MW-210S AV 4/4/1995	MW-210S NX 7/24/1995	MW-210S NX 12/20/2005	MW-211D NX 3/28/1995	MW-211D AV 7/18/1995	MW-211D NX 12/20/2005	MW-211S NX 3/28/1995	MW-211S NX 7/18/1995	MW-211S NX 12/20/2005
alpha-Chlordane	0.004 U	0.003 UJ	NA	0.003 U	0.003 UJ	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
beta-BHC	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
delta-BHC	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
Dieldrin	0.0003 J	0.005 U	NA	0.005 U	0.005 U	NA	0.006 U	0.006 U	NA	0.001 J	0.005 U	NA	0.005 U	0.005 U	0.01 U
Endosulfan I	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 UJ	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
Endosulfan II	0.006 U	0.005 U	NA	0.005 U	0.005 U	NA	0.006 U	0.006 U	NA	0.01	0.005 U	NA	0.008	0.005 U	0.01 U
Endosulfan Sulfate	0.006 U	0.007 U	NA	0.005 U	0.007 U	NA	0.006 U	0.006 U	NA	0.004 J	0.005 U	NA	0.002 J	0.005 U	0.01 U
Endrin	0.006 U	0.005 U	NA	0.005 U	0.005 U	NA	0.006 U	0.006 U	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	-- R
Endrin Aldehyde	0.009 U	0.008 U	NA	0.008 U	0.008 U	NA	0.009 U	0.01 U	NA	0.008 U	0.008 U	NA	0.008 U	0.008 U	0.01 U
Endrin Ketone	0.007 U	0.006 U	NA	0.006 U	0.006 U	NA	0.007 U	0.007 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	0.01 U
gamma-BHC(Lindane)	0.004 UJ	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003	0.003 U	NA	0.003 U	0.003 U	0.005 U
gamma-Chlordane	0.004 UJ	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
Heptachlor	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
Heptachlor Epoxide	0.004 UJ	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U
Methoxychlor	0.04 U	0.03 U	NA	0.03 U	0.03 U	NA	0.01 J	0.04 U	NA	0.03 U	0.03 U	NA	0.03 U	0.03 U	0.05 U
Toxaphene	0.35 U	0.32 U	NA	0.3 U	0.32 U	NA	0.33 U	0.37 U	NA	0.32 U	0.31 U	NA	0.32 U	0.32 U	0.5 U
Aroclor-1016	0.06 U	0.05 U	NA	0.05 U	0.05 U	NA	0.06 U	0.06 U	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1221	0.12 U	0.1 U	NA	0.1 U	0.1 U	NA	0.11 U	0.12 U	NA	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.2 U
Aroclor-1232	0.06 U	0.05 U	NA	0.05 U	0.05 U	NA	0.06 U	0.06 U	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1242	0.06 U	0.05 U	NA	0.05 U	0.05 U	NA	0.06 U	0.06 U	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1248	0.06 U	0.05 U	NA	0.05 U	0.05 U	NA	0.06 U	0.06 U	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1254	0.06 U	0.05 U	NA	0.05 U	0.05 U	NA	0.06 U	0.06 U	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.1 U
Aroclor-1260	0.06 U	0.05 U	NA	0.05 U	0.05 U	NA	0.01 J	0.06 U	NA	0.006 J	0.05 U	NA	0.006 J	0.05 U	0.1 U
Metals (ug/L)															
Aluminum	25.3 U	90.3 U	89.8	25 U	64.1 U	50.0 U	25 U	130 U	50.0 U	25 U	133 U	50.0 U	25 U	146 U	50.0 U
Antimony	3 U	2.6 U	2.0 U	3 U	3 U	2.0 U	3 U	2 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U
Arsenic	58.1	49.6	101	8 U	2.7 U	4.4	23.2	33.1	66.1	345	277.5	281	141	186	99.5
Barium	36.7	34.7 J	38.9	43.4	39.1 J	36.4	60.65	34.8	40.4	83.2	109	44.1	83	149	32.1
Beryllium	1 U	0.1 U	1.0 U	1 U	0.1 U	1.0 U	1 U	0.1 U	1.0 U	1 U	0.41 U	1.0 U	1 U	0.41 U	1.0 U
Cadmium	2 U	0.5 U	1.0 U	2 U	0.5 U	1.0 U	2 U	0.5 U	1.0 U	2 U	0.5 U	1.0 U	2 U	0.5 U	1.0 U
Calcium	7600	7330	9980	59300	55700	62600	46900	30500 J	44900	96400	96550	80800	56600	83700	30700
Chromium	5 U	1.8 U	0.77 J	5 U	1.4 U	2.0 U	5 U	0.99 U	0.24 J	5 U	0.86 U	2.0 U	5 U	1.2 U	0.38 J
Cobalt	3.5	3.9	3.5	2 U	0.5 U	2.6	6.6	3	3.5	12.2	10.7	10.6	4.8	6.1	1.6
Copper	3 U	1.7 U	2.9 UJ	3 U	1.6 U	0.52 J	3 U	1.9 U	2.0 UJ	3 U	2.7 U	2.0 U	3 U	2.6 U	2.0 UJ
Iron	17600	16700	21400	390 J	475	2250	30750 J	18900	21100	58500	63600	53800	63500	82000	37000
Lead	3 UJ	3	1.9 J	3 UJ	1.7	1.0 U	2.35 J	2.2 U	1.0 UJ	6.7 J	2.7 UJ	1.0 U	8.8 J	3.2 UJ	1.0 UJ
Magnesium	1410	1410	1740 J	23500	21000	22600	5800	3460 J	4480 J	16500	16000	12000	9230	12900	3600 J
Manganese	1010	1020	1050	1140	1100	1290	2440	1260	2770	6400	4765	5140	2320	2300	1180
Mercury	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ
Nickel	10 U	2.4 U	3.3 J	10 U	2.4 U	0.35 J	10 U	2.4 U	2.0 J	10 U	7.8 U	4.4	10 U	5.7 U	1.3 J
Potassium	2270	1940 J	2680 J	6890	5650 J	6020	9325	6230	6540 J	20000	22250	12600	12100	21100	5220 J
Selenium	5 U	3.4 U	5.0 UJ	5 U	3.4 U	5.0 U	5 U	3.4 U	5.0 UJ	5 UJ	3.4 U	0.18 J	5.6 J	3.4 U	5.0 UJ
Silver	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U
Sodium	12600	13100	13700	24500	23600	25500	14400	11500 J	11000	33100	34400	22800	14000	23800	4900 J
Thallium	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 UJ	8 U	3.6 U	0.50 U	8.9 J	3.6 U	0.50 UJ	8 UJ	3.6 U	0.50 U
Vanadium	2 U	1.2	2.0 J	2 U	0.6 U	1.0 UJ	2 U	0.6 U	1.0 UJ	2 U	2.65	1.0 UJ	2 U	3.6	0.36 J
Zinc	4 U	1.5 U	8.3 J	4 U	1.2 U	1.2 J	3.95 J	4.4 U	2.0 U	4 U	29.7 U	1.9 J	4 U	73.4 U	2.0 U
1,4-Dioxanes (ug/L)															
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-212B NX 3/29/1995	MW-212B NX 7/18/1995	MW-212B NX 12/20/2005	MW-212D NX 3/28/1995	MW-212D NX 7/18/1995	MW-212D NX 12/20/2005	MW-212D FD 12/20/2005	MW-213B NX 4/6/1995	MW-213B NX 7/27/1995	MW-213B NX 12/19/2005	MW-213D AV 4/6/1995	MW-213D NX 7/27/1995	MW-213D NX 12/19/2005
VOCs (ug/L)													
1,1,1-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	5 J	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 UJ	5 U	5 U	0.5 UJ
1,1-Dichloroethane	10 U	10 U	1.4	10 U	10 U	0.5 U	0.5 U	5 J	5 J	1.8	5.5 J	5 J	1.4
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	9 J	4 J	2.5	7.5 J	4 J	0.57 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.62 U	5 U	5 U	0.5 U
1,2-Dichloroethane	3 J	3 J	1.6	10 U	10 U	0.5 U	0.5 U	9 J	6 J	4.6	3 J	3 J	0.5 U
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	NA	3 J	3 J	NA	3 J	3 J	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	5 U	5 UJ	5 U	5 U	5 UJ	5 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	5 U	5 UJ	5 U	5 U	5 UJ	5 U	5 U
Acetone	10 U	10 U	5 U	10 UJ	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Bromoform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 UJ	0.5 U	5 U	5 UJ	0.5 U
Bromomethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 UJ	0.5 U	5 U	5 UJ	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.81 U	5 U	5 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Chlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	1.2	4 J	4 J	0.68
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Chloroform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	2 J	5 U	0.5 U	5 U	5 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	2.4	5 U	5 U	0.5 U	5 U	5 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	1.9	NA	NA	0.98
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 UJ	5 U	5 U	0.5 UJ
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Methyl acetate	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methyl tert-butyl ether	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
trans-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 UJ	5 U	5 U	0.5 UJ
Trichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	50	39	16	52.5	39	4.8
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	0.5 U	5 U	5 U	0.5 U
SVOCs (ug/L)													
1,1'-Biphenyl	NA	NA	5 UJ	NA	NA	5 UJ	5 UJ	NA	NA	5.2 UJ	NA	NA	5 UJ
1,2,4,5-Tetrachlorobenzene	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 U	NA	NA	5 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	25 U	25 U	20 U	25 U	25 U	20 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	20 U
2,4,6-Trichlorophenol	10 U	10 UJ	5 U	10 U	10 UJ	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2,4-Dichlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2,4-Dimethylphenol	10 U	10 UJ	5 U	10 U	10 UJ	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2,4-Dinitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	20 U
2,4-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2,6-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-212B NX 3/29/1995	MW-212B NX 7/18/1995	MW-212B NX 12/20/2005	MW-212D NX 3/28/1995	MW-212D NX 7/18/1995	MW-212D NX 12/20/2005	MW-212D FD 12/20/2005	MW-213B NX 4/6/1995	MW-213B NX 7/27/1995	MW-213B NX 12/19/2005	MW-213D AV 4/6/1995	MW-213D NX 7/27/1995	MW-213D NX 12/19/2005
2-Chloronaphthalene	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2-Chlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2-Methylnaphthalene	10 UJ	10 U	0.2 UJ	10 UJ	10 U	0.2 UJ	0.2 UJ	5 U	5 U	0.21 U	5 U	5 U	0.2 UJ
2-Methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
2-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	20 U
2-Nitrophenol	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	10 U	10 U	5 U	10 UJ	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
3-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	20 U
4,6-Dinitro-2-methylphenol	25 U	25 U	20 U	25 U	25 U	20 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	20 U
4-Bromophenyl-phenylether	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
4-Chloro-3-methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
4-Chloroaniline	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
4-Chlorophenyl-phenylether	10 U	10 U	5 UJ	10 U	10 U	5 UJ	5 UJ	5 U	5 U	5.2 UJ	5 U	5 U	5 UJ
4-Methylphenol	10 UJ	10 U	5 U	10 UJ	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
4-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	20 U
4-Nitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	20 U
Acenaphthene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	0.2 UJ	5 U	5 U	0.21 U	5 U	5 U	0.2 UJ
Acenaphthylene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	0.2 UJ	5 U	5 U	0.21 U	5 U	5 U	0.2 UJ
Acetophenone	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 U	NA	NA	5 U
Anthracene	10 U	10 UJ	5 UJ	10 U	10 UJ	5 UJ	5 UJ	5 U	5 U	5.2 U	5 U	5 U	5 UJ
Atrazine	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	1 U	NA	NA	5 U
Benzaldehyde	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 U	NA	NA	5 U
Benzo(a)anthracene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	0.1 UJ	5 U	5 U	0.1 U	5 U	5 U	0.1 UJ
Benzo(a)pyrene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	0.1 UJ	5 U	5 U	0.1 U	5 U	5 U	0.1 UJ
Benzo(b)fluoranthene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	0.1 UJ	5 U	5 U	0.1 U	5 U	5 U	0.1 UJ
Benzo(g,h,i)perylene	10 UJ	10 U	0.2 UJ	10 UJ	10 U	0.2 UJ	0.2 UJ	5 U	5 U	0.024 J	5 U	5 U	0.2 UJ
Benzo(k)fluoranthene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	0.2 UJ	5 U	5 U	0.21 U	5 U	5 U	0.2 UJ
Bis(2-chloroethoxy)methane	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Bis(2-chloroethyl)ether	10 U	10 U	0.1 J	10 U	10 U	0.5 UJ	0.51 UJ	5 U	5 U	0.31 J	5 U	5 U	0.5 UJ
Bis(2-ethylhexyl)phthalate	10 U	10 U	2 UJ	10 U	10 U	2 UJ	1.9 J	5 U	5 U	2.1 UJ	5 U	5 U	2 UJ
Butylbenzylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Caprolactam	NA	NA	5 U	NA	NA	5 U	5 U	NA	NA	5.2 U	NA	NA	5 U
Carbazole	10 U	10 U	NA	10 U	10 U	NA	NA	5 U	5 U	NA	5 U	5 U	NA
Chrysene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	0.2 UJ	5 U	5 U	0.21 U	5 U	5 U	0.2 UJ
Dibenz(a,h)anthracene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	0.1 UJ	5 U	5 U	0.019 J	5 U	5 U	0.1 UJ
Dibenzofuran	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Diethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	6.5 U	5 U
Dimethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Di-n-butylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Di-n-octylphthalate	10 U	10 U	5 UJ	10 U	10 U	5 UJ	5 UJ	5 U	5 U	5.2 U	5 U	5 U	5 UJ
Fluoranthene	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Fluorene	10 U	10 U	5 UJ	10 U	10 U	5 UJ	5 UJ	5 U	5 U	5.2 U	5 U	5 U	5 UJ
Hexachlorobenzene	10 U	10 U	1 UJ	10 U	10 U	1 UJ	1 UJ	5 U	5 U	1 U	5 U	5 U	1 UJ
Hexachlorobutadiene	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	10 UJ	10 UJ	5 U	10 UJ	10 UJ	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Hexachloroethane	10 U	10 UJ	5 U	10 U	10 UJ	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	0.1 UJ	5 U	5 U	0.021 J	5 U	5 U	0.1 UJ
Isophorone	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Naphthalene	10 U	10 UJ	0.2 UJ	10 U	10 UJ	0.2 UJ	0.2 UJ	5 U	5 U	0.21 U	5 U	5 U	0.2 UJ
Nitrobenzene	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
N-Nitroso-di-n-propylamine	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
N-Nitrosodiphenylamine	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Pentachlorophenol	25 U	25 U	1 UJ	25 U	25 U	1 UJ	1 UJ	12.5 U	12.5 U	1 U	12.5 U	12.5 U	1 UJ
Phenanthrene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	0.2 UJ	5 U	5 U	0.017 J	5 U	5 U	0.2 UJ
Phenol	10 U	10 U	5 U	10 U	10 U	5 U	5 U	5 U	5 U	5.2 U	5 U	5 U	5 U
Pyrene	10 U	10 UJ	0.2 UJ	10 U	10 UJ	0.2 UJ	0.2 UJ	5 U	5 U	0.21 U	5 U	5 U	0.2 UJ
Pesticides/PCBs (ug/L)													
4,4'-DDD	0.006 U	0.005 U	NA	0.005 U	0.006 U	NA	NA	0.0025 U	0.003 U	NA	0.0025 U	0.004 U	NA
4,4'-DDE	0.006 U	0.001 J	NA	0.005 U	0.0006 J	NA	NA	0.0025 U	0.002 J	NA	0.0025 U	0.003 U	NA
4,4'-DDT	0.006 U	0.005 U	NA	0.005 U	0.006 U	NA	NA	0.0025 U	0.003 U	NA	0.0025 U	0.003 U	NA
Aldrin	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 U	0.002 U	NA	0.0015 U	0.002 U	NA
alpha-BHC	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 UJ	0.002 UJ	NA	0.0015 UJ	0.002 UJ	NA

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-212B NX 3/29/1995	MW-212B NX 7/18/1995	MW-212B NX 12/20/2005	MW-212D NX 3/28/1995	MW-212D NX 7/18/1995	MW-212D NX 12/20/2005	MW-212D FD 12/20/2005	MW-213B NX 4/6/1995	MW-213B NX 7/27/1995	MW-213B NX 12/19/2005	MW-213D AV 4/6/1995	MW-213D NX 7/27/1995	MW-213D NX 12/19/2005
alpha-Chlordane	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 U	0.002 U	NA	0.0015 U	0.002 U	NA
beta-BHC	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 U	0.002 U	NA	0.0015 U	0.002 U	NA
delta-BHC	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 U	0.002 J	NA	0.0015 U	0.002 U	NA
Dieldrin	0.006 U	0.005 U	NA	0.0005 J	0.006 U	NA	NA	0.0025 U	0.003 U	NA	0.0025 U	0.003 U	NA
Endosulfan I	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	R	0.002 UJ	NA	R	0.002 UJ	NA
Endosulfan II	0.006 U	0.005 U	NA	0.005 U	0.006 U	NA	NA	0.0025 U	0.003 U	NA	0.0025 U	0.003 U	NA
Endosulfan Sulfate	0.006 U	0.005 U	NA	0.005 U	0.006 U	NA	NA	0.0025 U	0.003 U	NA	0.0002 J	0.003 U	NA
Endrin	0.006 U	0.005 U	NA	0.005 U	0.006 U	NA	NA	0.0025 U	0.003 U	NA	0.0025 U	0.003 U	NA
Endrin Aldehyde	0.0006 J	0.008 U	NA	0.009 U	0.009 U	NA	NA	0.004 U	0.005 U	NA	0.004 U	0.005 U	NA
Endrin Ketone	0.007 U	0.006 U	NA	0.006 U	0.007 U	NA	NA	0.003 U	0.0035 U	NA	0.003 U	0.004 U	NA
gamma-BHC(Lindane)	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 U	0.002 U	NA	0.0015 U	0.002 U	NA
gamma-Chlordane	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 U	0.002 U	NA	0.0015 U	0.002 U	NA
Heptachlor	0.004 U	0.003 U	NA	0.003 U	0.003 U	NA	NA	0.0015 U	0.002 U	NA	0.0015 U	0.002 U	NA
Heptachlor Epoxide	0.004 U	0.003 U	NA	0.0003 J	0.003 U	NA	NA	0.0015 UJ	0.002 UJ	NA	0.0015 UJ	0.002 UJ	NA
Methoxychlor	0.04 U	0.03 U	NA	0.03 U	0.03 U	NA	NA	0.015 U	0.02 U	NA	0.008 J	0.02 U	NA
Toxaphene	0.35 U	0.31 U	NA	0.33 U	0.34 U	NA	NA	0.16 U	0.18 U	NA	0.155 U	0.19 U	NA
Aroclor-1016	0.06 U	0.05 U	NA	0.05 U	0.06 U	NA	NA	0.025 U	0.03 U	NA	0.025 U	0.03 U	NA
Aroclor-1221	0.12 U	0.1 U	NA	0.11 U	0.11 U	NA	NA	0.05 U	0.06 U	NA	0.05 U	0.06 U	NA
Aroclor-1232	0.06 U	0.05 U	NA	0.05 U	0.06 U	NA	NA	0.025 U	0.03 U	NA	0.025 U	0.03 U	NA
Aroclor-1242	0.06 U	0.05 U	NA	0.05 U	0.06 U	NA	NA	0.025 U	0.03 U	NA	0.025 U	0.03 U	NA
Aroclor-1248	0.06 U	0.05 U	NA	0.05 U	0.06 U	NA	NA	0.025 U	0.03 U	NA	0.025 U	0.03 U	NA
Aroclor-1254	0.06 U	0.05 U	NA	0.05 U	0.06 U	NA	NA	0.025 U	0.03 U	NA	0.025 U	0.03 U	NA
Aroclor-1260	0.06 U	0.05 U	NA	0.08	0.06 U	NA	NA	0.025 U	0.03 U	NA	0.025 U	0.03 U	NA
Metals (ug/L)													
Aluminum	25 U	131 U	25.5 J	47 U	136 U	50.0 U	50.0 U	12.5 U	56.5 U	610	12.5 U	62.5 U	56.8
Antimony	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	2.0 U	1.5 U	0.95 U	2.0 U	1.5 U	2.75 U	2.0 U
Arsenic	13.2 U	10.5	32.9	8 U	7.2	22.0	18.5	4 U	1.35 U	5.1	4 U	1.35 U	0.42 J
Barium	28.7	21.2	13.8	41.3	38.5	67.1	57.6	11	13.4	16.3	73.15	70.3	57.3
Beryllium	1 U	0.33 U	1.0 U	1 U	0.38 U	1.0 U	1.0 U	0.5 U	0.175 U	1.0 U	0.5 U	0.185 U	1.0 U
Cadmium	2 U	0.5 U	1.0 U	2 U	0.5 U	0.084 J	0.074 J	1 U	0.25 U	1.2	1 U	0.25 U	1.0 U
Calcium	58000	48500	55800	18400	20500	23400	24100	55300	65700	44100	63850	57800	39600
Chromium	5 U	0.7 U	2.0 U	5 U	0.7 U	0.20 J	0.22 J	2.5 U	0.35 U	5.1	2.5 U	0.35 U	0.17 J
Cobalt	2 U	1.4 U	8.0	2 U	0.5 U	2.8	2.4	1 U	1.7	7.7	7.5	5.7	2.7
Copper	3 U	0.89 U	3.0	3 U	1 U	2.0 UJ	2.0 UJ	1.5 U	0.41 U	11.2 J	1.5 U	0.31 U	2.2 UJ
Iron	979	1100	2560	987	1050	4920	5290	41.6	178	2150	15 U	104	400
Lead	3 UJ	1.6 UJ	0.37 J	3 UJ	1.6 UJ	0.41 J	0.34 J	1.5 U	0.8 U	17.3 J	1.5 U	0.8 U	0.32 J
Magnesium	5830	4520	5420	2620	2690	3700 J	3840 J	8170	9770	6140	12200	10400	7280
Manganese	2690	2100	2770	1100	1110	1130	951	114	180	270	922	661	224
Mercury	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.20 UJ	0.1 U	0.1 U	0.20 UJ	0.1 U	0.1 U	0.20 UJ
Nickel	10 U	3.1 U	3.4	10 U	2.4 U	1.5 J	1.2 J	5 U	2.8	5.5 J	5 U	4	3.1 J
Potassium	8450	5810	3290 J	3610	3040	3150 J	3350 J	6140	5950 J	3460 J	9545	7420 J	4500 J
Selenium	5 UJ	3.4 U	5.0 U	5 UJ	3.4 U	5.0 UJ	5.0 UJ	2.5 U	1.7 U	5.0 UJ	2.5 U	1.7 U	5.0 UJ
Silver	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	1.0 U	1.5 U	0.3 U	1.0 U	1.5 U	0.3 U	1.0 U
Sodium	71700	65800	63500	62600	54100	71600	75300	45000	66500	54700	65350	79400	79200
Thallium	8 UJ	3.6 U	0.50 UJ	8 UJ	3.6 U	0.50 U	0.50 U	4 U	1.8 U	0.50 U	4 U	1.8 U	0.50 U
Vanadium	2 U	0.6 U	1.0 J	2 U	0.6 U	0.65 J	0.50 J	1 U	0.3 U	1.6 J	1 U	0.3 U	1.0 UJ
Zinc	4 U	7.7 U	5.2	4 U	7.9 U	3.9 U	2.6 U	2 U	0.6 U	32.9 J	3.8 J	1.05 U	2.2 U
1,4-Dioxanes (ug/L)													
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5 J	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-213S NX 4/6/1995	MW-213S NX 7/27/1995	MW-213S NX 12/19/2005	MW-213S FD 12/19/2005	MW-214S NX 4/5/1995	MW-214S NX 7/26/1995	MW-214S NX 12/19/2005	MW-215B NX 4/6/1995	MW-215B NX 7/25/1995	MW-215B NX 12/19/2005
VOCs (ug/L)										
1,1,1-Trichloroethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 UJ	5 U	5 U	0.5 U
1,1-Dichloroethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,1-Dichloroethene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	5 U	5 U	0.5 UJ	0.5 UJ	5 UJ	5 U	0.5 U	5 U	5 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,2-Dichloroethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,2-Dichloroethene(total)	5 U	5 U	NA	NA	5 U	5 U	NA	5 U	5 U	NA
1,2-Dichloropropane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,3-Dichlorobenzene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
1,4-Dichlorobenzene	5 U	5 U	0.5 UJ	0.5 UJ	5 UJ	5 U	0.5 U	5 U	5 U	0.5 U
2-Butanone	5 U	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 U	5 U	5 UJ	5 U	5 U
4-Methyl-2-pentanone	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 U	5 U	5 UJ	5 U	5 U
Acetone	15	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Bromoform	5 U	5 UJ	3 UJ	2.6 UJ	5 U	5 UJ	0.5 U	5 U	5 U	0.5 U
Bromomethane	5 U	5 UJ	0.5 UJ	0.5 UJ	5 U	5 UJ	0.5 U	5 U	5 U	0.5 U
Carbon Disulfide	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Carbon Tetrachloride	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Chlorobenzene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Chloroethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Chloroform	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	6 J	4 J	0.5 U
Chloromethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
cis-1,3-Dichloropropene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 UJ	5 U	5 U	0.5 U
Cyclohexane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Ethylbenzene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Methyl acetate	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Methyl tert-butyl ether	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Methylcyclohexane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Styrene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Tetrachloroethene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Toluene	3 J	4 J	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
trans-1,3-Dichloropropene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 UJ	5 U	5 U	0.5 U
Trichloroethene	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Trichlorofluoromethane	NA	NA	0.5 UJ	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
Xylene (total)	5 U	5 U	0.5 UJ	0.5 UJ	5 U	5 U	0.5 U	5 U	5 U	0.5 U
SVOCs (ug/L)										
1,1'-Biphenyl	NA	NA	5.8 UJ	5 UJ	NA	NA	5.3 UJ	NA	NA	5.7 UJ
1,2,4,5-Tetrachlorobenzene	NA	NA	5.8 U	5 U	NA	NA	5.3 U	NA	NA	5.7 U
2,2'-Oxybis(1-chloropropane)	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2,4,5-Trichlorophenol	12.5 U	12.5 U	23 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	23 U
2,4,6-Trichlorophenol	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2,4-Dichlorophenol	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2,4-Dimethylphenol	14	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2,4-Dinitrophenol	12.5 U	12.5 U	23 U	20 U	12.5 UJ	12.5 U	21 U	12.5 U	12.5 U	23 U
2,4-Dinitrotoluene	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2,6-Dinitrotoluene	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-213S NX 4/6/1995	MW-213S NX 7/27/1995	MW-213S NX 12/19/2005	MW-213S FD 12/19/2005	MW-214S NX 4/5/1995	MW-214S NX 7/26/1995	MW-214S NX 12/19/2005	MW-215B NX 4/6/1995	MW-215B NX 7/25/1995	MW-215B NX 12/19/2005
2-Chloronaphthalene	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2-Chlorophenol	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2-Methylnaphthalene	3 J	3 J	5.8 U	-- R	10	8 J	0.077 J	5 U	5 U	0.23 U
2-Methylphenol	5 U	6 J	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
2-Nitroaniline	12.5 U	12.5 U	23 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	23 U
2-Nitrophenol	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
3,3'-Dichlorobenzidine	5 U	5 UJ	-- R	-- R	5 UJ	5 U	5.3 U	5 U	5 U	5.7 U
3-Nitroaniline	12.5 U	12.5 U	23 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	23 U
4,6-Dinitro-2-methylphenol	12.5 U	12.5 UJ	23 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	23 U
4-Bromophenyl-phenylether	5 U	5 UJ	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
4-Chloro-3-methylphenol	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
4-Chloroaniline	5 U	5 U	-- R	-- R	5 U	5 U	5.3 U	5 U	5 U	5.7 U
4-Chlorophenyl-phenylether	5 U	5 U	5.8 UJ	5 UJ	5 U	5 U	5.3 UJ	5 U	5 U	5.7 UJ
4-Methylphenol	5 U	37	5.8 U	5 U	4 J	5 U	5.3 U	5 U	5 U	5.7 U
4-Nitroaniline	12.5 U	12.5 U	23 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	23 U
4-Nitrophenol	12.5 U	12.5 U	23 U	20 U	12.5 U	12.5 U	21 U	12.5 U	12.5 U	23 U
Acenaphthene	5 U	5 U	0.94 J	-- R	7 J	7 J	1	5 U	5 U	0.23 U
Acenaphthylene	5 U	5 U	5.8 UJ	5 UJ	5 U	5 U	0.015 J	5 U	5 U	0.23 U
Acetophenone	NA	NA	5.8 U	5 U	NA	NA	5.3 U	NA	NA	5.7 U
Anthracene	5 U	5 UJ	0.76 J	0.72 J	5 U	5 U	0.49 J	5 U	5 U	5.7 U
Atrazine	NA	NA	5.8 U	5 U	NA	NA	0.36 J	NA	NA	1.1 U
Benzaldehyde	NA	NA	1.8 J	5 U	NA	NA	5.3 U	NA	NA	5.7 U
Benzo(a)anthracene	5 U	5 UJ	5.8 U	5 U	5 U	5 U	0.11 U	5 U	5 U	0.11 U
Benzo(a)pyrene	5 U	5 UJ	5.8 UJ	5 U	5 U	5 U	0.11 U	5 U	5 U	0.11 U
Benzo(b)fluoranthene	5 U	5 UJ	5.8 UJ	5 U	5 U	5 U	0.11 U	5 U	5 U	0.11 U
Benzo(g,h,i)perylene	5 U	5 UJ	5.8 UJ	5 U	5 U	5 U	0.033 J	5 U	5 U	0.036 J
Benzo(k)fluoranthene	5 U	5 UJ	5.8 UJ	5 U	5 U	5 U	0.21 U	5 U	5 U	0.23 U
Bis(2-chloroethoxy)methane	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Bis(2-chloroethyl)ether	5 U	5 U	5.8 U	-- R	5 U	5 U	0.53 U	5 U	5 U	0.57 U
Bis(2-ethylhexyl)phthalate	5 U	5 U	5.8 U	5 U	5 U	5 U	2.1 UJ	9 J	5.5 U	2.3 UJ
Butylbenzylphthalate	5 U	5 UJ	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Caprolactam	NA	NA	5.8 U	5 U	NA	NA	5.3 U	NA	NA	5.7 U
Carbazole	5 U	5 UJ	NA	NA	6 J	3 J	NA	5 U	5 U	NA
Chrysene	5 U	5 UJ	5.8 U	5 U	5 U	5 U	0.21 U	5 U	5 U	0.23 U
Dibenz(a,h)anthracene	5 U	5 UJ	5.8 UJ	5 U	5 U	5 U	0.024 J	5 U	5 U	0.027 J
Dibenzofuran	5 U	5 U	0.93 J	0.87 J	6 J	6 J	5.3 U	5 U	5 U	5.7 U
Diethylphthalate	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Dimethylphthalate	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Di-n-butylphthalate	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Di-n-octylphthalate	5 U	5 UJ	5.8 UJ	5 UJ	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Fluoranthene	5 U	5 UJ	5.8 U	5 U	5 U	5 U	0.98 J	5 U	5 U	5.7 U
Fluorene	5 U	1 J	1.2 J	5 UJ	6 J	6 J	1.8 J	5 U	5 U	5.7 U
Hexachlorobenzene	5 U	5 UJ	5.8 U	5 U	5 U	5 U	1.1 U	5 U	5 U	1.1 U
Hexachlorobutadiene	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Hexachlorocyclopentadiene	5 U	5 U	-- R	-- R	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Hexachloroethane	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Indeno(1,2,3-cd)pyrene	5 U	5 UJ	5.8 UJ	5 U	5 U	5 U	0.025 J	5 U	5 U	0.027 J
Isophorone	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Naphthalene	41	40	5.8 U	-- R	54	34	0.2 U	5 U	5 U	0.23 U
Nitrobenzene	5 UJ	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 UJ	5 U	5.7 U
N-Nitroso-di-n-propylamine	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
N-Nitrosodiphenylamine	5 U	5 UJ	5.8 U	0.4 J	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Pentachlorophenol	12.5 U	12.5 UJ	5.8 U	5 U	12.5 U	12.5 U	1.1 U	12.5 U	12.5 U	1.1 U
Phenanthrene	5 U	5 UJ	0.33 J	0.31 J	8 J	8 J	2.1	5 U	5 U	0.016 J
Phenol	5 U	5 U	5.8 U	5 U	5 U	5 U	5.3 U	5 U	5 U	5.7 U
Pyrene	5 U	5 UJ	5.8 U	0.12 J	5 U	5 U	0.46	5 U	5 U	0.23 U
Pesticides/PCBs (ug/L)										
4,4'-DDD	0.005 U	0.03	-- R	-- R	0.0025 U	0.003 U	-- R	0.0025 U	0.003 U	NA
4,4'-DDE	0.005 U	0.003 U	-- R	-- R	0.0025 U	0.003 U	0.01 UJ	0.0025 U	0.003 U	NA
4,4'-DDT	0.0025 U	0.003 U	-- R	0.013 J	0.0025 U	0.003 U	0.01 UJ	0.0025 U	0.003 U	NA
Aldrin	0.003 U	0.002 U	-- R	-- R	0.0015 U	0.01	0.005 UJ	0.0015 U	0.0015 U	NA
alpha-BHC	0.003 UJ	0.002 UJ	-- R	-- R	0.0015 U	0.0015 UJ	0.005 UJ	0.0015 UJ	0.0015 U	NA

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	MW-213S NX 4/6/1995	MW-213S NX 7/27/1995	MW-213S NX 12/19/2005	MW-213S FD 12/19/2005	MW-214S NX 4/5/1995	MW-214S NX 7/26/1995	MW-214S NX 12/19/2005	MW-215B NX 4/6/1995	MW-215B NX 7/25/1995	MW-215B NX 12/19/2005
alpha-Chlordane	0.001 J	0.002 U	-- R	-- R	0.0015 U	0.0015 U	0.005 UJ	0.0015 U	0.0015 UJ	NA
beta-BHC	0.003 U	0.002 U	-- R	-- R	0.0015 U	0.0015 U	0.005 UJ	0.0015 U	0.0015 U	NA
delta-BHC	0.003 U	0.002 U	-- R	-- R	0.0015 U	0.0015 U	0.005 UJ	0.0015 U	0.0015 U	NA
Dieldrin	0.003 J	0.003 U	-- R	-- R	0.004 J	0.003 U	0.01 UJ	0.0025 U	0.003 U	NA
Endosulfan I	R	0.002 UJ	-- R	-- R	0.0015 U	0.0015 UJ	0.005 UJ	R	0.0015 U	NA
Endosulfan II	0.005 U	0.003 U	0.016 J	-- R	0.0025 U	0.003 U	0.01 UJ	0.0025 U	0.003 U	NA
Endosulfan Sulfate	0.005 J	0.003 U	-- R	-- R	0.0025 U	0.002 J	0.01 UJ	0.0025 U	0.004 U	NA
Endrin	0.005 U	0.003 U	-- R	-- R	0.0025 U	0.003 U	0.01 UJ	0.0025 U	0.003 U	NA
Endrin Aldehyde	0.01 U	0.0045 U	-- R	-- R	0.004 U	0.0045 U	0.01 UJ	0.004 U	0.0045 U	NA
Endrin Ketone	0.005 U	0.0035 U	0.027 J	0.012 J	0.003 U	0.0035 U	0.01 UJ	0.003 U	0.0035 U	NA
gamma-BHC(Lindane)	0.003 U	0.002 U	-- R	-- R	0.0015 UJ	0.0015 U	0.005 UJ	0.0015 U	0.0015 U	NA
gamma-Chlordane	0.003 U	0.002 U	-- R	-- R	0.002 J	0.0015 U	0.005 UJ	0.0015 U	0.0015 U	NA
Heptachlor	0.003 U	0.002 U	-- R	-- R	0.0015 U	0.0015 U	0.005 UJ	0.0015 U	0.0015 U	NA
Heptachlor Epoxide	0.003 UJ	0.002 UJ	-- R	-- R	0.0015 UJ	0.0015 UJ	0.005 UJ	0.0015 UJ	0.0015 U	NA
Methoxychlor	0.02 J	0.02 U	-- R	-- R	0.015 U	0.015 U	0.05 UJ	0.015 U	0.015 U	NA
Toxaphene	0.305 U	0.175 U	-- R	-- R	0.16 U	0.165 U	0.5 UJ	0.16 U	0.165 U	NA
Aroclor-1016	0.025 U	0.03 U	-- R	-- R	0.025 U	0.03 U	0.1 U	0.025 U	0.03 U	NA
Aroclor-1221	0.05 U	0.06 U	-- R	-- R	0.05 U	0.055 U	0.2 U	0.05 U	0.055 U	NA
Aroclor-1232	0.025 U	0.03 U	-- R	-- R	0.025 U	0.03 U	0.1 U	0.025 U	0.03 U	NA
Aroclor-1242	0.04 J	0.03 U	-- R	-- R	0.025 U	0.03 U	0.1 U	0.025 U	0.03 U	NA
Aroclor-1248	0.025 U	0.03 U	-- R	-- R	0.15	0.03 U	0.1 U	0.025 U	0.03 U	NA
Aroclor-1254	0.02 J	0.03 U	-- R	-- R	0.025 U	0.03 U	0.1 U	0.025 U	0.03 U	NA
Aroclor-1260	0.03 J	0.03 U	-- R	-- R	0.025 U	0.03 U	0.1 U	0.025 U	0.03 U	NA
Metals (ug/L)										
Aluminum	51.5 U	77 U	50.0 U	50.0 U	12.5 U	48.85 U	50.0 U	12.5 U	47.35 U	117
Antimony	1.5 U	0.95 U	2.0 U	2.0 U	1.5 U	0.95 U	2.0 U	1.5 U	0.95 U	2.0 U
Arsenic	4 U	3.1	1.7	1.7	55.6 J	39.7	88.8	4 U	7.5	4.2
Barium	1340	2000	801	873	134	137	41.2	6	2.1 U	3.9 J
Beryllium	0.5 U	0.21 U	1.0 U	1.0 U	0.5 U	0.185 U	1.0 U	0.5 U	0.05 U	1.0 U
Cadmium	1 U	0.25 U	1.0 U	0.075 J	1 U	0.25 U	1.0 U	1 U	0.25 U	0.088 J
Calcium	88500	55000	127000	124000	12100	10200	8000	15600	14200	16800
Chromium	2.5 U	5.4	4.1	4.0	2.5 U	0.35 U	0.083 J	2.5 U	0.75 U	0.27 J
Cobalt	1 U	2.3	0.75 J	0.73 J	6.3	3.6	2.3	1 U	0.25 U	1.0 U
Copper	57.8 J	1.45 U	3.5 UJ	3.4 UJ	1.5 U	0.25 U	2.0 UJ	1.5 U	0.85 U	2.0 UJ
Iron	14100	27900	12200	11800	45800	42500	57400	15 U	22.6 U	100 U
Lead	32.7	21.7	3.3 J	3.4 J	3.5	1.9	0.36 J	1.5 U	1.9	0.37 J
Magnesium	18600	14000	24100	23400	1530	1160	1360 J	3740	3470	4040 J
Manganese	316	2060	803	744	5420	4040	4550	47.3	80.7	30.7
Mercury	0.1 U	0.1 U	0.20 UJ	0.20 UJ	0.1 U	0.1 U	0.20 UJ	0.1 U	0.1 U	0.20 UJ
Nickel	12	21.8	9.9 J	9.5 J	5 U	1.2 U	1.0 J	5 U	1.2 U	0.44 J
Potassium	25400	27200 J	22200 J	21400 J	1120	946 J	878 J	4780	2860 J	2460 J
Selenium	2.5 U	1.7 U	2.6 J	2.7 J	2.5 U	1.7 U	5.0 UJ	2.5 U	1.7 U	5.0 UJ
Silver	1.5 U	0.3 U	1.0 U	1.0 U	1.5 U	0.3 U	1.0 U	1.5 U	0.3 U	1.0 U
Sodium	168000	219000	208000	199000	9410	8300	8000	16200	14000	15900
Thallium	4 U	1.8 U	0.50 U	0.50 U	4 U	1.8 U	0.50 U	4 U	1.8 U	0.50 U
Vanadium	1 U	2.5	1.0 J	1.0 J	1 U	0.86	1.0 UJ	1 U	0.3 U	1.3 J
Zinc	137 J	347	32.4 J	30.0 J	140 J	106	86.3 J	2 U	0.6 U	9.6 J
1,4-Dioxanes (ug/L)										
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-01 NX 3/28/1995	OW-01 NX 7/18/1995	OW-01 NX 12/20/2005	OW-02 NX 3/28/1995	OW-02 NX 7/18/1995	OW-02 NX 12/20/2005	OW-07 NX 4/4/1995	OW-07 NX 7/24/1995	OW-07 NX 2/22/2006	OW-08 AV 4/6/1995	OW-08 NX 7/24/1995	OW-08 NX 2/22/2006	OW-09 AV 4/4/1995	OW-09 AV 7/21/1995	OW-09 NX 12/15/2005
VOCs (ug/L)															
1,1,1-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	22	10 U	10 U	0.66
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethane	10 U	10 U	1.4	10 U	10 U	0.5 U	10 U	10 U	0.34 J	10 U	10 U	38	9 J	9.5 J	4.8
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	2 J	1.4
1,2-Dichloroethane	2 J	10 U	0.74	10 U	10 U	0.5 U	10 U	10 U	0.54 U	10 U	10 U	2.7 U	4 J	4.5 J	2.6
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	8 J	4 J	NA	10 U	10 U	NA	10 U	10 U	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.21 J	10 U	10 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	3 J	1.6	10 U	10 U	0.32 J
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Acetone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	345	350	59	10 U	10 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U
Bromoform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U
Bromomethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.36 J	10 U	10 U	0.5 U
Chlorobenzene	3 J	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	46	10 U	10 U	0.86
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	1.6	10 U	10 U	0.58	10 U	10 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.87
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	8.6	10 U	10 U	0.5 U
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.39 J	NA	NA	0.5 U
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.52	10 U	10 U	0.5 U
Methyl acetate	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 UJ
Methyl tert-butyl ether	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.089 J
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	3.2
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.52	10 U	10 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.58	NA	NA	0.5 U	NA	NA	0.093 J
trans-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U
Trichloroethene	5 J	5 J	1.5	10 U	10 U	0.5 U	23	21	4.6	10 U	10 U	0.13 J	10 U	10 U	2.2
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	9.5 J	13	4.8	10 U	10 U	0.5 U
SVOCs (ug/L)															
1,1'-Biphenyl	NA	NA	5 UJ	NA	NA	5 UJ	NA	NA	5 U	NA	NA	5 U	NA	NA	5.7 UJ
1,2,4,5-Tetrachlorobenzene	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5.7 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5.7 U
2,4,5-Trichlorophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	23 U
2,4,6-Trichlorophenol	10 U	10 UJ	5 U	10 U	10 UJ	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
2,4-Dichlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
2,4-Dimethylphenol	10 U	10 UJ	5 U	10 U	10 UJ	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 UJ	5.7 U
2,4-Dinitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	23 U
2,4-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
2,6-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-01 NX 3/28/1995	OW-01 NX 7/18/1995	OW-01 NX 12/20/2005	OW-02 NX 3/28/1995	OW-02 NX 7/18/1995	OW-02 NX 12/20/2005	OW-07 NX 4/4/1995	OW-07 NX 7/24/1995	OW-07 NX 2/22/2006	OW-08 AV 4/6/1995	OW-08 NX 7/24/1995	OW-08 NX 2/22/2006	OW-09 AV 4/4/1995	OW-09 AV 7/21/1995	OW-09 NX 12/15/2005
2-Chloronaphthalene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
2-Chlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
2-Methylnaphthalene	10 UJ	10 U	0.24 UJ	10 UJ	10 U	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.23 U
2-Methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
2-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	25 UJ	25 U	20 U	25 UJ	25 U	20 U	25 UJ	25 U	23 U
2-Nitrophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
3,3'-Dichlorobenzidine	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 UJ	5 U	10 U	10 UJ	5 U	10 U	10 U	5.7 U
3-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	23 U
4,6-Dinitro-2-methylphenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	23 U
4-Bromophenyl-phenylether	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
4-Chloro-3-methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
4-Chloroaniline	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
4-Chlorophenyl-phenylether	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 UJ
4-Methylphenol	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
4-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	23 U
4-Nitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	23 U
Acenaphthene	10 U	10 U	0.24 UJ	10 U	10 U	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.044 J
Acenaphthylene	10 U	10 U	0.24 UJ	10 U	10 U	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.23 U
Acetophenone	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5.7 U
Anthracene	10 U	10 UJ	5 UJ	10 U	10 UJ	5 UJ	10 UJ	10 U	5 U	10 U	10 UJ	5 U	10 UJ	10 UJ	5.7 U
Atrazine	NA	NA	5 U	NA	NA	5 UJ	NA	NA	R	NA	NA	R	NA	NA	1.1 U
Benzaldehyde	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5.7 U
Benzo(a)anthracene	10 U	10 U	0.12 UJ	10 U	10 U	0.12 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Benzo(a)pyrene	10 U	10 U	0.12 UJ	10 U	10 U	0.12 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Benzo(b)fluoranthene	10 U	10 U	0.12 UJ	10 U	10 U	0.12 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Benzo(g,h,i)perylene	10 UJ	10 U	0.24 UJ	10 UJ	10 U	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.23 U
Benzo(k)fluoranthene	10 U	10 U	0.24 UJ	10 U	10 U	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.23 U
Bis(2-chloroethoxy)methane	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Bis(2-chloroethyl)ether	10 U	10 U	0.065 J	10 U	10 U	0.58 UJ	10 U	10 U	0.093 J	10 U	10 U	0.5 U	10 U	10 U	0.44 J
Bis(2-ethylhexyl)phthalate	10 U	10 U	2.4 UJ	10 U	10 U	2.3 UJ	10 U	10 U	2 UJ	10 UJ	10 U	2 UJ	10 U	10 U	2.3 UJ
Butylbenzylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5.7 U
Caprolactam	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5.7 U
Carbazole	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
Chrysene	10 U	10 U	0.24 UJ	10 U	10 U	0.23 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.23 U
Dibenz(a,h)anthracene	10 U	10 U	0.12 UJ	10 U	10 U	0.12 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Dibenzofuran	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Diethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Dimethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Di-n-butylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Di-n-octylphthalate	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5.7 U
Fluoranthene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Fluorene	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5.7 U
Hexachlorobenzene	10 U	10 U	1.2 UJ	10 U	10 U	1.2 UJ	10 U	10 U	1 U	10 U	10 U	1 U	10 U	10 U	1.1 U
Hexachlorobutadiene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Hexachlorocyclopentadiene	10 UJ	10 UJ	5 U	10 UJ	10 UJ	5 U	R	10 U	5 U	10 U	10 U	5 U	R	10 UJ	5.7 U
Hexachloroethane	10 U	10 UJ	5 U	10 U	10 UJ	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.12 UJ	10 U	10 U	0.12 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U	10 U	10 U	0.11 U
Isophorone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Naphthalene	10 U	10 UJ	0.24 UJ	10 U	10 UJ	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.23 U
Nitrobenzene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5.7 U
N-Nitroso-di-n-propylamine	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
N-Nitrosodiphenylamine	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7 U
Pentachlorophenol	25 U	25 U	1.2 UJ	25 U	25 U	1.2 UJ	25 U	25 U	1 U	25 U	25 U	1 U	25 U	25 U	1.1 U
Phenanthrene	10 U	10 U	0.24 UJ	10 U	10 U	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.23 U
Phenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5.7	10 U	10 U	5.7 U
Pyrene	10 U	10 UJ	0.24 UJ	10 U	10 UJ	0.23 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U	10 U	10 U	0.039 J
Pesticides/PCBs (ug/L)															
4,4'-DDD	0.005 U	0.005 U	NA	0.006 U	0.005 U	NA	0.006 U	0.006 U	0.01 UJ	0.005 U	0.006 U	0.01 UJ	0.005 U	0.0004 J	-- R
4,4'-DDE	0.005 U	0.0007 J	NA	0.006 U	0.001 J	NA	0.006 U	0.003 J	0.01 UJ	0.005 U	0.006 U	0.01 UJ	0.005 U	0.005 J	0.01 U
4,4'-DDT	0.005 U	0.005 U	NA	0.006 U	0.005 U	NA	0.006 U	0.002 J	0.01 UJ	0.005 U	0.006 U	0.01 UJ	0.005 U	0.005 U	0.01 U
Aldrin	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.002 J	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 U
alpha-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 UJ	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 UJ

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-01 NX 3/28/1995	OW-01 NX 7/18/1995	OW-01 NX 12/20/2005	OW-02 NX 3/28/1995	OW-02 NX 7/18/1995	OW-02 NX 12/20/2005	OW-07 NX 4/4/1995	OW-07 NX 7/24/1995	OW-07 NX 2/22/2006	OW-08 AV 4/6/1995	OW-08 NX 7/24/1995	OW-08 NX 2/22/2006	OW-09 AV 4/4/1995	OW-09 AV 7/21/1995	OW-09 NX 12/15/2005
alpha-Chlordane	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 UJ	0.001 J	0.003 U	0.0051 J
beta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 U
delta-BHC	0.0004 J	0.0008 J	NA	0.003 U	0.0006 J	NA	0.003 U	0.002 J	0.005 UJ	0.003 U	0.003 U	0.005 UJ	0.003 U	0.002 J	0.005 U
Dieldrin	0.005 U	0.005 U	NA	0.0008 J	0.005 U	NA	0.006 U	0.006 U	0.01 UJ	0.005 U	0.006 U	0.01 UJ	0.005 U	0.005 U	0.01 U
Endosulfan I	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 UJ	0.005 UJ	0.003 U	0.003 UJ	0.005 UJ	0.003 U	0.003 UJ	0.005 U
Endosulfan II	0.005 U	0.005 U	NA	0.006 U	0.005 U	NA	0.006 U	0.006 U	0.01 UJ	0.005 U	0.002 J	0.01 UJ	0.003 J	0.005 U	0.01 U
Endosulfan Sulfate	0.005 U	0.005 U	NA	0.0002 J	0.005 U	NA	0.004 J	0.006 U	0.01 UJ	0.005 U	0.006 U	0.01 UJ	0.0005 J	0.005 U	0.01 U
Endrin	0.005 U	0.005 U	NA	0.006 U	0.005 U	NA	0.006 U	0.001 J	0.01 UJ	0.005 U	0.006 U	0.01 UJ	0.005 U	0.005 U	0.01 UJ
Endrin Aldehyde	0.009 U	0.008 U	NA	0.009 U	0.008 U	NA	0.009 U	0.009 U	0.01 UJ	0.009 U	0.009 U	0.01 UJ	0.008 U	0.008 U	0.01 U
Endrin Ketone	0.006 U	0.006 U	NA	0.007 U	0.006 U	NA	0.007 U	0.007 U	0.01 UJ	0.006 U	0.007 U	0.01 UJ	0.006 U	0.006 U	0.01 U
gamma-BHC(Lindane)	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 UJ	0.003 U	0.005 UJ	0.003 UJ	0.003 U	0.005 UJ
gamma-Chlordane	0.0005 J	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 UJ	0.003 U	0.005 UJ	0.0004 J	0.003 U	0.005 U
Heptachlor	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 UJ	0.003 U	0.003 U	0.005 U
Heptachlor Epoxide	0.002 J	0.003 U	NA	0.0002 J	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 UJ	0.003 U	0.005 UJ	0.005 J	0.003 U	0.005 U
Methoxychlor	0.03 U	0.03 U	NA	0.03 U	0.03 U	NA	0.03 U	0.03 U	0.05 UJ	0.007 J	0.03 U	0.05 UJ	0.03 U	0.03 U	0.05 U
Toxaphene	0.32 U	0.31 U	NA	0.33 U	0.32 U	NA	0.34 U	0.33 U	0.5 UJ	0.33 U	0.34 U	0.5 UJ	0.32 U	0.32 U	0.5 U
Aroclor-1016	0.05 U	0.05 U	NA	0.06 U	0.05 U	NA	0.06 U	0.06 U	0.1 U	0.05 U	0.06 U	0.1 U	0.05 U	0.05 U	0.1 U
Aroclor-1221	0.11 U	0.1 U	NA	0.11 U	0.1 U	NA	0.11 U	0.11 U	0.2 U	0.11 U	0.11 U	0.2 U	0.1 J	0.1 U	0.2 U
Aroclor-1232	0.05 U	0.05 U	NA	0.06 U	0.05 U	NA	0.05 J	0.06 U	0.1 U	0.05 U	0.06 U	0.1 U	0.05 U	0.05 U	0.1 U
Aroclor-1242	0.05 U	0.05 U	NA	0.06 U	0.05 U	NA	0.06 U	0.06 U	0.1 U	0.05 U	0.06 U	0.1 U	0.05 U	0.05 U	0.1 U
Aroclor-1248	0.05 U	0.05 U	NA	0.06 U	0.05 U	NA	0.06 U	0.06 U	0.1 U	0.05 U	0.06 U	0.1 U	0.05 U	0.05 U	0.1 U
Aroclor-1254	0.05 U	0.05 U	NA	0.06 U	0.05 U	NA	0.06 U	0.06 U	0.1 U	0.05 U	0.06 U	0.1 U	0.05 U	0.05 U	0.1 U
Aroclor-1260	0.08	0.05 U	NA	0.006 J	0.05 U	NA	0.06 U	0.06 U	0.1 U	0.05 U	0.06 U	0.1 U	0.05 U	0.05 U	0.1 U
Metals (ug/L)															
Aluminum	44 U	165 U	50.0 U	25 U	139 U	50.0 U	210	56.7 U	60.6	25 U	136 U	28.0 J	1600	1965	3200
Antimony	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 UJ	3 U	1.9 U	2.0 UJ	3 U	1.9 U	2.0 U
Arsenic	8 U	2.7 U	2.4	21.2 U	17.6	11.9	8.1	7.6	7.2	13.3 J	5.5	14.4	8 U	2.7 U	1.5
Barium	3.6 U	5.2 U	2.6 J	24.5	21.7	26.1	39.6	47.7	32.4	36	33.4	23.7	39.05	35.7	105
Beryllium	1 U	0.41 U	1.0 U	1 U	0.4 U	1.0 U	1 U	0.1 U	1.0 U	1 U	0.1 U	1.0 U	2.1	2 U	3.1 J
Cadmium	2 U	0.5 U	0.18 J	2 U	0.5 U	0.38 J	2 U	0.5 U	1.0 U	2 U	0.5 U	1.0 U	2 U	2.05	18.3
Calcium	78900	75800	71300	37900	33000	36700	35100	57500 J	44200	47600	46300 J	37700	104500	122000 J	304000
Chromium	5 U	0.88 U	0.095 J	5 U	0.7 U	0.15 J	20.6 J	0.7 U	2.0 U	5 U	0.91 U	0.48 J	5 U	0.7 U	1.4 J
Cobalt	2 U	0.72 U	0.40 J	2 U	1.6 U	2.2	2.3	2.1 U	1.2 U	2 U	0.91 U	1.0 U	103.5	134.5	341
Copper	3 U	1.9 U	2.0 UJ	3 U	1.5 U	2.0 UJ	34.7 J	1.6 U	2.2 U	3 U	1.7 U	2.0 U	14.55 J	7.9	135 J
Iron	117	78.7 U	100 U	3380	2270	1280	1130 J	849	1270	3615	3330	3160	531.5	805	770
Lead	3 UJ	1.6 UJ	1.0 UJ	3 UJ	1.6 UJ	0.24 J	25.2	1.6 U	0.25 J	3 U	1.6 U	0.11 J	20.95 J	1.6 U	6.1 J
Magnesium	8610	7980	6700	4720	3780	5110	9340	9090 J	7870	15200	14400 J	6580	20850	24350 J	60800
Manganese	273	229	158	2280	1790	2320	1830	1340	2110	967	927	567	7275	8745	22600
Mercury	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ
Nickel	10 U	3.2 U	1.2 J	10 U	3 U	2.5 J	14.2	2.4 U	1.0 U	10 U	2.4 U	1.0 U	99.1	121.5	286 J
Potassium	3090	2950	2090 J	4630	3940	3050 J	13400	7510	4600 J	9825	8260	5850 J	10600	10800	17900 J
Selenium	5 UJ	3.4 U	5.0 UJ	5 UJ	3.4 U	5.0 UJ	5 U	3.4 U	5.0 U	4.15 J	3.4 U	5.0 U	5 U	3.4 U	5.0 UJ
Silver	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	0.63 J
Sodium	46700	51000	36000	72600	79200	77700	485000	131000 J	48400	47400	51500 J	39500	136500	148000 J	311000
Thallium	8 UJ	3.6 U	0.50 U	8 UJ	3.6 U	0.50 U	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 U
Vanadium	2 U	0.6 U	0.31 J	2 U	0.6 U	0.51 J	2 U	0.6 U	0.31 J	2 U	1	0.43 J	2 U	0.6 U	1.4 J
Zinc	4 U	7.7 U	2.0 U	4 U	8 U	2.0 U	35.4	11.6 U	2.0 U	4 U	2.3 U	2.0 U	146.5	166	357 J
1,4-Dioxanes (ug/L)															
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-10 NX 4/5/1995	OW-10 AV 7/24/1995	OW-10 NX 12/15/2005	OW-12 NX 4/5/1995	OW-12 NX 7/24/1995	OW-12 NX 12/15/2005	OW-20 AV 4/4/1995	OW-20 NX 7/25/1995	OW-20 NX 12/21/2005	OW-25 NX 4/7/1995	OW-25 NX 7/24/1995	OW-25 NX 12/13/2005	OW-26 NX 4/7/1995	OW-26 NX 7/24/1995	OW-26 NX 12/13/2005
VOCs (ug/L)															
1,1,1-Trichloroethane	10 U	10 U	0.64	10 U	10 U	0.5 U	10 U	10 U	9.1	10 U	10 U	0.94	10 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	3 J	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethane	4 J	4 J	4.7	10 U	10 U	0.5 U	10	7 J	11	10 U	10 U	1.6	10 U	10 U	0.28 J
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	4.8 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	1.5	10 U	10 U	0.5 U	10 U	10 U	0.46 J	10 U	10 U	0.29 J	10 U	10 U	0.41 J
1,2-Dichloroethane	10 U	10 U	2.6	10 U	10 U	0.5 U	3 J	3 J	0.66	10 U	10 U	1.3	10 U	10 U	0.5 U
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.56	10 U	10 U	0.81	10 U	10 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.31 J	10 U	10 U	0.5 U	10 U	10 U	0.6	10 U	10 U	0.5 U	10 U	10 U	0.27 J
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	11	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Acetone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.37 J	10 U	10 U	0.26 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.34 J	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Bromoform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U	10 U	10 U	0.73 U	10 U	10 U	0.5 U
Bromomethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	7.8 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chlorobenzene	10 U	10 U	0.87	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.17 J	10 U	10 U	0.41 J
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	3.2	10 U	10 U	0.5 U	10 U	10 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.85	NA	NA	0.24 J	NA	NA	0.5 UJ	NA	NA	0.6	NA	NA	0.31 J
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.43 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Methyl acetate	NA	NA	0.5 UJ	NA	NA	0.5 UJ	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methyl tert-butyl ether	NA	NA	0.5 U	NA	NA	0.093 J	NA	NA	0.98	NA	NA	0.25 J	NA	NA	0.5 U
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.16 J	NA	NA	0.76	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ
Tetrachloroethene	10 U	10 U	3.2	10 U	10 U	0.5 U	10 U	10 U	39	10 U	10 U	4.4	10 U	10 U	0.5 U
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.32 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.076 J	NA	NA	0.5 U	NA	NA	0.21 J	NA	NA	0.5 U	NA	NA	0.096 J
trans-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Trichloroethene	10 U	10 U	2.2	10 U	10 U	0.5 U	10 U	10 U	7 J	10 U	10 U	3.2	10 U	10 U	0.08 J
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.11 J	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	1.7	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
SVOCs (ug/L)															
1,1'-Biphenyl	NA	NA	5.7 UJ	NA	NA	5.7 UJ	NA	NA	5 UJ	NA	NA	5 U	NA	NA	5 U
1,2,4,5-Tetrachlorobenzene	NA	NA	5.7 U	NA	NA	5.7 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4,5-Trichlorophenol	25 U	25 U	23 U	25 U	25 U	23 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2,4,6-Trichlorophenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4-Dichlorophenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4-Dimethylphenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4-Dinitrophenol	25 UJ	25 U	23 U	25 UJ	25 U	23 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2,4-Dinitrotoluene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,6-Dinitrotoluene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-10 NX 4/5/1995	OW-10 AV 7/24/1995	OW-10 NX 12/15/2005	OW-12 NX 4/5/1995	OW-12 NX 7/24/1995	OW-12 NX 12/15/2005	OW-20 AV 4/4/1995	OW-20 NX 7/25/1995	OW-20 NX 12/21/2005	OW-25 NX 4/7/1995	OW-25 NX 7/24/1995	OW-25 NX 12/13/2005	OW-26 NX 4/7/1995	OW-26 NX 7/24/1995	OW-26 NX 12/13/2005
2-Chloronaphthalene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Chlorophenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Methylnaphthalene	10 U	10 U	0.23 U	3 J	4 J	1.2	10 U	10 U	0.1 J	10 U	10 U	0.2 U	10 U	10 U	0.2 U
2-Methylphenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Nitroaniline	25 U	25 U	23 U	25 U	25 U	23 U	25 UJ	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2-Nitrophenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
3,3'-Dichlorobenzidine	10 UJ	10 UJ	5.7 U	10 UJ	10 UJ	5.7 U	10 UJ	10 U	5 U	10 U	10 UJ	5 UJ	10 U	10 UJ	5 UJ
3-Nitroaniline	25 U	25 U	23 U	25 U	25 U	23 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4,6-Dinitro-2-methylphenol	25 U	25 U	23 U	25 U	25 U	23 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4-Bromophenyl-phenylether	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chloro-3-methylphenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chloroaniline	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chlorophenyl-phenylether	10 U	10 U	5.7 UJ	10 U	10 U	5.7 UJ	10 U	10 U	5 UJ	10 U	10 U	5 U	10 U	10 U	5 U
4-Methylphenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Nitroaniline	25 U	25 U	23 U	25 U	25 U	23 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4-Nitrophenol	25 U	25 U	23 U	25 U	25 U	23 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
Acenaphthene	10 U	10 U	0.035 J	10 U	10 U	0.23 U	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Acenaphthylene	10 U	10 U	0.23 U	10 U	10 U	0.23 U	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Acetophenone	NA	NA	5.7 U	NA	NA	5.7 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Anthracene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Atrazine	NA	NA	0.13 J	NA	NA	1.1 U	NA	NA	R	NA	NA	0.28 J	NA	NA	1 U
Benzaldehyde	NA	NA	5.7 U	NA	NA	5.7 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Benzo(a)anthracene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Benzo(a)pyrene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Benzo(b)fluoranthene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Benzo(g,h,i)perylene	10 U	10 U	0.23 U	10 U	10 U	0.23 U	10 U	10 U	0.2 UJ	10 U	10 U	0.097 J	10 U	10 U	0.2 U
Benzo(k)fluoranthene	10 U	10 U	0.23 U	10 U	10 U	0.23 U	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Bis(2-chloroethoxy)methane	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Bis(2-chloroethyl)ether	10 U	10 U	0.058 J	10 U	10 U	0.57 U	10 U	10 U	0.5 UJ	10 U	10 U	0.02 J	10 U	10 U	0.11 J
Bis(2-ethylhexyl)phthalate	3 J	10 U	2.3 UJ	10 U	10 U	2.3 UJ	10 U	10 U	0.5 UJ	4 J	10 U	0.2 U	10 U	10 U	0.38 U
Butylbenzylphthalate	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Caprolactam	NA	NA	5.7 U	NA	NA	5.7 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Carbazole	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
Chrysene	10 U	10 U	0.23 U	10 U	10 U	0.23 U	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Dibenz(a,h)anthracene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Dibenzofuran	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Diethylphthalate	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Dimethylphthalate	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Di-n-butylphthalate	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Di-n-octylphthalate	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 UJ	10 U	10 U	5 U	10 U	10 U	5 U
Fluoranthene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Fluorene	10 U	10 U	5.7 U	10 U	10 U	0.46 J	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Hexachlorobenzene	10 U	10 U	1.1 U	10 U	10 U	1.1 U	10 U	10 U	1 UJ	10 U	10 U	1 U	10 U	10 U	1 U
Hexachlorobutadiene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Hexachlorocyclopentadiene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	R	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Hexachloroethane	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.11 U	10 U	10 U	0.11 U	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Isophorone	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Naphthalene	10 U	10 U	0.23 U	10 U	3 J	1.1	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Nitrobenzene	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
N-Nitroso-di-n-propylamine	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
N-Nitrosodiphenylamine	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Pentachlorophenol	25 U	25 U	1.1 U	25 U	25 U	1.1 U	25 U	25 U	1 UJ	25 U	25 U	1 U	25 U	25 U	1 U
Phenanthrene	10 U	10 U	0.23 U	10 U	10 U	0.23 U	10 U	10 U	0.04 J	10 U	10 U	0.083 J	10 U	10 U	0.031 J
Phenol	10 U	10 U	5.7 U	10 U	10 U	5.7 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Pyrene	10 U	10 U	0.23 U	10 U	10 U	0.23 U	10 U	10 U	0.2 UJ	10 U	10 U	0.095 J	10 U	10 U	0.2 U
Pesticides/PCBs (ug/L)															
4,4'-DDD	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.006 U	R	0.005 U	0.006 U	NA	0.005 U	0.01 U	0.01 U
4,4'-DDE	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.006 U	0.01 U	0.005 U	0.003 J	NA	0.005 U	0.02	0.01 U
4,4'-DDT	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.006 U	0.01 U	0.005 U	0.006 U	NA	0.005 U	0.01 U	0.01 U
Aldrin	0.0004 J	0.003 U	NA	0.003 U	0.003 U	NA	0.002 J	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.006 U	0.005 U
alpha-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 UJ	0.002 J	NA	0.003 UJ	0.006 U	0.005 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-10 NX 4/5/1995	OW-10 AV 7/24/1995	OW-10 NX 12/15/2005	OW-12 NX 4/5/1995	OW-12 NX 7/24/1995	OW-12 NX 12/15/2005	OW-20 AV 4/4/1995	OW-20 NX 7/25/1995	OW-20 NX 12/21/2005	OW-25 NX 4/7/1995	OW-25 NX 7/24/1995	OW-25 NX 12/13/2005	OW-26 NX 4/7/1995	OW-26 NX 7/24/1995	OW-26 NX 12/13/2005
alpha-Chlordane	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 UJ	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.006 U	0.005 U
beta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.04 J	0.005 U
delta-BHC	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.002 J	0.004 J	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.006 U	0.005 U
Dieldrin	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.006 U	0.01 U	0.005 U	0.006 U	NA	0.005 U	0.01 U	0.01 U
Endosulfan I	0.0008 J	0.003 UJ	NA	0.003 U	0.003 UJ	NA	0.003 U	0.003 U	0.005 U	R	0.004 UJ	NA	R	0.006 UJ	0.005 U
Endosulfan II	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.006 U	0.01 U	0.005 U	0.006 U	NA	0.005 U	0.01 U	0.01 U
Endosulfan Sulfate	0.0004 J	0.005 U	NA	0.005 U	0.005 U	NA	0.003 J	0.006 U	0.01 U	0.001 J	0.006 U	NA	0.004 J	0.01 U	0.01 U
Endrin	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.002 J	0.01 UJ	0.005 U	0.006 U	NA	0.0002 J	0.01 U	0.01 UJ
Endrin Aldehyde	0.008 U	0.008 U	NA	0.008 U	0.008 U	NA	0.008 U	0.009 U	0.01 U	0.009 U	0.01 U	NA	0.008 U	0.02 U	0.01 U
Endrin Ketone	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.0006 J	0.007 U	0.01 U	0.006 U	0.008 U	NA	0.006 U	0.01 U	0.01 U
gamma-BHC(Lindane)	0.003 UJ	0.003 U	NA	0.003 UJ	0.003 U	NA	0.003 U	0.003 U	0.005 UJ	0.003 U	0.004 U	NA	0.003 U	0.006 U	0.005 U
gamma-Chlordane	0.003 UJ	0.003 U	NA	0.003 UJ	0.003 U	NA	0.0007 J	0.0005 J	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.006 U	0.005 U
Heptachlor	0.003 U	0.003 U	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.006 U	0.005 U
Heptachlor Epoxide	0.004 J	0.003 U	NA	0.003 UJ	0.003 U	NA	0.005	0.003 U	0.005 U	0.003 UJ	0.004 U	NA	0.003 UJ	0.006 U	0.005 U
Methoxychlor	0.03 U	0.03 U	NA	0.03 U	0.03 U	NA	0.03 U	0.03 U	0.05 U	0.03 U	0.04 U	NA	0.008 J	0.06 U	0.05 U
Toxaphene	0.32 U	0.32 U	NA	0.32 U	0.32 U	NA	0.3 U	0.34 U	0.5 U	0.32 U	0.38 U	NA	0.32 U	0.64 U	0.5 U
Aroclor-1016	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	0.05 U	0.06 U	0.2 U	0.05 U	0.06 U	NA	0.05 U	0.11 U	0.2 U
Aroclor-1221	0.11 U	0.1 U	NA	0.11 U	0.11 U	NA	0.1 U	0.11 U	0.4 U	0.11 U	0.12 U	NA	0.1 U	0.22 U	0.4 U
Aroclor-1232	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	0.05 U	0.06 U	0.2 U	0.05 U	0.06 U	NA	0.05 U	0.11 U	0.2 U
Aroclor-1242	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	0.05 U	0.06 U	0.2 U	0.05 U	0.06 U	NA	0.05 U	0.11 U	0.2 U
Aroclor-1248	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	0.05 U	0.06 U	0.2 U	0.05 U	0.06 U	NA	0.05 U	0.11 U	0.2 U
Aroclor-1254	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	0.05 U	0.06 U	0.2 U	0.05 U	0.06 U	NA	0.05 U	0.11 U	0.2 U
Aroclor-1260	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	0.05 U	0.06 U	0.2 U	0.05 U	0.06 U	NA	0.05 U	0.11 U	0.2 U
Metals (ug/L)															
Aluminum	2460	2625	1870	1500	1010	419	39 U	108 U	50.0 U	25 U	179 U	61.7 J	51.5 U	113 U	81.7 J
Antimony	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	20.0 U	3 U	2.3 U	2.0 U
Arsenic	8 U	2.7 U	0.25 J	16.1 J	23.4	13.6	12	17.3	10.7	8 U	3.1	2.0 J	36.1	33.7	24.7
Barium	54	53.75	62.4	27.9	6.3 U	11.8	158	159 J	69.8	324	419	313	8.8	15.3 J	5.1 J
Beryllium	2.4	1.7 U	1.6 J	1 U	0.1 U	1.0 U	1 U	0.1 U	1.0 U	1 U	0.1 U	10.0 U	1 U	0.1 U	1.0 U
Cadmium	2 U	1.25	0.96 J	2 U	0.5 U	0.051 J	2 U	0.5 U	0.056 J	2 U	2	1.3 J	2 U	0.5 U	1.0 U
Calcium	50300	55400 J	51900	43200	39500 J	25700	54200	57400	34700	359000	410000 J	563000	25400	46000	19800
Chromium	5 U	0.7 U	0.32 J	8.2 J	1.1 U	0.16 J	5 U	1.1 U	2.0 U	5 U	1.3 U	20.0 U	5 U	1.1 U	1.1 J
Cobalt	45.4	54.65	41.5	2 U	0.5 U	0.28 J	35.05	37.4	24.7	5.8	9.8	12.2	2 U	0.5 U	1.0 U
Copper	7 J	8.7	8.6 J	22.4 J	1.3 U	2.0 UJ	3 U	2.6 U	1.0 J	3 U	3.5 U	20.0 U	5.9 J	1.8 U	2.0 U
Iron	1590	1675	443	2210	3080	293	5930 J	6780	9160	33	83.1	489 J	30.4	92.5	100 UJ
Lead	3 UJ	1.6 U	0.60 J	63.6	1.6 U	1.0 UJ	3 UJ	1.6 U	1.0 U	3 UJ	1.6 U	10.0 U	3 UJ	1.6 U	0.78 J
Magnesium	9430	9985 J	9500	1430	1330 J	5000 U	11400	11300	5350	41600	49000 J	74700	2030	3620	1190 J
Manganese	2850	3205	2820	530	585	82.2	3930	4160	3480	3330	3740	5970 J	11.7	22.4	7.6 J
Mercury	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ
Nickel	43.8	49.9	36.2 J	10 U	2.4 U	2.2 J	14.15	16.2	11.4	10 U	3.8	10.0 U	10 U	3.6	1.6
Potassium	5240	5005	3150 J	8380	7820	18800 J	18450	16700 J	6660	67900	82300	47300	8910	11200 J	3620 J
Selenium	5 U	3.4 U	0.15 J	5 U	3.4 U	5.0 UJ	5 U	3.4 U	5.0 U	5 U	3.4 U	50.0 U	5 U	3.4 U	5.0 U
Silver	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	R	0.6 U	10.0 U	R	0.6 U	1.0 U
Sodium	65300	86550 J	68800	31100	42000 J	39800	292500	288000	111000	3030000	4500000 J	4070000	233000	279000	141000
Thallium	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 UJ	9 J	3.6 U	5.0 U	8 U	3.6 U	0.50 U
Vanadium	2 U	0.6 U	1.0 UJ	2 U	1	1.1 J	2 U	0.6 U	1.0 UJ	2 U	1.1	1.4 J	2 U	1.7	0.64 J
Zinc	106	113	80.9 J	39.5 J	2.5 U	2.0 U	6	3.8 U	4.6	4 U	4.7 U	45.9 UJ	4 U	22.3 U	10.2 UJ
1,4-Dioxanes (ug/L)															
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-35 NX 3/31/1995	OW-35 NX 7/21/1995	OW-35 NX 12/21/2005	OW-37 NX 4/4/1995	OW-37 NX 7/28/1995	OW-37 NX 12/21/2005	OW-38 NX 4/4/1995	OW-38 NX 7/28/1995	OW-38 NX 12/21/2005	OW-49 NX 4/7/1995	OW-49 NX 7/26/1995	OW-49 NX 12/14/2005	OW-50 NX 4/7/1995	OW-50 NX 7/26/1995	OW-50 NX 12/14/2005
VOCs (ug/L)															
1,1,1-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethane	10 U	10 U	0.5 U	4 J	3 J	1.7	10 U	10 U	15	5 J	5 J	1.3	10 U	10 U	0.23 J
1,1-Dichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.26 J	10 U	10 U	1.7	5 J	3 J	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 UJ	10 U	0.5 U	10 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dibromoethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.35 J	10 U	10 U	0.5 U
1,2-Dichloroethane	10 U	10 U	0.5 U	10 U	10 U	0.47 J	10 U	10 U	0.5 U	6 J	8 J	5	10 U	10 U	0.5 U
1,2-Dichloroethene(total)	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	5 J	8 J	NA	10 U	10 U	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	1.7	10 UJ	10 U	0.14 J	10 U	10 U	0.5 U
2-Butanone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Hexanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
4-Methyl-2-pentanone	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
Acetone	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Benzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.63	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Benzene, (1-methylethyl)-	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromochloromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Bromoform	10 U	10 UJ	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U
Bromomethane	10 U	10 UJ	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 UJ	0.5 U	10 U	10 UJ	0.5 U
Carbon Disulfide	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Carbon Tetrachloride	10 U	10 U	0.5 U	10 U	10 U	0.56	10 U	10 U	37	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chlorobenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloroform	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	10 U	10 U	0.11 J	10 U	10 U	0.48 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
cis-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	2.4	NA	NA	0.5 U
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Cyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Ethylbenzene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.1 J	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Methyl acetate	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methyl tert-butyl ether	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.11 J	NA	NA	0.26 J	NA	NA	1.4
Methylcyclohexane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Methylene Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Styrene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	10 U	10 U	1.3	10 U	10 U	14	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Toluene	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
trans-1,2-Dichloroethene	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
trans-1,3-Dichloropropene	10 U	10 UJ	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Trichloroethene	10 U	10 U	0.5 U	10 U	10 U	0.28 J	10 U	10 U	2	22	25	7.8	10 U	10 U	0.18 J
Trichlorofluoromethane	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	0.5 U
Vinyl Chloride	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
Xylene (total)	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U	10 U	10 U	0.5 U
SVOCs (ug/L)															
1,1'-Biphenyl	NA	NA	5 UJ	NA	NA	5 UJ	NA	NA	5 UJ	NA	NA	5 U	NA	NA	5 U
1,2,4,5-Tetrachlorobenzene	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4,5-Trichlorophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2,4,6-Trichlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4-Dichlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4-Dimethylphenol	10 U	10 UJ	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,4-Dinitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2,4-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	6.7	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2,6-Dinitrotoluene	10 U	10 U	5 U	10 U	10 U	1.3 J	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-35 NX 3/31/1995	OW-35 NX 7/21/1995	OW-35 NX 12/21/2005	OW-37 NX 4/4/1995	OW-37 NX 7/28/1995	OW-37 NX 12/21/2005	OW-38 NX 4/4/1995	OW-38 NX 7/28/1995	OW-38 NX 12/21/2005	OW-49 NX 4/7/1995	OW-49 NX 7/26/1995	OW-49 NX 12/14/2005	OW-50 NX 4/7/1995	OW-50 NX 7/26/1995	OW-50 NX 12/14/2005
2-Chloronaphthalene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Chlorophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Methylnaphthalene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
2-Methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
2-Nitroaniline	25 U	25 U	20 U	25 UJ	25 U	20 U	25 UJ	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
2-Nitrophenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
3,3'-Dichlorobenzidine	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 UJ	10 U	10 U	5 UJ
3-Nitroaniline	25 U	25 U	20 U	25 U	25 U	6.2 J	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4,6-Dinitro-2-methylphenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4-Bromophenyl-phenylether	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chloro-3-methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chloroaniline	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Chlorophenyl-phenylether	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 U	10 U	10 U	5 U
4-Methylphenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
4-Nitroaniline	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
4-Nitrophenol	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U	25 U	25 U	20 U
Acenaphthene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Acenaphthylene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Acetophenone	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Anthracene	10 UJ	10 UJ	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Atrazine	NA	NA	R	NA	NA	R	NA	NA	R	NA	NA	1 U	NA	NA	1 U
Benzaldehyde	NA	NA	5 U	NA	NA	2 J	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Benzo(a)anthracene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Benzo(a)pyrene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Benzo(b)fluoranthene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Benzo(g,h,i)perylene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Benzo(k)fluoranthene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Bis(2-chloroethoxy)methane	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Bis(2-chloroethyl)ether	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.21 J	10 U	10 U	0.034 J
Bis(2-ethylhexyl)phthalate	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	10 U	0.5 UJ	10 U	24 U	0.2 U	10 U	10 U	0.2 U
Butylbenzylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Caprolactam	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U	NA	NA	5 U
Carbazole	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA
Chrysene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Dibenz(a,h)anthracene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Dibenzofuran	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Diethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Dimethylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Di-n-butylphthalate	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Di-n-octylphthalate	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 UJ	10 U	10 U	5 U	10 U	10 U	5 U
Fluoranthene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Fluorene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Hexachlorobenzene	10 U	10 U	1 UJ	10 U	10 U	1 UJ	10 U	10 U	1 UJ	10 U	10 U	1 U	10 U	10 U	1 U
Hexachlorobutadiene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Hexachlorocyclopentadiene	R	10 UJ	5 U	R	10 U	5 U	R	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Hexachloroethane	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 UJ	10 U	10 U	0.1 U	10 U	10 U	0.1 U
Isophorone	10 U	10 U	5 U	10 U	10 U	0.77 J	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Naphthalene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Nitrobenzene	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 UJ	10 U	5 U	10 UJ	10 U	5 U
N-Nitroso-di-n-propylamine	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
N-Nitrosodiphenylamine	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Pentachlorophenol	25 U	25 U	1 UJ	25 U	25 U	1 UJ	25 U	25 U	1 UJ	25 U	25 U	1 U	25 U	25 U	1 U
Phenanthrene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Phenol	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U	10 U	10 U	5 U
Pyrene	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 UJ	10 U	10 U	0.2 U	10 U	10 U	0.2 U
Pesticides/PCBs (ug/L)															
4,4'-DDD	0.005 U	0.005 U	R	0.0004 J	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA
4,4'-DDE	0.005 U	0.005 U	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA
4,4'-DDT	0.0009 J	0.005 U	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA
Aldrin	0.003 U	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.004 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA
alpha-BHC	0.003 U	0.003 U	0.005 UJ	0.003 U	0.004 UJ	NA	0.003 U	0.004 UJ	NA	0.003 U	0.004 U	NA	0.003 UJ	0.003 U	NA

COMPARISON OF GROUNDWATER MONITORING RESULTS - HISTORICAL VERSUS WINTER 2005-2006

ANALYTE	OW-35 NX 3/31/1995	OW-35 NX 7/21/1995	OW-35 NX 12/21/2005	OW-37 NX 4/4/1995	OW-37 NX 7/28/1995	OW-37 NX 12/21/2005	OW-38 NX 4/4/1995	OW-38 NX 7/28/1995	OW-38 NX 12/21/2005	OW-49 NX 4/7/1995	OW-49 NX 7/26/1995	OW-49 NX 12/14/2005	OW-50 NX 4/7/1995	OW-50 NX 7/26/1995	OW-50 NX 12/14/2005
alpha-Chlordane	0.003 U	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.004 U	NA	0.003 U	0.004 UJ	NA	0.003 U	0.003 UJ	NA
beta-BHC	0.003 U	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.004 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA
delta-BHC	0.003 U	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.002 J	NA	0.003 U	0.001 J	NA	0.003 U	0.003 U	NA
Dieldrin	0.005 U	0.005 U	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA
Endosulfan I	0.003 U	0.003 UJ	0.005 U	0.003 U	0.004 UJ	NA	0.003 U	0.004 UJ	NA	0.003 U	0.004 U	NA	R	0.003 U	NA
Endosulfan II	0.005 U	0.005 U	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA
Endosulfan Sulfate	0.005 U	0.005 U	0.01 U	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA
Endrin	0.005 U	0.005 U	0.01 UJ	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	NA
Endrin Aldehyde	0.008 U	0.008 U	0.01 U	0.009 U	0.009 U	NA	0.009 U	0.009 U	NA	0.009 U	0.009 U	NA	0.009 U	0.009 U	NA
Endrin Ketone	0.006 U	0.006 U	0.01 U	0.007 U	0.007 U	NA	0.007 U	0.007 U	NA	0.007 U	0.007 U	NA	0.007 U	0.007 U	NA
gamma-BHC(Lindane)	0.003 U	0.003 U	0.005 UJ	0.003 UJ	0.004 U	NA	0.003 UJ	0.004 U	NA	0.003 UJ	0.004 U	NA	0.003 U	0.003 U	NA
gamma-Chlordane	0.003 U	0.003 U	0.005 U	0.003 UJ	0.004 U	NA	0.003 UJ	0.004 U	NA	0.0007 J	0.004 U	NA	0.003 U	0.003 U	NA
Heptachlor	0.003 U	0.003 U	0.005 U	0.003 U	0.004 U	NA	0.003 U	0.004 U	NA	0.003 U	0.004 U	NA	0.003 U	0.003 U	NA
Heptachlor Epoxide	0.003 U	0.003 U	0.005 U	0.003 UJ	0.004 UJ	NA	0.003 UJ	0.004 UJ	NA	0.003 UJ	0.004 U	NA	0.003 UJ	0.003 U	NA
Methoxychlor	0.03 U	0.03 U	0.05 U	0.03 U	0.04 U	NA	0.03 U	0.04 U	NA	0.03 U	0.04 U	NA	0.03 U	0.03 U	NA
Toxaphene	0.31 U	0.31 U	0.5 U	0.33 U	0.35 U	NA	0.33 U	0.35 U	NA	0.33 U	0.35 U	NA	0.33 U	0.33 U	NA
Aroclor-1016	0.05 U	0.05 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA
Aroclor-1221	0.1 U	0.1 U	0.4 U	0.11 U	0.12 U	NA	0.11 U	0.12 U	NA	0.11 U	0.12 U	NA	0.11 U	0.11 U	NA
Aroclor-1232	0.05 U	0.05 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA
Aroclor-1242	0.05 U	0.05 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA
Aroclor-1248	0.05 U	0.05 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA
Aroclor-1254	0.05 U	0.05 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA
Aroclor-1260	0.02 J	0.05 U	0.2 U	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA
Metals (ug/L)															
Aluminum	25 U	81.4 U	50.0 U	47.1 U	126 U	50.0 U	25 U	68 U	50.0 U	25 U	74 U	50.0 UJ	35.1 U	66.3 U	643 J
Antimony	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	1.9 U	2.0 U	3 U	3.2 U	2.0 U	3 U	1.9 U	2.0 U
Arsenic	8 U	2.7 U	8.3	8 U	3	7.4	8 U	9.6 U	8.1	8 U	2.7 U	0.48 J	8 U	2.7 U	6.9
Barium	12	10.5	21.8	117	122	107	19.8	17.4 U	19.8	73.4	67.5 J	36.3	18.1	16 U	25.8
Beryllium	1 U	0.1 U	1.0 U	1 U	0.46 U	1.0 U	1 U	0.15 U	1.0 U	1 U	0.1 U	1.0 U	1 U	0.1 U	0.10 J
Cadmium	2 U	0.5 U	1.0 U	2 U	0.5 U	1.0 U	2 U	0.5 U	0.41 J	2 U	0.5 U	0.43 J	2 U	0.5 U	0.18 J
Calcium	34100	31400 J	43300	119000	120000	105000	28400	22200	25200	75900	66900	52100	28400	27300	22600
Chromium	5 U	0.96 U	2.0 U	5 U	0.7 U	2.0 U	5 U	0.7 U	2.0 U	5 U	0.99 U	2.0 U	16.2	0.79 U	1.4 J
Cobalt	2 U	0.66 U	0.53 J	4.6	5.6	5.3	2 U	1.5 U	1.5	3.3	3.7	2.1	2 U	0.5 U	4.4
Copper	8.3 J	1.6 U	0.77 J	42.2 J	0.5 U	0.66 J	3 U	0.5 U	0.66 J	3 U	1.3 U	2.0 U	3 U	1.5 U	3.2 U
Iron	140	123	536	1190	4770	8000	30 U	259	619	2010	1580	606 J	83.8	28.7 U	1230 J
Lead	3 UJ	1.6 U	0.73 J	7.3 J	1.6 U	1.0 U	3 UJ	1.6 U	1.0 U	3 U	1.6 U	1.0 U	3 UJ	1.6 U	1.1
Magnesium	10600	9160 J	12500	23000	23100	19700	5270	4080	5440	18300	15500	10600	6400	5720	4550 J
Manganese	156	306	327	1340	1370	1390	1370	1110	1700	1260	1210	516 J	888	888	1350 J
Mercury	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ	0.2 U	0.2 U	0.20 UJ
Nickel	10 U	2.4 U	1.0	10 U	2.5	1.4	10 U	2.4 U	0.48 J	10 U	3.3	1.7	10 U	2.4 U	1.7
Potassium	3410	2910	3280 J	15000	16700 J	11400	2930	2370	3270 J	8720	7300 J	4600 J	4990	4440 J	4150 J
Selenium	5 UJ	3.4 U	5.0 U	5 U	3.4 U	5.0 U	5 U	3.4 U	5.0 U	5 U	3.4 U	5.0 U	5 U	3.4 U	5.0 U
Silver	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	3 U	0.6 U	1.0 U	R	0.6 U	1.0 U
Sodium	15900	15100 J	15400	115000	134000	122000	25300	23300 J	23200	39800	39200	34400	34100	35900	36000
Thallium	8 UJ	3.6 U	0.50 UJ	8 U	3.6 U	0.50 UJ	8 U	3.6 U	0.50 UJ	8 U	3.6 U	0.50 U	8 U	3.6 U	0.50 U
Vanadium	2 U	0.6 U	1.0 UJ	2 U	0.6 U	1.0 UJ	2 U	0.6 U	0.35 J	2 U	0.6 U	0.25 J	2 U	0.6 U	2.6 J
Zinc	6	6.8 U	2.3	30.4	1.2 U	2.4	4 U	8.3 U	2.9	4 U	1.2 U	6.4 UJ	4 U	1.2 U	14.8 J
1,4-Dioxanes (ug/L)															
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	NA	NA	NA	NA	NA	0.59 J

Notes
NX - Normal Field Sample
FD - Field Duplicate
AV - Average of Field Duplicates
NA - Not Analyzed

WINTER 2005/2006
VOC TICs

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24T7

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24X4	A24X8	A24X9	A24Y0
Lab Sample ID	B2401403	B2401404	B2401405	B2401406
Matrix	AQ	AQ	AQ	AQ
Sample Type				
Date Sampled				
Date Received	02/24/06	02/24/06	02/24/06	02/24/06
Date Extracted				
Date Analyzed	02/24/06	02/24/06	02/27/06	02/27/06
Units	ug/L	ug/L	ug/L	ug/L
% Solids				
Dilution Factor	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL
Comments				
Analyte	Result	Result	Result	Result
NAPHTHALENE, 1,2,3,4-TETRAHYDRO-1,1,6-	0.6 NJ			

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24t4

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24W0	A24W1	A24W2	A24W3	A24W4	A24W5	A24W6
Lab Sample ID	B2102201	B2102202	B2102203	B2102204	B2102205	B2200905	B2200906
Matrix	AQ	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type							
Date Sampled							
Date Received	02/21/06	02/21/06	02/21/06	02/21/06	02/21/06	02/22/06	02/22/06
Date Extracted							
Date Analyzed	02/22/06	02/22/06	02/22/06	02/22/06	02/22/06	02/22/06	02/23/06
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids							
Dilution Factor	1	1	1	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL
Comments							
Analyte	Result	Result	Result	Result	Result	Result	Result
BENZENE							
BENZENE, 1,2,3,4-TETRAMETHYL-							
BENZENE, 1,2,4,5-TETRAMETHYL-							
BENZENE, 1,2,4-TRIMETHYL-							
BENZENE, 1-ETHYL-2-METHYL-							
BENZENE, 1-ETHYL-3-METHYL-							
BENZENE, 1-METHYL-2-(1-METHYLETHYL)-							
BENZENE, 2-ETHENYL-1,4-DIMETHYL-							
BENZENE, 2-ETHYL-1,4-DIMETHYL-							
CYCLOPENTANE, 1,3-DIMETHYL-							
DECANE							
DODECANE							
HEXANE							
INDANE			3.1 NJ				
ISOPROPYLCYCLOBUTANE							
NAPHTHALENE							
PENTANE, 3-METHYL-							

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24t4

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24W7	A24W8	A24W9	A24X0	A24X1	A24X2	A24X3
Lab Sample ID	B2200907	B2200908	B2301102R	B2200909	B2200910	B2301103	B2301104
Matrix	AQ	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type							
Date Sampled							
Date Received	02/22/06	02/22/06	02/23/06	02/22/06	02/22/06	02/23/06	02/23/06
Date Extracted							
Date Analyzed	02/24/06	02/24/06	02/27/06	02/24/06	02/22/06	02/24/06	02/24/06
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids							
Dilution Factor	1	1	1	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL
Comments							
Analyte	Result	Result	Result	Result	Result	Result	Result
BENZENE							1 NJ
BENZENE, 1,2,3,4-TETRAMETHYL-							
BENZENE, 1,2,4,5-TETRAMETHYL-							
BENZENE, 1,2,4-TRIMETHYL-							
BENZENE, 1-ETHYL-2-METHYL-							
BENZENE, 1-ETHYL-3-METHYL-							
BENZENE, 1-METHYL-2-(1-METHYLETHYL)-							
BENZENE, 2-ETHENYL-1,4-DIMETHYL-							0.56 NJ
BENZENE, 2-ETHYL-1,4-DIMETHYL-							
CYCLOPENTANE, 1,3-DIMETHYL-							
DECANE							
DODECANE			0.51 NJ				
HEXANE							1.8 NJ
INDANE							
ISOPROPYLCYCLOBUTANE							
NAPHTHALENE							
PENTANE, 3-METHYL-							

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24t4

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24X5	A24X6	A24X7
Lab Sample ID	B2301201	B2301202	B2301203
Matrix	AQ	AQ	AQ
Sample Type			
Date Sampled			
Date Received	02/23/06	02/23/06	02/23/06
Date Extracted			
Date Analyzed	02/24/06	02/24/06	02/24/06
Units	ug/L	ug/L	ug/L
% Solids			
Dilution Factor	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL
Comments			
Analyte	Result	Result	Result
BENZENE			
BENZENE, 1,2,3,4-TETRAMETHYL-	0.81 NJ		
BENZENE, 1,2,4,5-TETRAMETHYL-	0.86 NJ		
BENZENE, 1,2,4-TRIMETHYL-	2.9 NJ		
BENZENE, 1-ETHYL-2-METHYL-	2.8 NJ		
BENZENE, 1-ETHYL-3-METHYL-	4.1 NJ		
BENZENE, 1-METHYL-2-(1-METHYLETHYL)-	0.53 NJ		
BENZENE, 2-ETHENYL-1,4-DIMETHYL-	1 NJ		
BENZENE, 2-ETHYL-1,4-DIMETHYL-	1 NJ		
CYCLOPENTANE, 1,3-DIMETHYL-	0.64 NJ		
DECANE			
DODECANE			
HEXANE			
INDANE	2.4 NJ		
ISOPROPYLCYCLOBUTANE	0.7 NJ		
NAPHTHALENE	0.64 NJ		
PENTANE, 3-METHYL-	3.9 NJ		

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z41

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z67	A1Z68	A1Z69	A1Z70	A1Z71	A1Z73
Lab Sample ID	L1403105	L1403106	L1403107	L1403108	L1403109	L1502203
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/14/05	12/14/05	12/14/05	12/14/05	12/14/05	12/15/05
Date Extracted						
Date Analyzed	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
BENZENE, 1-CHLORO-2-METHYL-						
BUTANE, 1-CHLORO-						

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z41

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z75	A1Z76	A1Z77	A1Z78	A1Z79	A1Z72
Lab Sample ID	L1502204	L1502205	L1502206	L1502207	L1502208	L1403110
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/15/05	12/15/05	12/15/05	12/15/05	12/15/05	12/14/05
Date Extracted						
Date Analyzed	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/18/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
BENZENE, 1-CHLORO-2-METHYL-						
BUTANE, 1-CHLORO-						0.99 NJ

SITE: Iron Horse park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z60

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
groundwater (ug/L)

Traffic Report Sample No.	A1Z74	A1Z80	A1Z83	A1Z84	A1Z85	A1Z86
Lab Sample ID	L1600802	L1600801	L1600804	L1600807	L1600808	L1600809
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05
Date Extracted						
Date Analyzed	12/20/05	12/22/05	12/20/05	12/20/05	12/20/05	12/20/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
1H-INDENE, 1-METHYL-						
1H-INDENE, 2,3-DIHYDRO-4,7-DIMETHYL-						
1H-INDENE, 2,3-DIHYDRO-5,6-DIMETHYL-						
1H-INDENE, 4,7-DIMETHYL-						
1H-INDENE,2,3-DIHYDRO-2,2-DIMETHYL-						
3-PHENYLBUT-1-ENE						
AZULENE						
BENZENE, 1,2,3,5-TETRAMETHYL-						
BENZENE, 1,2,3-TRIMETHYL-						
BENZENE, 1,2,4,5-TETRAMETHYL-						
BENZENE, 1,3,5-TRIMETHYL-						
BENZENE, 1-ETHYL-2,4-DIMETHYL-						
BENZENE, 1-ETHYL-2-METHYL-						
BENZENE, 1-METHYL-2-(1-METHYLETHYL)-						
BENZENE, 1-METHYL-4-PROPYL-						
BENZENE, 2-ETHYL-1,4-DIMETHYL-						
HEXANAL, 2-ETHYL-						
NAPHTHALENE, 1,2,3,4-TETRAHYDRO-						
NAPHTHALENE, 1,2,3,4-TETRAHYDRO-6-METHYL						
NAPHTHALENE, 1,6-DIMETHYL-						
NAPHTHALENE, 1-METHYL-						
NAPHTHALENE, 2,3-DIMETHYL-						
NAPHTHALENE, 2-METHYL-						

SITE: Iron Horse park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z60

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
groundwater (ug/L)

Traffic Report Sample No.	A1Z94	A1Z95	A1Z96	A1Z97	A1Z98	A1Z99
Lab Sample ID	L1600805	L1600806	L1600810	L1701102	L1701103	L1701104
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/16/05	12/16/05	12/16/05	12/17/05	12/17/05	12/17/05
Date Extracted						
Date Analyzed	12/20/05	12/20/05	12/20/05	12/22/05	12/22/05	12/22/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL	25 mL	25 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
1H-INDENE, 1-METHYL-			1.3 NJ			
1H-INDENE, 2,3-DIHYDRO-4,7-DIMETHYL-			2.1 NJ			
1H-INDENE, 2,3-DIHYDRO-5,6-DIMETHYL-			0.83 NJ			
1H-INDENE, 4,7-DIMETHYL-			1.1 NJ			
1H-INDENE,2,3-DIHYDRO-2,2-DIMETHYL-			2.3 NJ			
3-PHENYLBUT-1-ENE			1 NJ			
AZULENE			1.8 NJ			
BENZENE, 1,2,3,5-TETRAMETHYL-			2.7 NJ			
BENZENE, 1,2,3-TRIMETHYL-			1.8 NJ			
BENZENE, 1,2,4,5-TETRAMETHYL-			1.8 NJ			
BENZENE, 1,3,5-TRIMETHYL-			2.1 NJ			
BENZENE, 1-ETHYL-2,4-DIMETHYL-			2.4 NJ			
BENZENE, 1-ETHYL-2-METHYL-			0.87 NJ			
BENZENE, 1-METHYL-2-(1-METHYLETHYL)-			1.4 NJ			
BENZENE, 1-METHYL-4-PROPYL-			0.84 NJ			
BENZENE, 2-ETHYL-1,4-DIMETHYL-			1.9 NJ			
HEXANAL, 2-ETHYL-						
NAPHTHALENE, 1,2,3,4-TETRAHYDRO-			1.2 NJ			
NAPHTHALENE, 1,2,3,4-TETRAHYDRO-6-METHYL			1.5 NJ			
NAPHTHALENE, 1,6-DIMETHYL-			1.3 NJ			
NAPHTHALENE, 1-METHYL-			2.1 NJ			
NAPHTHALENE, 2,3-DIMETHYL-			0.84 NJ			
NAPHTHALENE, 2-METHYL-			4.3 NJ			

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1ZA2

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1ZA1	A1ZA2	A1ZA3	A1ZA4	A1ZA5	A1ZA6	A1ZA7	A1ZA8
Lab Sample ID	L2300901	L2103701	L2103702	L2103703	L2103704	L2103705	L2103706	L2103707
Matrix	AQ	AQ	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type								
Date Sampled								
Date Received	12/22/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Date Extracted								
Date Analyzed	12/29/05	12/27/05	12/27/05	12/27/05	12/27/05	12/27/05	12/27/05	12/27/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids								
Dilution Factor	1	1	1	1	1	1	1	1
Mass/Volume of Sample	25 ml	25 ml	25 ml	25 ml	25 ml	25 ml	25 ml	25 ml
Comments								
Analyte	Result	Result	Result	Result	Result	Result	Result	Result
1H-INDENE, 2,3-DIHYDRO-5-METHYL-								
BENZOFURAN, 7-METHYL-								
BUTANE, 1-CHLORO-								0.5 NJ
DECANE								

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1ZA2

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1ZA9	A1Z88	A1Z89	A1Z90	A1Z91	A1Z92	A1Z93
Lab Sample ID	L2103708	L2103713	L2103714	L2103715	L2103716	L2103717	L2103718
Matrix	AQ	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type							
Date Sampled							
Date Received	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Date Extracted							
Date Analyzed	12/28/05	12/28/05	12/28/05	12/28/05	12/28/05	12/28/05	12/28/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids							
Dilution Factor	1	1	1	1	1	1	1
Mass/Volume of Sample	25 ml	25 ml	25 ml	25 ml	25 ml	25 ml	25 ml
Comments							
Analyte	Result	Result	Result	Result	Result	Result	Result
1H-INDENE, 2,3-DIHYDRO-5-METHYL-					0.65 NJ		
BENZOFURAN, 7-METHYL-					0.5 NJ		
BUTANE, 1-CHLORO-			0.67 NJ				
DECANE							

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1ZA0

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Volatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z81	A1Z82	A1Z87	A1ZA0
Lab Sample ID	L2301004	L2301005	L2301006	L2301007
Matrix	AQ	AQ	AQ	AQ
Sample Type				
Date Sampled				
Date Received	12/22/05	12/22/05	12/22/05	12/22/05
Date Extracted				
Date Analyzed	12/30/05	12/30/05	12/30/05	12/30/05
Units	ug/L	ug/L	ug/L	ug/L
% Solids				
Dilution Factor	1	1	1	1
Mass/Volume of Sample	25 mL	25 mL	25 mL	25 mL
Comments				
Analyte	Result	Result	Result	Result
BUTANE, 1-CHLORO-	0.57 NJ			
PROPANE, 2-CHLORO-		0.93 NJ		

WINTER 2005/2006
SVOC TICs

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24T7

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24X4	A24X8	A24X9	A24Y0
Lab Sample ID	30306	30309	30314	30311
Matrix	AQ	AQ	AQ	AQ
Sample Type				
Date Sampled				
Date Received	02/24/06	02/24/06	02/24/06	02/24/06
Date Extracted	03/01/06	03/01/06	03/01/06	03/01/06
Date Analyzed	03/03/06	03/03/06	03/03/06	03/03/06
Units	ug/L	ug/L	ug/L	ug/L
% Solids				
Dilution Factor	1	1	1	1
Mass/Volume of Sample	1000 ml	1000 ml	1000 ml	1000 ml
Comments				
Analyte	Result	Result	Result	Result
9-OCTADECENAMIDE, (Z)-	20 NJ	12 NJ	6.4 NJ	2.1 NJ
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE	7.2 NJB			

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24T4

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24W5	A24W6	A24W7	A24W8	A24X0	A24X1	A24W0
Lab Sample ID	30206	30208	30209	30210	30211	30212	30215
Matrix	AQ	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type							
Date Sampled							
Date Received	02/22/06	02/22/06	02/22/06	02/22/06	02/22/06	02/22/06	02/21/06
Date Extracted	02/25/06	02/25/06	02/25/06	02/25/06	02/25/06	02/25/06	02/25/06
Date Analyzed	03/02/06	03/02/06	03/02/06	03/02/06	03/02/06	03/02/06	03/02/06
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids							
Dilution Factor	1	1	1	1	1	1	1
Mass/Volume of Sample	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL
Comments							
Analyte	Result	Result	Result	Result	Result	Result	Result
1,1'-BIPHENYL, 2,4,4'-TRICHLORO-							
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH							
1,2-BENZENEDICARBOXYLIC ACID, BUTYL 2-ME							
2(3H)-BENZOTHIAZOLONE							
4-CHLOROANILINE, N-ISOPROPYLIDENE							
9-OCTADECENAMIDE, (Z)-		4 NJ		5.8 NJ	7.4 NJ		
BENZ[A]ANTHRACENE, 1,12-DIMETHYL-							
BENZENE, 1,2,3-TRIMETHYL-							
BENZENESULFONAMIDE, N-ETHYL-2-METHYL-							
BENZOIC ACID, P-TERT-BUTYL-							
BICYCLO[2.2.1]HEPTAN-2-ONE, 1,7,7-TRIMET							
ETHANOL, 2-(2-BUTOXYETHOXY)-							
FORMAMIDE, N,N-DIMETHYL-							
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE							
N-HEXADECANOIC ACID							
OCTADECANOIC ACID							
PHENOL, 4,4'-(1-METHYLETHYLIDENE)BIS-							
SQUALENE						3.9 NJ	
TETRADECANAMIDE							

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24T4

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24W1	A24W2	A24W3	A24W4	A24W9	A24X2	A24X3
Lab Sample ID	30216	30217	30218	30219	30220	30221	30222
Matrix	AQ	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type							
Date Sampled							
Date Received	02/21/06	02/21/06	02/21/06	02/21/06	02/23/06	02/23/06	02/23/06
Date Extracted	02/25/06	02/25/06	02/25/06	02/25/06	02/25/06	02/25/06	02/25/06
Date Analyzed	03/02/06	03/02/06	03/02/06	03/02/06	03/02/06	03/02/06	03/02/06
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids							
Dilution Factor	1	1	1	1	1	1	1
Mass/Volume of Sample	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL
Comments							
Analyte	Result	Result	Result	Result	Result	Result	Result
1,1'-BIPHENYL, 2,4,4'-TRICHLORO-							
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH						4.3 NJ	
1,2-BENZENEDICARBOXYLIC ACID, BUTYL 2-ME				2.1 NJ			
2(3H)-BENZOTHIAZOLONE							2.3 NJ
4-CHLOROANILINE, N-ISOPROPYLIDENE							
9-OCTADECENAMIDE, (Z)-	15 NJ	22 NJ	13 NJ		17 NJ	2.5 NJ	19 NJ
BENZ[A]ANTHRACENE, 1,12-DIMETHYL-							
BENZENE, 1,2,3-TRIMETHYL-							
BENZENESULFONAMIDE, N-ETHYL-2-METHYL-							3 NJ
BENZOIC ACID, P-TERT-BUTYL-							
BICYCLO[2.2.1]HEPTAN-2-ONE, 1,7,7-TRIMET							
ETHANOL, 2-(2-BUTOXYETHOXY)-					2.5 NJ		
FORMAMIDE, N,N-DIMETHYL-							
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE		5.9 NJ	7.3 NJ	14 NJ	13 NJ	26 NJ	48 NJ
N-HEXADECANOIC ACID	3.7 NJ						
OCTADECANOIC ACID	3.6 NJ						
PHENOL, 4,4'-(1-METHYLETHYLIDENE)BIS-					2.3 NJ		
SQUALENE							
TETRADECANAMIDE				10 NJ		13 NJ	

SITE: Iron Horse Park Superfund Site
CASE NO.: 35099
SDG NO.: A24T4

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A24X5	A24X6	A24X7
Lab Sample ID	30223	30224	0302B06
Matrix	AQ	AQ	AQ
Sample Type			
Date Sampled			
Date Received	02/23/06	02/23/06	02/23/06
Date Extracted	02/25/06	02/25/06	02/25/06
Date Analyzed	03/02/06	03/02/06	03/02/06
Units	ug/L	ug/L	ug/L
% Solids			
Dilution Factor	1	1	1
Mass/Volume of Sample	1000 mL	1000 mL	1000 mL
Comments			
Analyte	Result	Result	Result
1,1'-BIPHENYL, 2,4,4'-TRICHLORO-			
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH			
1,2-BENZENEDICARBOXYLIC ACID, BUTYL 2-ME			
2(3H)-BENZOTHIAZOLONE	2.7 NJ		
4-CHLOROANILINE, N-ISOPROPYLIDENE			
9-OCTADECENAMIDE, (Z)-	20 NJ	17 NJ	14 NJ
BENZ[A]ANTHRACENE, 1,12-DIMETHYL-			
BENZENE, 1,2,3-TRIMETHYL-	6 NJ		
BENZENESULFONAMIDE, N-ETHYL-2-METHYL-			
BENZOIC ACID, P-TERT-BUTYL-	3.4 NJ		
BICYCLO[2.2.1]HEPTAN-2-ONE, 1,7,7-TRIMET	2.1 NJ		
ETHANOL, 2-(2-BUTOXYETHOXY)-			
FORMAMIDE, N,N-DIMETHYL-			
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE			2.5 NJ
N-HEXADECANOIC ACID			
OCTADECANOIC ACID			
PHENOL, 4,4'-(1-METHYLETHYLIDENE)BIS-	4.3 NJ		
SQUALENE			
TETRADECANAMIDE			

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z41

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z67	A1Z68	A1Z69	A1Z70	A1Z71	A1Z72
Lab Sample ID	122106	122107	122120	122121	122110	122113
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/14/05	12/14/05	12/15/05	12/15/05	12/14/05	12/14/05
Date Extracted	12/19/05	12/19/05	12/19/05	12/19/05	12/19/05	12/19/05
Date Analyzed	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
1,3,5-TRIAZIN-2(1H)-ONE, 4,6-BIS[(1-METH						
1,3,5-TRIAZINE-2,4,6(1H,3H,5H)-TRIONE, 1					2 NJ	
1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10						
7,9-DI-TERT-BUTYL-1-OXASPIRO(4,5)DECA-6,						
9-OCTADECENAMIDE, (Z)-						4.2 NJ
BENZ[A]ANTHRACENE, 7,12-DIMETHYL-						
BENZENESULFONAMIDE, 4-METHYL-		2.1 NJ				
BENZOIC ACID, 3,5-BIS(1,1-DIMETHYLETHYL)						
DIISOOCTYL ADIPATE						
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE						
O-HYDROXYBIPHENYL						

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z41

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z64	A1Z73	A1Z76	A1Z77	A1Z78	A1Z79
Lab Sample ID	122114	122115	122116	122117	122118	122119
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/15/05	12/15/05	12/15/05	12/15/05	12/15/05	12/15/05
Date Extracted	12/19/05	12/19/05	12/19/05	12/19/05	12/19/05	12/19/05
Date Analyzed	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
1,3,5-TRIAZIN-2(1H)-ONE, 4,6-BIS[(1-METH						
1,3,5-TRIAZINE-2,4,6(1H,3H,5H)-TRIONE, 1						
1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10						
7,9-DI-TERT-BUTYL-1-OXASPIRO(4,5)DECA-6,	5.8 NJ					
9-OCTADECENAMIDE, (Z)-						
BENZ[A]ANTHRACENE, 7,12-DIMETHYL-						
BENZENESULFONAMIDE, 4-METHYL-		2.5 NJ				
BENZOIC ACID, 3,5-BIS(1,1-DIMETHYLETHYL)		4 NJ				
DIISOOCTYL ADIPATE						19 NJ
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE		6.2 NJ				
O-HYDROXYBIPHENYL						

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z60

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z74	A1Z75	A1Z80	A1Z83	A1Z84	A1Z85
Lab Sample ID	122608	122609	122605	122610	122613	122614
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05
Date Extracted	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Date Analyzed	12/26/05	12/26/05	12/26/05	12/26/05	12/26/05	12/26/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	950 mL	880 mL	970 mL	950 mL	950 mL	880 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH					4.3 NJ	
1,2-BENZENEDICARBOXYLIC ACID, BUTYL CYCL						
1-NAPHTHALENECARBOXYLIC ACID						
9-OCTADECENAMIDE, (Z)-	11 NJ					
BENZENESULFONAMIDE, 4-METHYL-		4 NJ				
BENZOIC ACID, 2,4,5-TRIMETHYL-						
BENZOIC ACID, 2,5-DIMETHYL-						
BENZOIC ACID, 3,5-BIS(1,1-DIMETHYLETHYL)	29 NJ					
BENZOIC ACID, 3,5-DIMETHYL-						
EICOSANE		5.2 NJ				
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTER	3.8 NJB					5.2 NJB
HYDROXYTOLUIC ACID						
NAPHTHALENE, 2,3-DIMETHYL-						
NAPHTHALENE, 2-METHYL-						
N-HEXADECANOIC ACID			3.8 NJ			
SQUALENE						
TETRADECANOIC ACID						

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z60

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z86	A1Z88	A1Z89	A1Z92	A1Z94	A1Z95
Lab Sample ID	122615	122620	122621	122622	122611	122612
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/16/05	12/20/05	12/20/05	12/20/05	12/16/05	12/16/05
Date Extracted	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Date Analyzed	12/26/05	12/26/05	12/26/05	12/26/05	12/26/05	12/26/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	950 mL	880 mL	940 mL	960 mL	880 mL	880 mL
Comments						
Analyte	Result	Result	Result	Result	Result	Result
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH						5 NJ
1,2-BENZENEDICARBOXYLIC ACID, BUTYL CYCL			3.8 NJ	3.6 NJ		
1-NAPHTHALENECARBOXYLIC ACID						
9-OCTADECENAMIDE, (Z)-				4.2 NJ	11 NJ	
BENZENESULFONAMIDE, 4-METHYL-						
BENZOIC ACID, 2,4,5-TRIMETHYL-						
BENZOIC ACID, 2,5-DIMETHYL-						
BENZOIC ACID, 3,5-BIS(1,1-DIMETHYLETHYL)						
BENZOIC ACID, 3,5-DIMETHYL-						
EICOSANE						
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTER						
HYDROXYTOLUIC ACID						
NAPHTHALENE, 2,3-DIMETHYL-						
NAPHTHALENE, 2-METHYL-						
N-HEXADECANOIC ACID				4 NJ		
SQUALENE						
TETRADECANOIC ACID				2.9 NJ		

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1Z60

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z96	A1Z97	A1Z98	A1Z99
Lab Sample ID	122616	122617	122618	122619
Matrix	AQ	AQ	AQ	AQ
Sample Type				
Date Sampled				
Date Received	12/16/05	12/17/05	12/17/05	12/17/05
Date Extracted	12/21/05	12/21/05	12/21/05	12/21/05
Date Analyzed	12/26/05	12/26/05	12/26/05	12/26/05
Units	ug/L	ug/L	ug/L	ug/L
% Solids				
Dilution Factor	1	1	1	1
Mass/Volume of Sample	880 mL	900 mL	920 mL	960 mL
Comments				
Analyte	Result	Result	Result	Result
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH				
1,2-BENZENEDICARBOXYLIC ACID, BUTYL CYCL				2.8 NJ
1-NAPHTHALENECARBOXYLIC ACID	3.6 NJ			
9-OCTADECENAMIDE, (Z)-			4.2 NJ	
BENZENESULFONAMIDE, 4-METHYL-				
BENZOIC ACID, 2,4,5-TRIMETHYL-	4.8 NJ			
BENZOIC ACID, 2,5-DIMETHYL-	4.7 NJ			
BENZOIC ACID, 3,5-BIS(1,1-DIMETHYLETHYL)				
BENZOIC ACID, 3,5-DIMETHYL-	9.1 NJ			
EICOSANE				
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTER	5.2 NJB			
HYDROXYTOLUIC ACID	5.4 NJ			
NAPHTHALENE, 2,3-DIMETHYL-	3.2 NJ			
NAPHTHALENE, 2-METHYL-	4.1 NJ			
N-HEXADECANOIC ACID	12 NJ	6.1 NJ	4 NJ	
SQUALENE		3.8 NJ	3.1 NJ	
TETRADECANOIC ACID	4.1 NJ			

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1ZA2

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1ZA2	A1ZA3	A1ZA4	A1ZA5	A1ZA6	A1ZA7
Lab Sample ID	122806	1228B08	122808	122809	122810	122811
Matrix	AQ	AQ	AQ	AQ	AQ	AQ
Sample Type						
Date Sampled						
Date Received	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Date Extracted	12/25/05	12/25/05	12/25/05	12/25/05	12/25/05	12/25/05
Date Analyzed	12/28/05	12/29/05	12/28/05	12/28/05	12/28/05	12/28/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids						
Dilution Factor	1	1	1	1	1	1
Mass/Volume of Sample	1000 ml	1000 ml	1000 ml	1000 ml	1000 ml	1000 ml
Comments						
Analyte	Result	Result	Result	Result	Result	Result
1,1'-BIPHENYL, 2,3-DICHLORO-						
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH			6.9 NJ	8.8 NJ		
1,8-NAPHTHALIC ANHYDRIDE						
2(3H)-BENZOTHIAZOLONE				12 NJ		
9-OCTADECENAMIDE, (Z)-			3.7 NJ			
BENZENESULFONAMIDE, N-ETHYL-2-METHYL-				5.4 NJ		
BENZENESULFONAMIDE, N-ETHYL-4-METHYL-				3 NJ		
BENZOIC ACID, P-TERT-BUTYL-						
BUTYLATED HYDROXYTOLUENE	2.3 NJB	2.4 NJB	2.1 NJB	2.9 NJB		
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE					2.8 NJ	
OCTADECANAMIDE						
O-HYDROXYBIPHENYL						
PHENOL, 4,4'-(1-METHYLETHYLIDENE)BIS-				2.3 NJ		
PHTHALIC ANHYDRIDE						
TRI(2-CHLOROETHYL) PHOSPHATE				12 NJ		
TRIBUTYL PHOSPHATE						

SITE: Iron Horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1ZA2

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1ZA8	A1ZA9	A1Z90	A1Z91	A1Z93
Lab Sample ID	122812	122815	122817	122818	122819
Matrix	AQ	AQ	AQ	AQ	AQ
Sample Type					
Date Sampled					
Date Received	12/21/05	12/21/05	12/21/05	12/21/05	12/21/05
Date Extracted	12/25/05	12/25/05	12/25/05	12/25/05	12/25/05
Date Analyzed	12/28/05	12/28/05	12/28/05	12/28/05	12/28/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids					
Dilution Factor	1	1	1	1	1
Mass/Volume of Sample	1000 ml	1000 ml	860 ml	1000 ml	1000 ml
Comments					
Analyte	Result	Result	Result	Result	Result
1,1'-BIPHENYL, 2,3-DICHLORO-					
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH					
1,8-NAPHTHALIC ANHYDRIDE				6.3 NJ	
2(3H)-BENZOTHIAZOLONE		4.2 NJ	94 NJ	100 NJ	
9-OCTADECENAMIDE, (Z)-					
BENZENESULFONAMIDE, N-ETHYL-2-METHYL-		4.5 NJ		7.5 NJ	
BENZENESULFONAMIDE, N-ETHYL-4-METHYL-		2.3 NJ			
BENZOIC ACID, P-TERT-BUTYL-			67 NJ	92 NJ	
BUTYLATED HYDROXYTOLUENE	2.7 NJB				2.2 NJB
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE		5.5 NJ	22 NJ		
OCTADECANAMIDE		3.3 NJ			
O-HYDROXYBIPHENYL					
PHENOL, 4,4'-(1-METHYLETHYLIDENE)BIS-		2.1 NJ			
PHTHALIC ANHYDRIDE			5.1 NJ	5.5 NJ	
TRI(2-CHLOROETHYL) PHOSPHATE					
TRIBUTYL PHOSPHATE		4.2 NJ			

SITE: iron horse Park Superfund Site
CASE NO.: 34958
SDG NO.: A1ZA0

TABLE III: TENTATIVELY IDENTIFIED COMPOUND SUMMARY
Semivolatile Organic Analysis (OLC03.2 (modified))
Groundwater (ug/L)

Traffic Report Sample No.	A1Z81	A1Z82	A1Z87	A1ZA0	A1ZA1
Lab Sample ID	122825	122827	1228B07	122822	122826
Matrix	AQ	AQ	AQ	AQ	AQ
Sample Type					
Date Sampled					
Date Received	12/22/05	12/22/05	12/22/05	12/22/05	12/22/05
Date Extracted	12/25/05	12/25/05	12/25/05	12/25/05	12/25/05
Date Analyzed	12/28/05	12/28/05	12/29/05	12/28/05	12/28/05
Units	ug/L	ug/L	ug/L	ug/L	ug/L
% Solids					
Dilution Factor	1	1	1	1	1
Mass/Volume of Sample	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL
Comments					
Analyte	Result	Result	Result	Result	Result
1,1'-BIPHENYL, 4-NITRO-					
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH			4.7 NJ		
1,2-BENZENEDICARBOXYLIC ACID, BUTYL 2-ET					2.6 NJ
3-METHYLCHOLANTHRENE					
9-OCTADECENAMIDE, (Z)-					
BUTYLATED HYDROXYTOLUENE	2.3 NJB			2.3 NJB	
HEXANEDIOIC ACID, BIS(2-ETHYLHEXYL) ESTE			13 NJ		4.8 NJ

ATTACHMENT 2

DERIVATION OF AIR

EXPOSURE POINT CONCENTRATIONS

TABLE 1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor/Outdoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits
Site-Wide Overburden (a)										
	71-55-6	1,1,1-Trichloroethane	0.16	J	22		ug/L	OW-08	5 / 43	0.5
	79-34-5	1,1,2,2-Tetrachloroethane	0.077	J	0.077	J	ug/L	MW-202S	1 / 43	0.5
	75-34-3	1,1-Dichloroethane	0.066	J	38		ug/L	OW-08	15 / 43	0.5
	75-35-4	1,1-Dichloroethene	1.7		4.8	J	ug/L	OW-20	2 / 43	0.5 - 0.57
	87-61-6	1,2,3-Trichlorobenzene	0.23	J	0.23	J	ug/L	MW-306S	1 / 43	0.5
	95-50-1	1,2-Dichlorobenzene	0.27	J	1.5		ug/L	OW-10	7 / 43	0.5
	107-06-2	1,2-Dichloroethane	0.095	J	11		ug/L	MW-307D	6 / 43	0.5 - 2.7
	78-87-5	1,2-Dichloropropane	0.21	J	0.81		ug/L	OW-25	4 / 43	0.5
	541-73-1	1,3-Dichlorobenzene	0.16	J	0.16	J	ug/L	MW-202S	1 / 43	0.5
	106-46-7	1,4-Dichlorobenzene	0.27	J	7.5		ug/L	MW-202S	9 / 43	0.5
	67-64-1	Acetone	5.4		5.4		ug/L	MW-307S	1 / 43	5
	71-43-2	Benzene	0.26	J	59		ug/L	OW-08	7 / 43	0.5
	74-97-5	Bromochloromethane	0.057	J	0.26	J	ug/L	MW-305D	2 / 43	0.5
	56-23-5	Carbon Tetrachloride	0.22	J	120		ug/L	MW-202S	8 / 43	0.5
	108-90-7	Chlorobenzene	0.17	J	46		ug/L	OW-08	7 / 43	0.5
	75-00-3	Chloroethane	4.5	J	4.5	J	ug/L	MW-305D	1 / 43	0.5 - 1.5
	74-87-3	Chloromethane	0.22	J	3.2		ug/L	OW-20	8 / 43	0.5
	156-59-2	cis-1,2-Dichloroethene	0.24	J	0.98		ug/L	MW-213D	5 / 43	0.5
	10061-01-5	cis-1,3-Dichloropropene	1.2	J	8.6		ug/L	OW-08	2 / 43	0.5
	110-82-7	Cyclohexane	0.35	J	0.35	J	ug/L	MW-211D	1 / 43	0.5
	75-71-8	Dichlorodifluoromethane	0.23	J	3.5	J	ug/L	MW-307S	3 / 43	0.5
	100-41-4	Ethylbenzene	0.10	J	1.1	J	ug/L	MW-307S	5 / 43	0.5
	98-82-8	Isopropylbenzene	0.34	J	0.34	J	ug/L	OW-12	1 / 43	0.5
	79-20-9	Methyl acetate	1.8	J	1.8	J	ug/L	MW-203D	1 / 43	0.5
	1634-04-4	Methyl tert-butyl ether	0.093	J	3.4		ug/L	MW-301S	15 / 43	0.5
	108-87-2	Methylcyclohexane	0.16	J	1.7	J	ug/L	MW-307S	5 / 43	0.5
	75-09-2	Methylene Chloride	0.065	J	0.065	J	ug/L	MW-203S	1 / 43	0.5
	127-18-4	Tetrachloroethene	0.085	J	39		ug/L	OW-20	9 / 43	0.5
	108-88-3	Toluene	0.058	J	0.52		ug/L	OW-08	6 / 43	0.5
	156-60-5	trans-1,2-Dichloroethene	0.076	J	0.58		ug/L	OW-07	6 / 43	0.5
	79-01-6	Trichloroethene	0.080	J	7.0	J	ug/L	OW-20	12 / 43	0.5
	75-69-4	Trichlorofluoromethane	0.11	J	0.11	J	ug/L	OW-25	1 / 43	0.5
	75-01-4	Vinyl Chloride	0.66		0.66		ug/L	MW-307S	1 / 43	0.5
	1330-20-7	Xylene (total)	0.29	J	250	J	ug/L	MW-307S	4 / 43	0.5
	123-91-1	**1,4-Dioxane**	0.59	J	2.9		ug/L	MW-203D	3 / 12	2
	105-67-9	**2,4-Dimethylphenol**	0.52	J	1.1	J	ug/L	MW-307S	2 / 43	5 - 5.7
	91-57-6	2-Methylnaphthalene	0.077	J	1.2		ug/L	OW-12	3 / 43	0.2 - 5.8
	95-48-7	**2-Methylphenol**	0.48	J	0.48	J	ug/L	MW-306S	1 / 43	5 - 5.7

TABLE 1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor/Outdoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits
	534-52-1	**4,6-Dinitro-2-methylphenc**	0.11	J	0.11	J	ug/L	MW-203S	1 / 43	20 - 23
	106-44-5	**4-Methylphenol**	0.97	J	0.97	J	ug/L	MW-306S	1 / 43	5 - 5.7
	83-32-9	Acenaphthene	0.033	J	1.0		ug/L	MW-214S	8 / 43	0.2 - 0.33
	208-96-8	Acenaphthylene	0.015	J	0.015	J	ug/L	MW-214S	1 / 43	0.2 - 5
	120-12-7	Anthracene	0.49	J	0.74	J	ug/L	MW-213S	2 / 43	5 - 5.7
	1912-24-9	**Atrazine**	0.13	J	1.9	J	ug/L	MW-202D	6 / 26	1 - 5
	100-52-7	Benzaldehyde	1.8	J	1.8	J	ug/L	MW-213S	1 / 43	5 - 5.7
	191-24-2	**Benzo(g,h,i)perylene**	0.033	J	0.097	J	ug/L	OW-25	4 / 43	0.2 - 5
	111-44-4	Bis(2-chloroethyl)ether	0.020	J	0.70		ug/L	MW-307D	9 / 42	0.05 - 0.82
	117-81-7	**Bis(2-ethylhexyl)phthalate**	1.9	J	1.9	J	ug/L	MW-212D	1 / 43	0.2 - 5
	85-68-7	**Butylbenzylphthalate**	0.50	J	0.71	J	ug/L	MW-305D	2 / 43	5 - 5.7
	53-70-3	**Dibenz(a,h)anthracene**	0.024	J	0.050	J	ug/L	MW-208D and MW-208S	3 / 43	0.1 - 5
	132-64-9	**Dibenzofuran**	0.90	J	0.90	J	ug/L	MW-213S	1 / 43	5 - 5.7
	131-11-3	**Dimethylphthalate**	0.015	J	0.54	J	ug/L	MW-306S	2 / 43	5 - 5.7
	117-84-0	**Di-n-octylphthalate**	0.58	J	0.58	J	ug/L	MW-306S	1 / 43	5 - 5.7
	206-44-0	**Fluoranthene**	0.13	J	0.98	J	ug/L	MW-214S	3 / 43	5 - 5.7
	86-73-7	Fluorene	0.46	J	1.8	J	ug/L	MW-214S	4 / 43	5 - 5.7
	193-39-5	**Indeno(1,2,3-cd)pyrene**	0.025	J	0.057	J	ug/L	MW-208S	3 / 43	0.1 - 5
	91-20-3	Naphthalene	0.065	J	1.1		ug/L	OW-12	4 / 42	0.2 - 0.33
	86-30-6	**N-Nitrosodiphenylamine**	0.40	J	0.40	J	ug/L	MW-213S	1 / 43	5 - 5.7
	85-01-8	Phenanthrene	0.011	J	2.1		ug/L	MW-214S	9 / 43	0.2 - 0.33
	108-95-2	**Phenol**	5.7		5.7		ug/L	OW-08	1 / 43	5 - 5.7
	129-00-0	**Pyrene**	0.095	J	0.46		ug/L	MW-214S	4 / 43	0.2 - 0.33
	50-29-3	**4,4'-DDT**	0.0066	J	0.013	J	ug/L	MW-213S	2 / 17	0.01
	319-86-8	**delta-BHC**	0.0054		0.0054		ug/L	MW-304S	1 / 16	0.005
	60-57-1	**Dieldrin**	0.013		0.013		ug/L	MW-305S	1 / 16	0.01
	33213-65-9	**Endosulfan II**	0.016	J	0.016	J	ug/L	MW-213S	1 / 17	0.01
	53494-70-5	**Endrin Ketone**	0.020	J	0.020	J	ug/L	MW-213S	1 / 17	0.01
	7429-90-5	**Aluminum**	13	J	7070		ug/L	MW-301D	29 / 43	50
	7440-36-0	**Antimony**	2.6	J	4.2	J	ug/L	MW-304S	4 / 43	2 - 20
	7440-38-2	**Arsenic**	0.054	J	281		ug/L	MW-211D	41 / 43	0.5
	7440-39-3	**Barium**	5.1	J	837		ug/L	MW-213S	43 / 43	NA
	7440-41-7	**Beryllium**	0.10	J	1.6	J	ug/L	OW-10	5 / 43	1 - 10
	7440-43-9	**Cadmium**	0.051	J	22		ug/L	MW-01B	25 / 43	1
	7440-70-2	**Calcium**	3120	J	563000		ug/L	OW-25	43 / 43	NA
	7440-47-3	**Chromium**	0.083	J	32		ug/L	MW-301D	26 / 43	2 - 20
	7440-48-4	**Cobalt**	0.23	J	224		ug/L	MW-204S	31 / 43	1 - 2
	7440-50-8	**Copper**	0.66	J	15		ug/L	MW-01B	9 / 43	2 - 20
	7439-89-6	**Iron**	161	J	57400		ug/L	MW-214S	32 / 43	100 - 226
	7439-92-1	**Lead**	0.11	J	11		ug/L	MW-01A	24 / 43	1 - 10

TABLE 1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor/Outdoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits
	7439-95-4	**Magnesium**	1040	J	74700		ug/L	OW-25	41 / 43	5000
	7439-96-5	**Manganese**	6.6		22400	J	ug/L	MW-204S	43 / 43	NA
	7440-02-0	**Nickel**	0.48	J	41		ug/L	MW-204S	29 / 43	1 - 10
	7440-09-7	**Potassium**	878	J	47300		ug/L	OW-25	43 / 43	NA
	7782-49-2	**Selenium**	0.15	J	2.7	J	ug/L	MW-213S	5 / 43	5 - 50
	7440-23-5	**Sodium**	4900	J	4070000		ug/L	OW-25	43 / 43	NA
	7440-62-2	**Vanadium**	0.046	J	16		ug/L	MW-301D	33 / 43	0.19 - 1
	7440-66-6	**Zinc**	1.9	J	86	J	ug/L	MW-214S	16 / 43	2 - 45.9
Site-Wide (Overburden and Bedrock Combined) (b)	71-55-6	1,1,1-Trichloroethane	0.072	J	22		ug/L	OW-08	8 / 60	0.5
	79-34-5	1,1,2,2-Tetrachloroethane	0.077	J	0.077	J	ug/L	MW-202S	1 / 60	0.5
	75-34-3	1,1-Dichloroethane	0.063	J	38		ug/L	OW-08	27 / 60	0.5
	75-35-4	1,1-Dichloroethene	0.26	J	4.8	J	ug/L	OW-20	5 / 60	0.5 - 0.57
	87-61-6	1,2,3-Trichlorobenzene	0.23	J	0.23	J	ug/L	MW-306S	1 / 60	0.5
	95-50-1	1,2-Dichlorobenzene	0.27	J	1.5		ug/L	OW-10	11 / 60	0.5 - 0.62
	107-06-2	1,2-Dichloroethane	0.095	J	23		ug/L	MW-307B	17 / 60	0.5 - 2.7
	78-87-5	1,2-Dichloropropane	0.21	J	0.81		ug/L	OW-25	4 / 60	0.5
	541-73-1	1,3-Dichlorobenzene	0.16	J	0.16	J	ug/L	MW-202S	1 / 60	0.5
	106-46-7	1,4-Dichlorobenzene	0.14	J	7.5		ug/L	MW-202S	13 / 60	0.5
	67-64-1	Acetone	5.4		5.4		ug/L	MW-307S	1 / 60	5
	71-43-2	Benzene	0.20	J	59		ug/L	OW-08	8 / 60	0.5
	74-97-5	Bromochloromethane	0.057	J	1.4		ug/L	MW-308B	5 / 60	0.5
	56-23-5	Carbon Tetrachloride	0.10	J	120		ug/L	MW-202S	12 / 60	0.5
	108-90-7	Chlorobenzene	0.16	J	46		ug/L	OW-08	10 / 60	0.5
	75-00-3	Chloroethane	2.5		7.2		ug/L	MW-308B	3 / 60	0.5 - 1.5
	74-87-3	Chloromethane	0.11	J	7.1		ug/L	MW-308B	10 / 60	0.5
	156-59-2	cis-1,2-Dichloroethene	0.24	J	2.4		ug/L	OW-49	9 / 60	0.5
	10061-01-5	cis-1,3-Dichloropropene	1.2	J	8.6		ug/L	OW-08	2 / 60	0.5
	110-82-7	Cyclohexane	0.19	J	0.35	J	ug/L	MW-211D	2 / 60	0.5
	75-71-8	Dichlorodifluoromethane	0.23	J	3.5	J	ug/L	MW-307S	3 / 60	0.5
	100-41-4	Ethylbenzene	0.10	J	1.1	J	ug/L	MW-307S	5 / 60	0.5
	98-82-8	Isopropylbenzene	0.34	J	0.34	J	ug/L	OW-12	1 / 60	0.5
	79-20-9	Methyl acetate	1.8	J	1.8	J	ug/L	MW-203D	1 / 60	0.5
	1634-04-4	Methyl tert-butyl ether	0.089	J	3.4		ug/L	MW-301S	21 / 60	0.5
	108-87-2	Methylcyclohexane	0.16	J	1.7	J	ug/L	MW-307S	5 / 60	0.5
	75-09-2	Methylene Chloride	0.065	J	0.065	J	ug/L	MW-203S	1 / 60	0.5
	127-18-4	Tetrachloroethene	0.085	J	39		ug/L	OW-20	13 / 60	0.5
	108-88-3	Toluene	0.058	J	0.52		ug/L	OW-08	9 / 60	0.5
	156-60-5	trans-1,2-Dichloroethene	0.076	J	2.1		ug/L	MW-308B	8 / 60	0.5
	79-01-6	Trichloroethene	0.080	J	75		ug/L	MW-308B	19 / 60	0.5
	75-69-4	Trichlorofluoromethane	0.11	J	0.71		ug/L	MW-207B	2 / 60	0.5
	75-01-4	Vinyl Chloride	0.66		0.74		ug/L	MW-308B	2 / 60	0.5

TABLE 1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor/Outdoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits
	1330-20-7	Xylene (total)	0.29	J	250	J	ug/L	MW-307S	4 / 60	0.5
	123-91-1	**1,4-Dioxane**	0.59	J	2.9		ug/L	MW-203D	6 / 15	2
	105-67-9	**2,4-Dimethylphenol**	0.52	J	1.1	J	ug/L	MW-307S	2 / 60	5 - 5.7
	121-14-2	**2,4-Dinitrotoluene**	6.7		6.7		ug/L	OW-37	1 / 60	5 - 5.7
	606-20-2	**2,6-Dinitrotoluene**	1.3	J	1.3	J	ug/L	OW-37	1 / 60	5 - 5.7
	91-57-6	2-Methylnaphthalene	0.077	J	1.2		ug/L	OW-12	3 / 60	0.2 - 5.8
	95-48-7	**2-Methylphenol**	0.48	J	0.48	J	ug/L	MW-306S	1 / 60	5 - 5.7
	99-09-2	**3-Nitroaniline**	6.2	J	6.2	J	ug/L	OW-37	1 / 60	20 - 23
	534-52-1	**4,6-Dinitro-2-methylphenc**	0.11	J	0.11	J	ug/L	MW-203S	1 / 60	20 - 23
	106-44-5	**4-Methylphenol**	0.97	J	0.97	J	ug/L	MW-306S	1 / 60	5 - 5.7
	83-32-9	Acenaphthene	0.033	J	1.0		ug/L	MW-214S	9 / 60	0.2 - 0.33
	208-96-8	Acenaphthylene	0.012	J	0.015	J	ug/L	MW-214S	2 / 60	0.2 - 5
	120-12-7	Anthracene	0.49	J	0.74	J	ug/L	MW-213S	2 / 60	5 - 5.7
	1912-24-9	**Atrazine**	0.13	J	1.9	J	ug/L	MW-202D	7 / 36	1 - 5
	100-52-7	Benzaldehyde	1.8	J	2.0	J	ug/L	OW-37	2 / 60	5 - 5.7
	191-24-2	**Benzo(g,h,i)perylene**	0.024	J	0.097	J	ug/L	OW-25	7 / 60	0.2 - 5
	111-44-4	Bis(2-chloroethyl)ether	0.020	J	0.70		ug/L	MW-307D	19 / 59	0.05 - 0.82
	117-81-7	**Bis(2-ethylhexyl)phthalate**	1.9	J	1.9	J	ug/L	MW-212D	1 / 60	0.2 - 5
	85-68-7	**Butylbenzylphthalate**	0.19	J	0.71	J	ug/L	MW-305D	3 / 60	5 - 5.7
	53-70-3	**Dibenz(a,h)anthracene**	0.019	J	0.050	J	ug/L	MW-208D and MW-208S	6 / 60	0.1 - 5
	132-64-9	**Dibenzofuran**	0.90	J	0.90	J	ug/L	MW-213S	1 / 60	5 - 5.7
	131-11-3	**Dimethylphthalate**	0.015	J	0.54	J	ug/L	MW-306S	2 / 60	5 - 5.7
	117-84-0	**Di-n-octylphthalate**	0.58	J	0.58	J	ug/L	MW-306S	1 / 60	5 - 5.7
	206-44-0	**Fluoranthene**	0.13	J	0.98	J	ug/L	MW-214S	3 / 60	5 - 5.7
	86-73-7	Fluorene	0.46	J	1.8	J	ug/L	MW-214S	4 / 60	5 - 5.7
	193-39-5	**Indeno(1,2,3-cd)pyrene**	0.021	J	0.057	J	ug/L	MW-208S	6 / 60	0.1 - 5
	78-59-1	**Isophorone**	0.77	J	0.77	J	ug/L	OW-37	1 / 60	5 - 5.7
	91-20-3	Naphthalene	0.028	J	1.1		ug/L	OW-12	5 / 59	0.2 - 0.33
	86-30-6	**N-Nitrosodiphenylamine**	0.40	J	0.40	J	ug/L	MW-213S	1 / 60	5 - 5.7
	85-01-8	Phenanthrene	0.011	J	2.1		ug/L	MW-214S	12 / 60	0.2 - 0.33
	108-95-2	**Phenol**	5.7		5.7		ug/L	OW-08	1 / 60	5 - 5.7
	129-00-0	**Pyrene**	0.039	J	0.46		ug/L	MW-214S	5 / 60	0.2 - 0.33
	50-29-3	**4,4'-DDT**	0.0066	J	0.013	J	ug/L	MW-213S	2 / 21	0.01
	5103-71-9	**alpha-Chlordane**	0.0051	J	0.0051	J	ug/L	OW-09	1 / 20	0.005
	319-86-8	**delta-BHC**	0.0054		0.0054		ug/L	MW-304S	1 / 20	0.005
	60-57-1	**Dieldrin**	0.013		0.013		ug/L	MW-305S	1 / 20	0.01
	33213-65-9	**Endosulfan II**	0.016	J	0.016	J	ug/L	MW-213S	1 / 21	0.01
	53494-70-5	**Endrin Ketone**	0.020	J	0.020	J	ug/L	MW-213S	1 / 21	0.01

TABLE 1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
IRON HORSE PARK SUPERFUND SITE - OU4

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor/Outdoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits
	7429-90-5	**Aluminum**	11	J	7070		ug/L	MW-301D	42 / 60	50
	7440-36-0	**Antimony**	2.6	J	4.2	J	ug/L	MW-304S	4 / 60	2 - 20
	7440-38-2	**Arsenic**	0.054	J	281		ug/L	MW-211D	58 / 60	0.5
	7440-39-3	**Barium**	2.6	J	837		ug/L	MW-213S	60 / 60	N/A
	7440-41-7	**Beryllium**	0.10	J	3.1	J	ug/L	OW-09	8 / 60	1 - 10
	7440-43-9	**Cadmium**	0.051	J	22		ug/L	MW-01B	35 / 60	1
	7440-70-2	**Calcium**	3120	J	1775000		ug/L	MW-207B	60 / 60	N/A
	7440-47-3	**Chromium**	0.083	J	32		ug/L	MW-301D	35 / 60	2 - 20
	7440-48-4	**Cobalt**	0.23	J	341		ug/L	OW-09	43 / 60	1 - 10
	7440-50-8	**Copper**	0.52	J	135	J	ug/L	OW-09	15 / 60	2 - 20
	7439-89-6	**Iron**	31	J	57400		ug/L	MW-214S	44 / 60	100 - 226
	7439-92-1	**Lead**	0.11	J	29		ug/L	MW-01	37 / 60	1 - 10
	7439-95-4	**Magnesium**	1040	J	196000		ug/L	MW-207B	58 / 60	5000
	7439-96-5	**Manganese**	6.6		22600		ug/L	OW-09	60 / 60	N/A
	7487-94-7	**Mercury (inorganic)**	0.083	J	0.90	J	ug/L	MW-207B	2 / 60	0.2
	7440-02-0	**Nickel**	0.35	J	286	J	ug/L	OW-09	41 / 60	1 - 10
	7440-09-7	**Potassium**	878	J	47300		ug/L	OW-25	60 / 60	N/A
	7782-49-2	**Selenium**	0.15	J	2.7	J	ug/L	MW-213S	5 / 60	5 - 50
	7440-22-4	**Silver**	0.63	J	23		ug/L	MW-207B	2 / 60	1 - 10
	7440-23-5	**Sodium**	4900	J	4070000		ug/L	OW-25	60 / 60	N/A
	7440-62-2	**Vanadium**	0.046	J	16		ug/L	MW-301D	48 / 60	0.19 - 1
	7440-66-6	**Zinc**	1.2	J	357	J	ug/L	OW-09	26 / 60	2 - 45.9

(a), (b) Refer to Table 2.1 for samples.
(1) Minimum/maximum detected concentration.
(2) Boldface analytes are not considered volatile (molecular weight > 200 or Henry's law constant < 1E-05 atm-m^3/mol)

GROUNDWATER TO INDOOR AIR

TABLE 2
GROUNDWATER TO INDOOR AIR (VAPOR INTRUSION)
OVERBURDEN GROUNDWATER

	GW EPC	GW Temp.	GW Temp.	Henry's Law Constant at ref. temp.	Henry's Law Reference Temp.	Normal Boiling Point	Enthalpy of vaporization at T_S	Critical Temp.	constant	Enthalpy of vaporization at T_S	Gas Constant	Henry's Law Constant at T_S	Gas Constant	Henry's Law Constant
	C_w	T_S	T'_S	H_R	T_R	T_B	$\Delta H_{v,B}$	T_C	n	$\Delta H_{v,TS}$	R_c	H_{TS}	R	H'_{TS}
Units:	µg/L	°C	K	atm-m^3/mol	K	K	cal/mol	K	unitless	cal/mol	cal/mol-K	atm-m^3/mol	m^3-atm/mol-K	unitless
Formula:	**Input**	(10 for screening)	(T_S + 273.15)	lookup	(lookup+273.15)	lookup	lookup	lookup	(Note 7)	(Note 8)		(Note 9)		H_{TS} / (R * T'_S)
Analyte														
1,1,1-Trichloroethane	**2.2E+01**	1.00E+01	2.83E+02	1.72E-02	2.98E+02	3.47E+02	7.14E+03	5.45E+02	3.55E-01	7.88E+03	1.99E+00	8.48E-03	8.21E-05	3.65E-01
1,1,2,2-Tetrachloroethane	**7.7E-02**	1.00E+01	2.83E+02	3.44E-04	2.98E+02	4.20E+02	9.00E+03	6.61E+02	3.54E-01	1.05E+04	1.99E+00	1.34E-04	8.21E-05	5.77E-03
1,1-Dichloroethane	**3.8E+01**	1.00E+01	2.83E+02	5.61E-03	2.98E+02	3.31E+02	6.90E+03	5.23E+02	3.52E-01	7.45E+03	1.99E+00	2.88E-03	8.21E-05	1.24E-01
1,1-Dichloroethene	**4.8E+00**	1.00E+01	2.83E+02	2.60E-02	2.98E+02	3.05E+02	6.25E+03	5.76E+02	3.00E-01	6.39E+03	1.99E+00	1.47E-02	8.21E-05	6.33E-01
1,2,3-Trichlorobenzene	**2.3E-01**	1.00E+01	2.83E+02	1.25E-03	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	1.25E-03	8.21E-05	5.38E-02
1,2-Dichlorobenzene	**1.5E+00**	1.00E+01	2.83E+02	1.90E-03	2.98E+02	4.54E+02	9.70E+03	7.05E+02	3.60E-01	1.17E+04	1.99E+00	6.67E-04	8.21E-05	2.87E-02
1,2-Dichloroethane	**1.1E+01**	1.00E+01	2.83E+02	9.77E-04	2.98E+02	3.57E+02	7.64E+03	5.61E+02	3.54E-01	8.52E+03	1.99E+00	4.56E-04	8.21E-05	1.96E-02
1,2-Dichloropropane	**8.1E-01**	1.00E+01	2.83E+02	2.79E-03	2.98E+02	3.70E+02	7.59E+03	5.72E+02	3.62E-01	8.63E+03	1.99E+00	1.29E-03	8.21E-05	5.56E-02
1,3-Dichlorobenzene	**1.6E-01**	1.00E+01	2.83E+02	3.09E-03	2.98E+02	4.46E+02	9.23E+03	6.84E+02	3.67E-01	1.12E+04	1.99E+00	1.14E-03	8.21E-05	4.90E-02
1,4-Dichlorobenzene	**7.5E+00**	1.00E+01	2.83E+02	2.39E-03	2.98E+02	4.47E+02	9.27E+03	6.85E+02	3.67E-01	1.12E+04	1.99E+00	8.76E-04	8.21E-05	3.77E-02
Acetone	**5.4E+00**	1.00E+01	2.83E+02	3.87E-05	2.98E+02	3.29E+02	6.96E+03	5.08E+02	3.63E-01	7.56E+03	1.99E+00	1.97E-05	8.21E-05	8.47E-04
Benzene	**5.9E+01**	1.00E+01	2.83E+02	5.54E-03	2.98E+02	3.53E+02	7.34E+03	5.62E+02	3.49E-01	8.12E+03	1.99E+00	2.68E-03	8.21E-05	1.15E-01
Bromochloromethane	**2.6E-01**	1.00E+01	2.83E+02	1.47E-03	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	1.47E-03	8.21E-05	6.33E-02
Carbon Tetrachloride	**1.2E+02**	1.00E+01	2.83E+02	3.03E-02	2.98E+02	3.50E+02	7.13E+03	5.57E+02	3.49E-01	7.86E+03	1.99E+00	1.50E-02	8.21E-05	6.46E-01
Chlorobenzene	**4.6E+01**	1.00E+01	2.83E+02	3.69E-03	2.98E+02	4.05E+02	8.41E+03	6.32E+02	3.58E-01	9.80E+03	1.99E+00	1.54E-03	8.21E-05	6.61E-02
Chloroethane	**4.5E+00**	1.00E+01	2.83E+02	8.80E-03	2.98E+02	2.85E+02	5.88E+03	4.60E+02	3.43E-01	5.90E+03	1.99E+00	5.19E-03	8.21E-05	2.23E-01
Chloromethane	**3.2E+00**	1.00E+01	2.83E+02	8.80E-03	2.98E+02	2.49E+02	5.11E+03	4.16E+02	3.27E-01	4.75E+03	1.99E+00	5.76E-03	8.21E-05	2.48E-01
cis-1,2-Dichloroethene	**9.8E-01**	1.00E+01	2.83E+02	4.07E-03	2.98E+02	3.34E+02	7.19E+03	5.44E+02	3.38E-01	7.73E+03	1.99E+00	2.04E-03	8.21E-05	8.77E-02
cis-1,3-Dichloropropene	**8.6E+00**	1.00E+01	2.83E+02	2.38E-03	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	2.38E-03	8.21E-05	1.02E-01
Cyclohexane	**3.5E-01**	1.00E+01	2.83E+02	4.55E-02	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	4.55E-02	8.21E-05	1.96E+00
Dichlorodifluoromethane	**3.5E+00**	1.00E+01	2.83E+02	3.42E-01	2.98E+02	2.43E+02	9.42E+03	3.85E+02	3.52E-01	8.39E+03	1.99E+00	1.62E-01	8.21E-05	6.96E+00
Ethylbenzene	**1.1E+00**	1.00E+01	2.83E+02	7.86E-03	2.98E+02	4.09E+02	8.50E+03	6.17E+02	3.75E-01	1.02E+04	1.99E+00	3.17E-03	8.21E-05	1.36E-01
Isopropylbenzene	**3.4E-01**	1.00E+01	2.83E+02	1.46E-02	2.98E+02	4.26E+02	1.03E+04	6.31E+02	3.83E-01	1.26E+04	1.99E+00	4.71E-03	8.21E-05	2.03E-01
Methyl acetate	**1.8E+00**	1.00E+01	2.83E+02	1.18E-04	2.98E+02	3.30E+02	7.26E+03	5.07E+02	3.66E-01	7.91E+03	1.99E+00	5.82E-05	8.21E-05	2.50E-03
Methyl tert-butyl ether	**3.4E+00**	1.00E+01	2.83E+02	6.23E-04	2.98E+02	3.28E+02	6.68E+03	4.97E+02	3.73E-01	7.29E+03	1.99E+00	3.25E-04	8.21E-05	1.40E-02
Methylcyclohexane	**1.7E+00**	1.00E+01	2.83E+02	1.03E-01	2.98E+02	3.74E+02	7.47E+03	5.72E+02	3.68E-01	8.58E+03	1.99E+00	4.77E-02	8.21E-05	2.05E+00
Methylene Chloride	**6.5E-02**	1.00E+01	2.83E+02	2.18E-03	2.98E+02	3.13E+02	6.71E+03	5.10E+02	3.38E-01	7.03E+03	1.99E+00	1.16E-03	8.21E-05	5.01E-02
Tetrachloroethene	**3.9E+01**	1.00E+01	2.83E+02	1.84E-02	2.98E+02	3.94E+02	8.29E+03	6.20E+02	3.55E-01	9.55E+03	1.99E+00	7.81E-03	8.21E-05	3.36E-01
Toluene	**5.2E-01**	1.00E+01	2.83E+02	6.62E-03	2.98E+02	3.84E+02	7.93E+03	5.92E+02	3.64E-01	9.15E+03	1.99E+00	2.92E-03	8.21E-05	1.26E-01
trans-1,2-Dichloroethene	**5.8E-01**	1.00E+01	2.83E+02	9.36E-03	2.98E+02	3.21E+02	6.72E+03	5.17E+02	3.44E-01	7.14E+03	1.99E+00	4.94E-03	8.21E-05	2.13E-01
Trichloroethene	**7.0E+00**	1.00E+01	2.83E+02	1.03E-02	2.98E+02	3.60E+02	7.51E+03	5.44E+02	3.74E-01	8.56E+03	1.99E+00	4.78E-03	8.21E-05	2.06E-01
Trichlorofluoromethane	**1.1E-01**	1.00E+01	2.83E+02	9.68E-02	2.98E+02	2.97E+02	6.00E+03	4.71E+02	3.50E-01	6.16E+03	1.99E+00	5.58E-02	8.21E-05	2.40E+00
Vinyl Chloride	**6.6E-01**	1.00E+01	2.83E+02	2.69E-02	2.98E+02	2.59E+02	5.25E+03	4.32E+02	3.28E-01	5.00E+03	1.99E+00	1.72E-02	8.21E-05	7.41E-01
Xylene (total)	**2.5E+02**	1.00E+01	2.83E+02	6.73E-03	2.98E+02	4.12E+02	8.53E+03	6.16E+02	3.78E-01	1.02E+04	1.99E+00	2.69E-03	8.21E-05	1.16E-01
2-Methylnaphthalene	**1.2E+00**	1.00E+01	2.83E+02	5.17E-04	2.98E+02	5.14E+02	1.26E+04	7.61E+02	3.84E-01	1.62E+04	1.99E+00	1.21E-04	8.21E-05	5.20E-03
Acenaphthene	**1.0E+00**	1.00E+01	2.83E+02	1.55E-04	2.98E+02	5.51E+02	1.22E+04	8.03E+02	3.91E-01	1.61E+04	1.99E+00	3.66E-05	8.21E-05	1.57E-03
Acenaphthylene	**1.5E-02**	1.00E+01	2.83E+02	1.14E-04	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	1.14E-04	8.21E-05	4.90E-03
Anthracene	**7.4E-01**	1.00E+01	2.83E+02	6.51E-05	2.98E+02	6.15E+02	1.31E+04	8.73E+02	4.05E-01	1.84E+04	1.99E+00	1.26E-05	8.21E-05	5.43E-04
Benzaldehyde	**1.8E+00**	1.00E+01	2.83E+02	2.37E-05	2.98E+02	4.52E+02	1.17E+04	6.95E+02	3.65E-01	1.41E+04	1.99E+00	6.71E-06	8.21E-05	2.89E-04
Bis(2-chloroethyl)ether	**7.0E-01**	1.00E+01	2.83E+02	1.80E-05	2.98E+02	4.51E+02	1.08E+04	6.60E+02	3.90E-01	1.36E+04	1.99E+00	5.32E-06	8.21E-05	2.29E-04
Fluorene	**1.8E+00**	1.00E+01	2.83E+02	6.34E-05	2.98E+02	5.70E+02	1.27E+04	8.70E+02	3.69E-01	1.62E+04	1.99E+00	1.49E-05	8.21E-05	6.39E-04
Naphthalene	**1.1E+00**	1.00E+01	2.83E+02	4.82E-04	2.98E+02	4.91E+02	1.04E+04	7.48E+02	3.70E-01	1.29E+04	1.99E+00	1.52E-04	8.21E-05	6.54E-03
Phenanthrene	**2.1E+00**	1.00E+01	2.83E+02	3.57E-05	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	3.57E-05	8.21E-05	1.54E-03

TABLE 2 (continued)
GROUNDWATER TO INDOOR AIR (VAPOR INTRUSION)
OVERBURDEN GROUNDWATER

	Conversion Factor m^3 to L	Source Vapor Conc.	Depth below grade to bottom of enclosed space	Depth below grade to water table	Source-Building Separation	SCS soil type directly above water table	SCS soil type in vadose zone	Capillary zone mean particle diameter	Thickness of capillary zone	Diffusivity in air	Diffusivity in water	Vadose zone soil total porosity
	Conv01	C_{source}	L_F	L_{WT}	L_T	ST_{WT}	ST_v	D_{cz}	L_{cz}	D_a	D_w	n_v
Units:	L/m^3	$\mu g/m^3$	cm	cm	cm	unitless	unitless	cm	cm	cm^2/s	cm^2/s	cm^3/cm^3
Formula:		C_w*H'_{TS}*Conv01	(15 or 200 for screening)	(Note 3)	L_{WT} - L_F	(Note 10)	(Note 11)	lookup	(Note 12)	lookup	lookup	lookup
Analyte												
1,1,1-Trichloroethane	1.00E+03	8.03E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.80E-02	8.80E-06	3.84E-01
1,1,2,2-Tetrachloroethane	1.00E+03	4.44E-01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.10E-02	7.90E-06	3.84E-01
1,1-Dichloroethane	1.00E+03	4.71E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.42E-02	1.05E-05	3.84E-01
1,1-Dichloroethene	1.00E+03	3.04E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	9.00E-02	1.04E-05	3.84E-01
1,2,3-Trichlorobenzene	1.00E+03	1.24E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	3.82E-02	8.23E-06	3.84E-01
1,2-Dichlorobenzene	1.00E+03	4.30E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.90E-02	7.90E-06	3.84E-01
1,2-Dichloroethane	1.00E+03	2.16E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	1.04E-01	9.90E-06	3.84E-01
1,2-Dichloropropane	1.00E+03	4.50E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.82E-02	8.73E-06	3.84E-01
1,3-Dichlorobenzene	1.00E+03	7.84E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.92E-02	7.86E-06	3.84E-01
1,4-Dichlorobenzene	1.00E+03	2.83E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.90E-02	7.90E-06	3.84E-01
Acetone	1.00E+03	4.58E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	1.24E-01	1.14E-05	3.84E-01
Benzene	1.00E+03	6.80E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	8.80E-02	9.80E-06	3.84E-01
Bromochloromethane	1.00E+03	1.64E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.88E-02	1.00E-05	3.84E-01
Carbon Tetrachloride	1.00E+03	7.76E+04	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.80E-02	8.80E-06	3.84E-01
Chlorobenzene	1.00E+03	3.04E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.30E-02	8.70E-06	3.84E-01
Chloroethane	1.00E+03	1.01E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	2.71E-01	1.15E-05	3.84E-01
Chloromethane	1.00E+03	7.93E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	1.26E-01	6.50E-06	3.84E-01
cis-1,2-Dichloroethene	1.00E+03	8.60E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.36E-02	1.13E-05	3.84E-01
cis-1,3-Dichloropropene	1.00E+03	8.81E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.26E-02	1.00E-05	3.84E-01
Cyclohexane	1.00E+03	6.85E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	8.32E-02	9.50E-06	3.84E-01
Dichlorodifluoromethane	1.00E+03	2.43E+04	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.65E-02	9.92E-06	3.84E-01
Ethylbenzene	1.00E+03	1.50E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.50E-02	7.80E-06	3.84E-01
Isopropylbenzene	1.00E+03	6.90E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.50E-02	7.10E-06	3.84E-01
Methyl acetate	1.00E+03	4.51E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	1.04E-01	1.00E-05	3.84E-01
Methyl tert-butyl ether	1.00E+03	4.75E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	1.02E-01	1.05E-05	3.84E-01
Methylcyclohexane	1.00E+03	3.49E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.35E-02	8.52E-06	3.84E-01
Methylene Chloride	1.00E+03	3.26E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	1.01E-01	1.17E-05	3.84E-01
Tetrachloroethene	1.00E+03	1.31E+04	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.20E-02	8.20E-06	3.84E-01
Toluene	1.00E+03	6.54E+01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	8.70E-02	8.60E-06	3.84E-01
trans-1,2-Dichloroethene	1.00E+03	1.23E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.07E-02	1.19E-05	3.84E-01
Trichloroethene	1.00E+03	1.44E+03	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.90E-02	9.10E-06	3.84E-01
Trichlorofluoromethane	1.00E+03	2.64E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	8.70E-02	9.70E-06	3.84E-01
Vinyl Chloride	1.00E+03	4.89E+02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	1.06E-01	1.23E-05	3.84E-01
Xylene (total)	1.00E+03	2.90E+04	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.69E-02	8.44E-06	3.84E-01
2-Methylnaphthalene	1.00E+03	6.25E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	5.22E-02	7.75E-06	3.84E-01
Acenaphthene	1.00E+03	1.57E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	4.21E-02	7.69E-06	3.84E-01
Acenaphthylene	1.00E+03	7.35E-02	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	4.49E-02	6.98E-06	3.84E-01
Anthracene	1.00E+03	4.02E-01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	3.24E-02	7.74E-06	3.84E-01
Benzaldehyde	1.00E+03	5.20E-01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	7.21E-02	9.07E-06	3.84E-01
Bis(2-chloroethyl)ether	1.00E+03	1.60E-01	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	6.92E-02	7.53E-06	3.84E-01
Fluorene	1.00E+03	1.15E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	3.63E-02	7.88E-06	3.84E-01
Naphthalene	1.00E+03	7.19E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	5.90E-02	7.50E-06	3.84E-01
Phenanthrene	1.00E+03	3.23E+00	2.00E+02	4.00E+02	2.00E+02	SCL	SCL	2.90E-02	2.59E+01	3.75E-02	7.47E-06	3.84E-01

TABLE 2 (continued)
GROUNDWATER TO INDOOR AIR (VAPOR INTRUSION)
OVERBURDEN GROUNDWATER

	Vadose zone soil water-filled porosity	Vadose zone soil air-filled porosity	Vadose zone Effective Diffusion Coeff.	Capillary zone soil total porosity	Capillary zone residual soil water content	Capillary zone saturated soil water content	Capillary zone van Genuchten shape parameter	Capillary zone soil water-filled porosity	Capillary zone soil air-filled porosity	Capillary zone Effective Diffusion Coeff.	Total Overall Effective Diffusion Coeff.
Units:	$\theta_{w,v}$ cm^3/cm^3	$\theta_{a,v}$ cm^3/cm^3	D_v^{eff} cm^2/s	n_{cz} cm^3/cm^3	$\theta_{r,cz}$ cm^3/cm^3	$\theta_{s,cz}$ cm^3/cm^3	M_{cz} unitless	$\theta_{w,cz}$ cm^3/cm^3	$\theta_{a,cz}$ cm^3/cm^3	D_{cz}^{eff} cm^2/s	D_T^{eff} cm^2/s
Formula:	lookup	$n_v - \theta_{w,v}$	(Note 13)	lookup	lookup	lookup	lookup	(Note 15)	$n_{cz} - \theta_{w,cz}$	(Note 14)	(Note 4)
Analyte											
1,1,1-Trichloroethane	1.46E-01	2.38E-01	4.44E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.00E-05	2.22E-04
1,1,2,2-Tetrachloroethane	1.46E-01	2.38E-01	4.06E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.63E-04	1.41E-03
1,1-Dichloroethane	1.46E-01	2.38E-01	4.23E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.93E-05	2.86E-04
1,1-Dichloroethene	1.46E-01	2.38E-01	5.12E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.26E-05	2.42E-04
1,2,3-Trichlorobenzene	1.46E-01	2.38E-01	2.18E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.94E-05	2.71E-04
1,2-Dichlorobenzene	1.46E-01	2.38E-01	3.93E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	7.09E-05	4.89E-04
1,2-Dichloroethane	1.46E-01	2.38E-01	5.93E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	1.23E-04	8.32E-04
1,2-Dichloropropane	1.46E-01	2.38E-01	4.45E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.33E-05	3.82E-04
1,3-Dichlorobenzene	1.46E-01	2.38E-01	3.94E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.09E-05	3.62E-04
1,4-Dichlorobenzene	1.46E-01	2.38E-01	3.93E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.94E-05	4.17E-04
Acetone	1.46E-01	2.38E-01	7.21E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.39E-03	5.72E-03
Benzene	1.46E-01	2.38E-01	5.01E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.40E-05	3.21E-04
Bromochloromethane	1.46E-01	2.38E-01	3.92E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.04E-05	3.58E-04
Carbon Tetrachloride	1.46E-01	2.38E-01	4.44E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.82E-05	2.09E-04
Chlorobenzene	1.46E-01	2.38E-01	4.16E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.71E-05	3.39E-04
Chloroethane	1.46E-01	2.38E-01	1.54E-02	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	9.86E-05	7.31E-04
Chloromethane	1.46E-01	2.38E-01	7.17E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.63E-05	3.43E-04
cis-1,2-Dichloroethene	1.46E-01	2.38E-01	4.19E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.68E-05	3.37E-04
cis-1,3-Dichloropropene	1.46E-01	2.38E-01	3.56E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.78E-05	2.73E-04
Cyclohexane	1.46E-01	2.38E-01	4.74E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.84E-05	2.11E-04
Dichlorodifluoromethane	1.46E-01	2.38E-01	3.79E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.22E-05	1.65E-04
Ethylbenzene	1.46E-01	2.38E-01	4.27E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.48E-05	2.55E-04
Isopropylbenzene	1.46E-01	2.38E-01	3.70E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.76E-05	2.03E-04
Methyl acetate	1.46E-01	2.38E-01	5.97E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	7.32E-04	3.10E-03
Methyl tert-butyl ether	1.46E-01	2.38E-01	5.84E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	1.65E-04	1.07E-03
Methylcyclohexane	1.46E-01	2.38E-01	4.18E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.50E-05	1.86E-04
Methylene Chloride	1.46E-01	2.38E-01	5.75E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	7.42E-05	5.28E-04
Tetrachloroethene	1.46E-01	2.38E-01	4.10E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.81E-05	2.08E-04
Toluene	1.46E-01	2.38E-01	4.95E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.07E-05	2.98E-04
trans-1,2-Dichloroethene	1.46E-01	2.38E-01	4.03E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.32E-05	2.43E-04
Trichloroethene	1.46E-01	2.38E-01	4.50E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.39E-05	2.49E-04
Trichlorofluoromethane	1.46E-01	2.38E-01	4.95E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.95E-05	2.19E-04
Vinyl Chloride	1.46E-01	2.38E-01	6.03E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.80E-05	2.82E-04
Xylene (total)	1.46E-01	2.38E-01	4.38E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.82E-05	2.79E-04
2-Methylnaphthalene	1.46E-01	2.38E-01	2.99E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.77E-04	1.32E-03
Acenaphthene	1.46E-01	2.38E-01	2.45E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	8.67E-04	1.98E-03
Acenaphthylene	1.46E-01	2.38E-01	2.57E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.64E-04	1.21E-03
Anthracene	1.46E-01	2.38E-01	2.00E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.50E-03	2.06E-03
Benzaldehyde	1.46E-01	2.38E-01	4.46E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.51E-03	4.57E-03
Bis(2-chloroethyl)ether	1.46E-01	2.38E-01	4.31E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.77E-03	4.45E-03
Fluorene	1.46E-01	2.38E-01	2.20E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.17E-03	2.20E-03
Naphthalene	1.46E-01	2.38E-01	3.37E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.20E-04	1.18E-03
Phenanthrene	1.46E-01	2.38E-01	2.19E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	8.62E-04	1.83E-03

TABLE 2 (continued)
GROUNDWATER TO INDOOR AIR (VAPOR INTRUSION)
OVERBURDEN GROUNDWATER

	Area of Enclosed Space Below Grade	Building Ventilation Rate	Pressure Diff. between soil & enclosed space	Vadose zone soil saturated hydraulic conductivity	Conversion Factor hr to s	Viscosity of water at 10^oC	Viscosity of water at system temp.	Density of water	Acceleration due to gravity	Vadose zone soil intrinsic permeability	Vadose zone residual soil water content	Vadose zone effective total fluid saturation
	A_B	$Q_{building}$	ΔP	$K_{s,v}$	Conv02	μ_{w-10}	μ_w	ρ_w	g	$k_{i,v}$	$\theta_{r,v}$	S_{te}
Units:	cm^2	cm^3/s	$g/cm\text{-}s^2$	cm/hr	s/hr	g/cm-s	g/cm-s	g/cm^3	cm/s^2	cm^2	cm^3/cm^3	unitless
Formula:	(Note 2)	(Note 2a)	(40 for screening)	lookup			(Note 16)	(0.999 for screening)		(Note 17)	lookup	(Note 18)
Analyte												
1,1,1-Trichloroethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,1,2,2-Tetrachloroethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,1-Dichloroethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,1-Dichloroethene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2,3-Trichlorobenzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2-Dichlorobenzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2-Dichloroethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2-Dichloropropane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,3-Dichlorobenzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,4-Dichlorobenzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Acetone	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Benzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Bromochloromethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Carbon Tetrachloride	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Chlorobenzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Chloroethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Chloromethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
cis-1,2-Dichloroethene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
cis-1,3-Dichloropropene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Cyclohexane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Dichlorodifluoromethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Ethylbenzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Isopropylbenzene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methyl acetate	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methyl tert-butyl ether	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methylcyclohexane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methylene Chloride	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Tetrachloroethene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Toluene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
trans-1,2-Dichloroethene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Trichloroethene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Trichlorofluoromethane	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Vinyl Chloride	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Xylene (total)	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
2-Methylnaphthalene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Acenaphthene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Acenaphthylene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Anthracene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Benzaldehyde	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Bis(2-chloroethyl)ether	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Fluorene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Naphthalene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Phenanthrene	1.80E+06	2.54E+04	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01

TABLE 2 (continued)
GROUNDWATER TO INDOOR AIR (VAPOR INTRUSION)
OVERBURDEN GROUNDWATER

	Vadose zone van Genuchten shape parameter	Vadose zone soil relative air permeability	Vadose zone soil effective vapor permeability	Floor-wall seam perimeter	Vapor viscosity at avg. soil temp.	Crack depth below grade	Total area of cracks	Crack-to-total area ratio	Equivalent crack radius	Avg. Vapor Flow Rate Into Bldg.	Foundation or Slab Thickness	Crack Effective Diffusion Coeff.
	M_v	k_{rg}	k_v	X_{crack}	μ_{TS}	Z_{crack}	A_{crack}	η	r_{crack}	Q_{soil}	L_{crack}	D^{crack}
Units:	unitless	unitless	cm^2	cm	g/cm-s	cm	cm^2	unitless	cm	cm^3/s	cm	cm^2/s
Formula:	lookup	(Note 19)	(Note 20)	(4000 for screening)	0.00018*(T'$_S$/298.15)^0.5	(= L_F for screening)	(400 for screening)	A_{crack}/A_B	$\eta(A_B/X_{crack})$	(Note 5)	(10 for screening)	(Note 1)
Analyte												
1,1,1-Trichloroethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.44E-03
1,1,2,2-Tetrachloroethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.06E-03
1,1-Dichloroethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.23E-03
1,1-Dichloroethene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	5.12E-03
1,2,3-Trichlorobenzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	2.18E-03
1,2-Dichlorobenzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.93E-03
1,2-Dichloroethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	5.93E-03
1,2-Dichloropropane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.45E-03
1,3-Dichlorobenzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.94E-03
1,4-Dichlorobenzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.93E-03
Acetone	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	7.21E-03
Benzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	5.01E-03
Bromochloromethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.92E-03
Carbon Tetrachloride	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.44E-03
Chlorobenzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.16E-03
Chloroethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	1.54E-02
Chloromethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	7.17E-03
cis-1,2-Dichloroethene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.19E-03
cis-1,3-Dichloropropene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.56E-03
Cyclohexane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.74E-03
Dichlorodifluoromethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.79E-03
Ethylbenzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.27E-03
Isopropylbenzene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.70E-03
Methyl acetate	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	5.97E-03
Methyl tert-butyl ether	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	5.84E-03
Methylcyclohexane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.18E-03
Methylene Chloride	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	5.75E-03
Tetrachloroethene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.10E-03
Toluene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.95E-03
trans-1,2-Dichloroethene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.03E-03
Trichloroethene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.50E-03
Trichlorofluoromethane	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.95E-03
Vinyl Chloride	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	6.03E-03
Xylene (total)	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.38E-03
2-Methylnaphthalene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	2.99E-03
Acenaphthene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	2.45E-03
Acenaphthylene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	2.57E-03
Anthracene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	2.00E-03
Benzaldehyde	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.46E-03
Bis(2-chloroethyl)ether	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	4.31E-03
Fluorene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	2.20E-03
Naphthalene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	3.37E-03
Phenanthrene	2.48E-01	8.59E-01	1.75E-09	4.00E+03	1.75E-04	2.00E+02	4.00E+02	2.22E-04	1.00E-01	1.21E+00	1.00E+01	2.19E-03

TABLE 2 (continued)
GROUNDWATER TO INDOOR AIR (VAPOR INTRUSION)
OVERBURDEN GROUNDWATER

	Infinite Source Indoor Attenuation Coeff.	Infinite Source Bldg. Conc.
	α	$C_{building}$
Units:	unitless	$\mu g/m^3$
Formula:	(Note 6)	$C_{source} * \alpha$
Analyte		
1,1,1-Trichloroethane	2.97E-05	2.4E-01
1,1,2,2-Tetrachloroethane	4.35E-05	1.9E-05
1,1-Dichloroethane	3.24E-05	1.5E-01
1,1-Dichloroethene	3.07E-05	9.3E-02
1,2,3-Trichlorobenzene	3.18E-05	3.9E-04
1,2-Dichlorobenzene	3.74E-05	1.6E-03
1,2-Dichloroethane	4.12E-05	8.9E-03
1,2-Dichloropropane	3.52E-05	1.6E-03
1,3-Dichlorobenzene	3.47E-05	2.7E-04
1,4-Dichlorobenzene	3.60E-05	1.0E-02
Acetone	4.72E-05	2.2E-04
Benzene	3.36E-05	2.3E-01
Bromochloromethane	3.46E-05	5.7E-04
Carbon Tetrachloride	2.90E-05	2.2E+00
Chlorobenzene	3.41E-05	1.0E-01
Chloroethane	4.56E-05	4.6E-02
Chloromethane	3.46E-05	2.7E-02
cis-1,2-Dichloroethene	3.40E-05	2.9E-03
cis-1,3-Dichloropropene	3.19E-05	2.8E-02
Cyclohexane	2.91E-05	2.0E-02
Dichlorodifluoromethane	2.63E-05	6.4E-01
Ethylbenzene	3.12E-05	4.7E-03
Isopropylbenzene	2.87E-05	2.0E-03
Methyl acetate	4.59E-05	2.1E-04
Methyl tert-butyl ether	4.25E-05	2.0E-03
Methylcyclohexane	2.77E-05	9.7E-02
Methylene Chloride	3.81E-05	1.2E-04
Tetrachloroethene	2.89E-05	3.8E-01
Toluene	3.29E-05	2.1E-03
trans-1,2-Dichloroethene	3.07E-05	3.8E-03
Trichloroethene	3.09E-05	4.5E-02
Trichlorofluoromethane	2.95E-05	7.8E-03
Vinyl Chloride	3.24E-05	1.6E-02
Xylene (total)	3.21E-05	9.3E-01
2-Methylnaphthalene	4.32E-05	2.7E-04
Acenaphthene	4.46E-05	7.0E-05
Acenaphthylene	4.28E-05	3.1E-06
Anthracene	4.47E-05	1.8E-05
Benzaldehyde	4.63E-05	2.4E-05
Bis(2-chloroethyl)ether	4.63E-05	7.4E-06
Fluorene	4.49E-05	5.2E-05
Naphthalene	4.28E-05	3.1E-04
Phenanthrene	4.43E-05	1.4E-04

Notes:

Reference: *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* , USEPA, June 19, 2003.

(1) Assumed equivalent to D_i^{eff} of soil layer i in contact with the floor

(2) For screening, A_B = 1,000,000 cm^2 for L_F <= 15 cm and A_B = 1,800,000 cm^2 for LF > 15 cm

(2a) For screening, $Q_{building}$ = 25,417 cm^3/s for L_F <= 15 cm and $Q_{building}$ = 16,944 cm^3/s for LF > 15 cm

(3) Depth to water table minus depth to bottom of floor must be > thickness of capillary fringe, which is based on the soil type (typ. around 30 cm). Use 400 cm for screening purposes.

(4) $D_T^{eff} = L_T / (((L_{WT} - L_{cz} - L_F) / D_v^{eff}) + (L_{cz} / D_{cz}^{eff}))$

(5) $Q_{soil} = (2*\pi*\Delta P*k_v*X_{crack}) / (\mu_{TS}*\ln(2*Z_{crack}/r_{crack}))$

(6) $\alpha = [(D_T^{eff}*A_B/(Q_{building}*L_T))*EXP(Q_{soil}*L_{crack}/(D^{crack}*A_{crack}))]/[EXP(Q_{soil}*L_{crack}/(D^{crack}*A_{crack}))+(D_T^{eff}*A_B/(Q_{building}*L_T))+(D_T^{eff}*A_B/(Q_{soil}*L_T))*(EXP(Q_{soil}*L_{crack}/(D^{crack}*A_{crack}))-1)]$

(7) A function of the ratio T_B/T_C:

T_B/T_C	n
<0.57	0.30
0.57-0.71	$0.74(T_B/T_C)-0.116$
>0.71	0.41

If values are not available for calculation, result is NA.

(8) $\Delta H_{v,TS} = \Delta H_{v,B}*[(1-T_S/T_C)/(1-T_B/T_C)]^n$; if values are not available for calculation, result is NA.

(9) $H_{TS} = EXP[-\Delta H_{v,TS}/R_c*(1/T_S-1/T_R)]*H_R$; if values are not available for calculation, result assumed to be H_R

(10) Refer to 12 SCS soil types - if no site-specific information is available, use SCL for screening.

(11) Refer to 12 SCS soil types - if no site-specific information is available, use SCL for screening.

(12) $L_{cz} = 0.15 / (0.2 * D_{cz})$

(13) $D_v^{eff} = D_a*(\theta_{a,v}^{3.33}/n_v^2)+(D_w/H'_{TS})(\theta_{w,v}^{3.33}/n_v^2)$

(14) $D_{cz}^{eff} = D_a*(\theta_{a,cz}^{3.33}/n_{cz}^2)+(D_w/H'_{TS})(\theta_{w,cz}^{3.33}/n_{cz}^2)$

(15) $\theta_{w,cz} = \theta_{r,cz}+((\theta_{s,cz}-\theta_{r,cz})/(2^{Mcz}))$, where the value 2 in the formula is used for screening, but may be refined based on soil parameters.

(16) $\mu_w = \mu_{w-10} * (T'_S / 283.15)^{0.5}$

(17) $k_{i,v} = K_{s,v} * 1/Conv02 * \mu_w / (\rho_w * g)$

(18) $S_{te} = (\theta_{w,v} - \theta_{r,v}) / (n_v - \theta_{r,v})$

(19) $k_{rg} = (1 - S_{te})^{0.5} * (1-S_{te}^{1/Mv})^{2Mv}$

(20) $k_v = k_{i,v} * k_{rg}$; note that the model is very sensitive to this parameter and if site-specific values are available, they should be used.

TABLE 3. SUMMARY OF MODELED AIR DATA
GROUNDWATER TO INDOOR AIR (VAPOR INTRUSION)

	Indoor Air Concentrations (ug/m^3)
Analyte	
1,1,1-Trichloroethane	2.4E-01
1,1,2,2-Tetrachloroethane	1.9E-05
1,1-Dichloroethane	1.5E-01
1,1-Dichloroethene	9.3E-02
1,2,3-Trichlorobenzene	3.9E-04
1,2-Dichlorobenzene	1.6E-03
1,2-Dichloroethane	8.9E-03
1,2-Dichloropropane	1.6E-03
1,3-Dichlorobenzene	2.7E-04
1,4-Dichlorobenzene	1.0E-02
Acetone	2.2E-04
Benzene	2.3E-01
Bromochloromethane	5.7E-04
Carbon Tetrachloride	2.2E+00
Chlorobenzene	1.0E-01
Chloroethane	4.6E-02
Chloromethane	2.7E-02
cis-1,2-Dichloroethene	2.9E-03
cis-1,3-Dichloropropene	2.8E-02
Cyclohexane	2.0E-02
Dichlorodifluoromethane	6.4E-01
Ethylbenzene	4.7E-03
Isopropylbenzene	2.0E-03
Methyl acetate	2.1E-04
Methyl tert-butyl ether	2.0E-03
Methylcyclohexane	9.7E-02
Methylene Chloride	1.2E-04
Tetrachloroethene	3.8E-01
Toluene	2.1E-03
trans-1,2-Dichloroethene	3.8E-03
Trichloroethene	4.5E-02
Trichlorofluoromethane	7.8E-03
Vinyl Chloride	1.6E-02
Xylene (total)	9.3E-01
2-Methylnaphthalene	2.7E-04
Acenaphthene	7.0E-05
Acenaphthylene	3.1E-06
Anthracene	1.8E-05
Benzaldehyde	2.4E-05
Bis(2-chloroethyl)ether	7.4E-06
Fluorene	5.2E-05
Naphthalene	3.1E-04
Phenanthrene	1.4E-04

GROUNDWATER TO OUTDOOR AIR

TABLE 4
GROUNDWATER TO OUTDOOR AIR (TRENCH)
OVERBURDEN GROUNDWATER

	GW EPC	GW Temp.	GW Temp.	Henry's Law Constant at ref. temp.	Henry's Law Reference Temp.	Normal Boiling Point	Enthalpy of vaporization at T_S	Critical Temp.	constant	Enthalpy of vaporization at T_S	Gas Constant	Henry's Law Constant at T_S	Gas Constant	Henry's Law Constant
	C_w	T_S	T'_S	H_R	T_R	T_B	$\Delta H_{v,B}$	T_C	n	$\Delta H_{v,TS}$	R_c	H_{TS}	R	H'_{TS}
Units:	µg/L	°C	K	atm-m^3/mol	K	K	cal/mol	K	unitless	cal/mol	cal/mol-K	atm-m^3/mol	m^3-atm/mol-K	unitless
Formula:	**Input**	(10 for screening)	(T_S + 273.15)	lookup	(lookup+273.15)	lookup	lookup	lookup	(Note 7)	(Note 8)		(Note 9)		H_{TS} / (R * T'$_S$)
Analyte														
1,1,1-Trichloroethane	**2.2E+01**	1.00E+01	2.83E+02	1.72E-02	2.98E+02	3.47E+02	7.14E+03	5.45E+02	3.55E-01	7.88E+03	1.99E+00	8.48E-03	8.21E-05	3.65E-01
1,1,2,2-Tetrachloroethane	**7.7E-02**	1.00E+01	2.83E+02	3.44E-04	2.98E+02	4.20E+02	9.00E+03	6.61E+02	3.54E-01	1.05E+04	1.99E+00	1.34E-04	8.21E-05	5.77E-03
1,1-Dichloroethane	**3.8E+01**	1.00E+01	2.83E+02	5.61E-03	2.98E+02	3.31E+02	6.90E+03	5.23E+02	3.52E-01	7.45E+03	1.99E+00	2.88E-03	8.21E-05	1.24E-01
1,1-Dichloroethene	**4.8E+00**	1.00E+01	2.83E+02	2.60E-02	2.98E+02	3.05E+02	6.25E+03	5.76E+02	3.00E-01	6.39E+03	1.99E+00	1.47E-02	8.21E-05	6.33E-01
1,2,3-Trichlorobenzene	**2.3E-01**	1.00E+01	2.83E+02	1.25E-03	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	1.25E-03	8.21E-05	5.38E-02
1,2-Dichlorobenzene	**1.5E+00**	1.00E+01	2.83E+02	1.90E-03	2.98E+02	4.54E+02	9.70E+03	7.05E+02	3.60E-01	1.17E+04	1.99E+00	6.67E-04	8.21E-05	2.87E-02
1,2-Dichloroethane	**1.1E+01**	1.00E+01	2.83E+02	9.77E-04	2.98E+02	3.57E+02	7.64E+03	5.61E+02	3.54E-01	8.52E+03	1.99E+00	4.56E-04	8.21E-05	1.96E-02
1,2-Dichloropropane	**8.1E-01**	1.00E+01	2.83E+02	2.79E-03	2.98E+02	3.70E+02	7.59E+03	5.72E+02	3.62E-01	8.63E+03	1.99E+00	1.29E-03	8.21E-05	5.56E-02
1,3-Dichlorobenzene	**1.6E-01**	1.00E+01	2.83E+02	3.09E-03	2.98E+02	4.46E+02	9.23E+03	6.84E+02	3.67E-01	1.12E+04	1.99E+00	1.14E-03	8.21E-05	4.90E-02
1,4-Dichlorobenzene	**7.5E+00**	1.00E+01	2.83E+02	2.39E-03	2.98E+02	4.47E+02	9.27E+03	6.85E+02	3.67E-01	1.12E+04	1.99E+00	8.76E-04	8.21E-05	3.77E-02
Acetone	**5.4E+00**	1.00E+01	2.83E+02	3.87E-05	2.98E+02	3.29E+02	6.96E+03	5.08E+02	3.63E-01	7.56E+03	1.99E+00	1.97E-05	8.21E-05	8.47E-04
Benzene	**5.9E+01**	1.00E+01	2.83E+02	5.54E-03	2.98E+02	3.53E+02	7.34E+03	5.62E+02	3.49E-01	8.12E+03	1.99E+00	2.68E-03	8.21E-05	1.15E-01
Bromochloromethane	**2.6E-01**	1.00E+01	2.83E+02	1.47E-03	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	1.47E-03	8.21E-05	6.33E-02
Carbon Tetrachloride	**1.2E+02**	1.00E+01	2.83E+02	3.03E-02	2.98E+02	3.50E+02	7.13E+03	5.57E+02	3.49E-01	7.86E+03	1.99E+00	1.50E-02	8.21E-05	6.46E-01
Chlorobenzene	**4.6E+01**	1.00E+01	2.83E+02	3.69E-03	2.98E+02	4.05E+02	8.41E+03	6.32E+02	3.58E-01	9.80E+03	1.99E+00	1.54E-03	8.21E-05	6.61E-02
Chloroethane	**4.5E+00**	1.00E+01	2.83E+02	8.80E-03	2.98E+02	2.85E+02	5.88E+03	4.60E+02	3.43E-01	5.90E+03	1.99E+00	5.19E-03	8.21E-05	2.23E-01
Chloromethane	**3.2E+00**	1.00E+01	2.83E+02	8.80E-03	2.98E+02	2.49E+02	5.11E+03	4.16E+02	3.27E-01	4.75E+03	1.99E+00	5.76E-03	8.21E-05	2.48E-01
cis-1,2-Dichloroethene	**9.8E-01**	1.00E+01	2.83E+02	4.07E-03	2.98E+02	3.34E+02	7.19E+03	5.44E+02	3.38E-01	7.73E+03	1.99E+00	2.04E-03	8.21E-05	8.77E-02
cis-1,3-Dichloropropene	**8.6E+00**	1.00E+01	2.83E+02	2.38E-03	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	2.38E-03	8.21E-05	1.02E-01
Cyclohexane	**3.5E-01**	1.00E+01	2.83E+02	4.55E-02	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	4.55E-02	8.21E-05	1.96E+00
Dichlorodifluoromethane	**3.5E+00**	1.00E+01	2.83E+02	3.42E-01	2.98E+02	2.43E+02	9.42E+03	3.85E+02	3.52E-01	8.39E+03	1.99E+00	1.62E-01	8.21E-05	6.96E+00
Ethylbenzene	**1.1E+00**	1.00E+01	2.83E+02	7.86E-03	2.98E+02	4.09E+02	8.50E+03	6.17E+02	3.75E-01	1.02E+04	1.99E+00	3.17E-03	8.21E-05	1.36E-01
Isopropylbenzene	**3.4E-01**	1.00E+01	2.83E+02	1.46E-02	2.98E+02	4.26E+02	1.03E+04	6.31E+02	3.83E-01	1.26E+04	1.99E+00	4.71E-03	8.21E-05	2.03E-01
Methyl acetate	**1.8E+00**	1.00E+01	2.83E+02	1.18E-04	2.98E+02	3.30E+02	7.26E+03	5.07E+02	3.66E-01	7.91E+03	1.99E+00	5.82E-05	8.21E-05	2.50E-03
Methyl tert-butyl ether	**3.4E+00**	1.00E+01	2.83E+02	6.23E-04	2.98E+02	3.28E+02	6.68E+03	4.97E+02	3.73E-01	7.29E+03	1.99E+00	3.25E-04	8.21E-05	1.40E-02
Methylcyclohexane	**1.7E+00**	1.00E+01	2.83E+02	1.03E-01	2.98E+02	3.74E+02	7.47E+03	5.72E+02	3.68E-01	8.58E+03	1.99E+00	4.77E-02	8.21E-05	2.05E+00
Methylene Chloride	**6.5E-02**	1.00E+01	2.83E+02	2.18E-03	2.98E+02	3.13E+02	6.71E+03	5.10E+02	3.38E-01	7.03E+03	1.99E+00	1.16E-03	8.21E-05	5.01E-02
Tetrachloroethene	**3.9E+01**	1.00E+01	2.83E+02	1.84E-02	2.98E+02	3.94E+02	8.29E+03	6.20E+02	3.55E-01	9.55E+03	1.99E+00	7.81E-03	8.21E-05	3.36E-01
Toluene	**5.2E-01**	1.00E+01	2.83E+02	6.62E-03	2.98E+02	3.84E+02	7.93E+03	5.92E+02	3.64E-01	9.15E+03	1.99E+00	2.92E-03	8.21E-05	1.26E-01
trans-1,2-Dichloroethene	**5.8E-01**	1.00E+01	2.83E+02	9.36E-03	2.98E+02	3.21E+02	6.72E+03	5.17E+02	3.44E-01	7.14E+03	1.99E+00	4.94E-03	8.21E-05	2.13E-01
Trichloroethene	**7.0E+00**	1.00E+01	2.83E+02	1.03E-02	2.98E+02	3.60E+02	7.51E+03	5.44E+02	3.74E-01	8.56E+03	1.99E+00	4.78E-03	8.21E-05	2.06E-01
Trichlorofluoromethane	**1.1E-01**	1.00E+01	2.83E+02	9.68E-02	2.98E+02	2.97E+02	6.00E+03	4.71E+02	3.50E-01	6.16E+03	1.99E+00	5.58E-02	8.21E-05	2.40E+00
Vinyl Chloride	**6.6E-01**	1.00E+01	2.83E+02	2.69E-02	2.98E+02	2.59E+02	5.25E+03	4.32E+02	3.28E-01	5.00E+03	1.99E+00	1.72E-02	8.21E-05	7.41E-01
Xylene (total)	**2.5E+02**	1.00E+01	2.83E+02	6.73E-03	2.98E+02	4.12E+02	8.53E+03	6.16E+02	3.78E-01	1.02E+04	1.99E+00	2.69E-03	8.21E-05	1.16E-01
2-Methylnaphthalene	**1.2E+00**	1.00E+01	2.83E+02	5.17E-04	2.98E+02	5.14E+02	1.26E+04	7.61E+02	3.84E-01	1.62E+04	1.99E+00	1.21E-04	8.21E-05	5.20E-03
Acenaphthene	**1.0E+00**	1.00E+01	2.83E+02	1.55E-04	2.98E+02	5.51E+02	1.22E+04	8.03E+02	3.91E-01	1.61E+04	1.99E+00	3.66E-05	8.21E-05	1.57E-03
Acenaphthylene	**1.5E-02**	1.00E+01	2.83E+02	1.14E-04	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	1.14E-04	8.21E-05	4.90E-03
Anthracene	**7.4E-01**	1.00E+01	2.83E+02	6.51E-05	2.98E+02	6.15E+02	1.31E+04	8.73E+02	4.05E-01	1.84E+04	1.99E+00	1.26E-05	8.21E-05	5.43E-04
Benzaldehyde	**1.8E+00**	1.00E+01	2.83E+02	2.37E-05	2.98E+02	4.52E+02	1.17E+04	6.95E+02	3.65E-01	1.41E+04	1.99E+00	6.71E-06	8.21E-05	2.89E-04
Bis(2-chloroethyl)ether	**7.0E-01**	1.00E+01	2.83E+02	1.80E-05	2.98E+02	4.51E+02	1.08E+04	6.60E+02	3.90E-01	1.36E+04	1.99E+00	5.32E-06	8.21E-05	2.29E-04
Fluorene	**1.8E+00**	1.00E+01	2.83E+02	6.34E-05	2.98E+02	5.70E+02	1.27E+04	8.70E+02	3.69E-01	1.62E+04	1.99E+00	1.49E-05	8.21E-05	6.39E-04
Naphthalene	**1.1E+00**	1.00E+01	2.83E+02	4.82E-04	2.98E+02	4.91E+02	1.04E+04	7.48E+02	3.70E-01	1.29E+04	1.99E+00	1.52E-04	8.21E-05	6.54E-03
Phenanthrene	**2.1E+00**	1.00E+01	2.83E+02	3.57E-05	2.98E+02	NA	NA	NA	NA	NA	1.99E+00	3.57E-05	8.21E-05	1.54E-03

TABLE 4 (continued)
GROUNDWATER TO OUTDOOR AIR (TRENCH)
OVERBURDEN GROUNDWATER

	Conversion Factor m^3 to L	Source Vapor Conc.	Depth below grade to bottom of trench	Depth below grade to water table	Source Trench Separation	SCS soil type directly above water table	SCS soil type in vadose zone	Capillary zone mean particle diameter	Thickness of capillary zone	Diffusivity in air	Diffusivity in water	Vadose zone soil total porosity
	Conv01	C_{source}	L_F	L_{WT}	L_T	ST_{WT}	ST_v	D_{cz}	L_{cz}	D_a	D_w	n_v
Units:	L/m^3	$\mu g/m^3$	cm	cm	cm	unitless	unitless	cm	cm	cm^2/s	cm^2/s	cm^3/cm^3
Formula:		C_w*H'_{TS}*Conv01	(120 (4') for screening)	(Note 3)	L_{WT} - L_F	(Note 10)	(Note 11)	lookup	(Note 12)	lookup	lookup	lookup
Analyte												
1,1,1-Trichloroethane	1.00E+03	8.03E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.80E-02	8.80E-06	3.84E-01
1,1,2,2-Tetrachloroethane	1.00E+03	4.44E-01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.10E-02	7.90E-06	3.84E-01
1,1-Dichloroethane	1.00E+03	4.71E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.42E-02	1.05E-05	3.84E-01
1,1-Dichloroethene	1.00E+03	3.04E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	9.00E-02	1.04E-05	3.84E-01
1,2,3-Trichlorobenzene	1.00E+03	1.24E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	3.82E-02	8.23E-06	3.84E-01
1,2-Dichlorobenzene	1.00E+03	4.30E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.90E-02	7.90E-06	3.84E-01
1,2-Dichloroethane	1.00E+03	2.16E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	1.04E-01	9.90E-06	3.84E-01
1,2-Dichloropropane	1.00E+03	4.50E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.82E-02	8.73E-06	3.84E-01
1,3-Dichlorobenzene	1.00E+03	7.84E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.92E-02	7.86E-06	3.84E-01
1,4-Dichlorobenzene	1.00E+03	2.83E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.90E-02	7.90E-06	3.84E-01
Acetone	1.00E+03	4.58E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	1.24E-01	1.14E-05	3.84E-01
Benzene	1.00E+03	6.80E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	8.80E-02	9.80E-06	3.84E-01
Bromochloromethane	1.00E+03	1.64E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.88E-02	1.00E-05	3.84E-01
Carbon Tetrachloride	1.00E+03	7.76E+04	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.80E-02	8.80E-06	3.84E-01
Chlorobenzene	1.00E+03	3.04E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.30E-02	8.70E-06	3.84E-01
Chloroethane	1.00E+03	1.01E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	2.71E-01	1.15E-05	3.84E-01
Chloromethane	1.00E+03	7.93E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	1.26E-01	6.50E-06	3.84E-01
cis-1,2-Dichloroethene	1.00E+03	8.60E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.36E-02	1.13E-05	3.84E-01
cis-1,3-Dichloropropene	1.00E+03	8.81E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.26E-02	1.00E-05	3.84E-01
Cyclohexane	1.00E+03	6.85E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	8.32E-02	9.50E-06	3.84E-01
Dichlorodifluoromethane	1.00E+03	2.43E+04	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.65E-02	9.92E-06	3.84E-01
Ethylbenzene	1.00E+03	1.50E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.50E-02	7.80E-06	3.84E-01
Isopropylbenzene	1.00E+03	6.90E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.50E-02	7.10E-06	3.84E-01
Methyl acetate	1.00E+03	4.51E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	1.04E-01	1.00E-05	3.84E-01
Methyl tert-butyl ether	1.00E+03	4.75E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	1.02E-01	1.05E-05	3.84E-01
Methylcyclohexane	1.00E+03	3.49E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.35E-02	8.52E-06	3.84E-01
Methylene Chloride	1.00E+03	3.26E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	1.01E-01	1.17E-05	3.84E-01
Tetrachloroethene	1.00E+03	1.31E+04	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.20E-02	8.20E-06	3.84E-01
Toluene	1.00E+03	6.54E+01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	8.70E-02	8.60E-06	3.84E-01
trans-1,2-Dichloroethene	1.00E+03	1.23E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.07E-02	1.19E-05	3.84E-01
Trichloroethene	1.00E+03	1.44E+03	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.90E-02	9.10E-06	3.84E-01
Trichlorofluoromethane	1.00E+03	2.64E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	8.70E-02	9.70E-06	3.84E-01
Vinyl Chloride	1.00E+03	4.89E+02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	1.06E-01	1.23E-05	3.84E-01
Xylene (total)	1.00E+03	2.90E+04	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.69E-02	8.44E-06	3.84E-01
2-Methylnaphthalene	1.00E+03	6.25E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	5.22E-02	7.75E-06	3.84E-01
Acenaphthene	1.00E+03	1.57E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	4.21E-02	7.69E-06	3.84E-01
Acenaphthylene	1.00E+03	7.35E-02	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	4.49E-02	6.98E-06	3.84E-01
Anthracene	1.00E+03	4.02E-01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	3.24E-02	7.74E-06	3.84E-01
Benzaldehyde	1.00E+03	5.20E-01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	7.21E-02	9.07E-06	3.84E-01
Bis(2-chloroethyl)ether	1.00E+03	1.60E-01	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	6.92E-02	7.53E-06	3.84E-01
Fluorene	1.00E+03	1.15E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	3.63E-02	7.88E-06	3.84E-01
Naphthalene	1.00E+03	7.19E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	5.90E-02	7.50E-06	3.84E-01
Phenanthrene	1.00E+03	3.23E+00	1.20E+02	4.00E+02	2.80E+02	SCL	SCL	2.90E-02	2.59E+01	3.75E-02	7.47E-06	3.84E-01

TABLE 4 (continued)
GROUNDWATER TO OUTDOOR AIR (TRENCH)
OVERBURDEN GROUNDWATER

	Vadose zone soil water-filled porosity	Vadose zone soil air-filled porosity	Vadose zone Effective Diffusion Coeff.	Capillary zone soil total porosity	Capillary zone residual soil water content	Capillary zone saturated soil water content	Capillary zone van Genuchten shape parameter	Capillary zone soil water-filled porosity	Capillary zone soil air-filled porosity	Capillary zone Effective Diffusion Coeff.	Total Overall Effective Diffusion Coeff.
	$\theta_{w,v}$	$\theta_{a,v}$	D_v^{eff}	n_{cz}	$\theta_{r,cz}$	$\theta_{s,cz}$	M_{cz}	$\theta_{w,cz}$	$\theta_{a,cz}$	D_{cz}^{eff}	D_T^{eff}
Units:	cm^3/cm^3	cm^3/cm^3	cm^2/s	cm^3/cm^3	cm^3/cm^3	cm^3/cm^3	unitless	cm^3/cm^3	cm^3/cm^3	cm^2/s	cm^2/s
Formula:	lookup	$n_v - \theta_{w,v}$	(Note 13)	lookup	lookup	lookup	lookup	(Note 15)	$n_{cz} - \theta_{w,cz}$	(Note 14)	(Note 4)
Analyte											
1,1,1-Trichloroethane	1.46E-01	2.38E-01	4.44E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.00E-05	3.05E-04
1,1,2,2-Tetrachloroethane	1.46E-01	2.38E-01	4.06E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.63E-04	1.74E-03
1,1-Dichloroethane	1.46E-01	2.38E-01	4.23E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.93E-05	3.90E-04
1,1-Dichloroethene	1.46E-01	2.38E-01	5.12E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.26E-05	3.33E-04
1,2,3-Trichlorobenzene	1.46E-01	2.38E-01	2.18E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.94E-05	3.62E-04
1,2-Dichlorobenzene	1.46E-01	2.38E-01	3.93E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	7.09E-05	6.52E-04
1,2-Dichloroethane	1.46E-01	2.38E-01	5.93E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	1.23E-04	1.10E-03
1,2-Dichloropropane	1.46E-01	2.38E-01	4.45E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.33E-05	5.16E-04
1,3-Dichlorobenzene	1.46E-01	2.38E-01	3.94E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.09E-05	4.89E-04
1,4-Dichlorobenzene	1.46E-01	2.38E-01	3.93E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.94E-05	5.60E-04
Acetone	1.46E-01	2.38E-01	7.21E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.39E-03	6.08E-03
Benzene	1.46E-01	2.38E-01	5.01E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.40E-05	4.38E-04
Bromochloromethane	1.46E-01	2.38E-01	3.92E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.04E-05	4.84E-04
Carbon Tetrachloride	1.46E-01	2.38E-01	4.44E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.82E-05	2.87E-04
Chlorobenzene	1.46E-01	2.38E-01	4.16E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.71E-05	4.59E-04
Chloroethane	1.46E-01	2.38E-01	1.54E-02	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	9.86E-05	1.00E-03
Chloromethane	1.46E-01	2.38E-01	7.17E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.63E-05	4.71E-04
cis-1,2-Dichloroethene	1.46E-01	2.38E-01	4.19E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.68E-05	4.57E-04
cis-1,3-Dichloropropene	1.46E-01	2.38E-01	3.56E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.78E-05	3.70E-04
Cyclohexane	1.46E-01	2.38E-01	4.74E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.84E-05	2.90E-04
Dichlorodifluoromethane	1.46E-01	2.38E-01	3.79E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.22E-05	2.28E-04
Ethylbenzene	1.46E-01	2.38E-01	4.27E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.48E-05	3.49E-04
Isopropylbenzene	1.46E-01	2.38E-01	3.70E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.76E-05	2.79E-04
Methyl acetate	1.46E-01	2.38E-01	5.97E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	7.32E-04	3.59E-03
Methyl tert-butyl ether	1.46E-01	2.38E-01	5.84E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	1.65E-04	1.40E-03
Methylcyclohexane	1.46E-01	2.38E-01	4.18E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.50E-05	2.56E-04
Methylene Chloride	1.46E-01	2.38E-01	5.75E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	7.42E-05	7.13E-04
Tetrachloroethene	1.46E-01	2.38E-01	4.10E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.81E-05	2.85E-04
Toluene	1.46E-01	2.38E-01	4.95E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	4.07E-05	4.08E-04
trans-1,2-Dichloroethene	1.46E-01	2.38E-01	4.03E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.32E-05	3.32E-04
Trichloroethene	1.46E-01	2.38E-01	4.50E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.39E-05	3.41E-04
Trichlorofluoromethane	1.46E-01	2.38E-01	4.95E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.95E-05	3.02E-04
Vinyl Chloride	1.46E-01	2.38E-01	6.03E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.80E-05	3.87E-04
Xylene (total)	1.46E-01	2.38E-01	4.38E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	3.82E-05	3.81E-04
2-Methylnaphthalene	1.46E-01	2.38E-01	2.99E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.77E-04	1.57E-03
Acenaphthene	1.46E-01	2.38E-01	2.45E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	8.67E-04	2.10E-03
Acenaphthylene	1.46E-01	2.38E-01	2.57E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.64E-04	1.42E-03
Anthracene	1.46E-01	2.38E-01	2.00E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.50E-03	2.04E-03
Benzaldehyde	1.46E-01	2.38E-01	4.46E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.51E-03	4.54E-03
Bis(2-chloroethyl)ether	1.46E-01	2.38E-01	4.31E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	5.77E-03	4.41E-03
Fluorene	1.46E-01	2.38E-01	2.20E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.17E-03	2.20E-03
Naphthalene	1.46E-01	2.38E-01	3.37E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	2.20E-04	1.45E-03
Phenanthrene	1.46E-01	2.38E-01	2.19E-03	3.84E-01	6.30E-02	3.84E-01	2.48E-01	3.33E-01	5.07E-02	8.62E-04	1.92E-03

TABLE 4 (continued)
GROUNDWATER TO OUTDOOR AIR (TRENCH)
OVERBURDEN GROUNDWATER

	Area of Trench Below Grade	Trench Ventilation Rate	Pressure Diff. between soil & enclosed space	Vadose zone soil saturated hydraulic conductivity	Conversion Factor hr to s	Viscosity of water at 10^oC	Viscosity of water at system temp.	Density of water	Acceleration due to gravity	Vadose zone soil intrinsic permeability	Vadose zone residual soil water content	Vadose zone effective total fluid saturation
	A_B	Q_{trench}	ΔP	$K_{s,v}$	Conv02	μ_{w-10}	μ_w	ρ_w	g	$k_{i,v}$	$\theta_{r,v}$	S_{te}
Units:	cm^2	cm^3/s	$g/cm\text{-}s^2$	cm/hr	s/hr	g/cm-s	g/cm-s	g/cm^3	cm/s^2	cm^2	cm^3/cm^3	unitless
Formula:	(Note 2)	(Note 21)	(40 for screening)	lookup			(Note 16)	(0.999 for screening)		(Note 17)	lookup	(Note 18)
Analyte												
1,1,1-Trichloroethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,1,2,2-Tetrachloroethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,1-Dichloroethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,1-Dichloroethene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2,3-Trichlorobenzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2-Dichlorobenzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2-Dichloroethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,2-Dichloropropane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,3-Dichlorobenzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
1,4-Dichlorobenzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Acetone	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Benzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Bromochloromethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Carbon Tetrachloride	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Chlorobenzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Chloroethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Chloromethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
cis-1,2-Dichloroethene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
cis-1,3-Dichloropropene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Cyclohexane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Dichlorodifluoromethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Ethylbenzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Isopropylbenzene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methyl acetate	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methyl tert-butyl ether	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methylcyclohexane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Methylene Chloride	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Tetrachloroethene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Toluene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
trans-1,2-Dichloroethene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Trichloroethene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Trichlorofluoromethane	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Vinyl Chloride	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Xylene (total)	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
2-Methylnaphthalene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Acenaphthene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Acenaphthylene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Anthracene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Benzaldehyde	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Bis(2-chloroethyl)ether	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Fluorene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Naphthalene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01
Phenanthrene	3.29E+05	1.70E+05	4.00E+01	5.50E-01	3.60E+03	1.31E-02	1.31E-02	9.99E-01	9.81E+02	2.04E-09	6.30E-02	2.59E-01

TABLE 4 (continued)
GROUNDWATER TO OUTDOOR AIR (TRENCH)
OVERBURDEN GROUNDWATER

	Vadose zone van Genuchten shape parameter	Vadose zone soil relative air permeability	Vadose zone soil effective vapor permeability	Thickness of soil between soilgas & trench	Vapor viscosity at avg. soil temp.	Avg. Vapor Flow Rate Into trench	Infinite Source Attenuation Coeff.	Infinite Source Trench Conc.
	M_v	k_{rg}	k_v	L_{soil}	μ_{TS}	Q_{soil}	α	C_{trench}
Units:	unitless	unitless	cm^2	cm	g/cm-s	cm^3/s	unitless	$\mu g/m^3$
Formula:	lookup	(Note 19)	(Note 20)	(1 for screening)	$0.00018*(T'_S/298.15)^{\wedge}0.5$	(Note 5)	(Note 6)	$C_{source} * \alpha$
Analyte								
1,1,1-Trichloroethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.9E-05
1,1,2,2-Tetrachloroethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.0E-09
1,1-Dichloroethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.1E-05
1,1-Dichloroethene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	7.1E-06
1,2,3-Trichlorobenzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	2.9E-08
1,2-Dichlorobenzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.0E-07
1,2-Dichloroethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	5.1E-07
1,2-Dichloropropane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.1E-07
1,3-Dichlorobenzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.8E-08
1,4-Dichlorobenzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	6.6E-07
Acetone	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.1E-08
Benzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.6E-05
Bromochloromethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	3.9E-08
Carbon Tetrachloride	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.8E-04
Chlorobenzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	7.1E-06
Chloroethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	2.4E-06
Chloromethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.9E-06
cis-1,2-Dichloroethene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	2.0E-07
cis-1,3-Dichloropropene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	2.1E-06
Cyclohexane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.6E-06
Dichlorodifluoromethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	5.7E-05
Ethylbenzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	3.5E-07
Isopropylbenzene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.6E-07
Methyl acetate	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.1E-08
Methyl tert-butyl ether	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.1E-07
Methylcyclohexane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	8.2E-06
Methylene Chloride	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	7.7E-09
Tetrachloroethene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	3.1E-05
Toluene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.5E-07
trans-1,2-Dichloroethene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	2.9E-07
Trichloroethene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	3.4E-06
Trichlorofluoromethane	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	6.2E-07
Vinyl Chloride	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.1E-06
Xylene (total)	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	6.8E-05
2-Methylnaphthalene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.5E-08
Acenaphthene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	3.7E-09
Acenaphthylene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.7E-10
Anthracene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	9.4E-10
Benzaldehyde	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.2E-09
Bis(2-chloroethyl)ether	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	3.8E-10
Fluorene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	2.7E-09
Naphthalene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	1.7E-08
Phenanthrene	2.48E-01	8.59E-01	1.75E-09	1.00E+00	1.75E-04	3.99E-04	2.35E-09	7.6E-09

TABLE 4 (continued)
GROUNDWATER TO OUTDOOR AIR (TRENCH)
OVERBURDEN GROUNDWATER

Notes:

Reference: *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* , USEPA, June 19, 2003.

(1) Purposely left blank

(2) For screening, assume a trench 4 ft deep, 3 ft wide, and 30 ft long.

(3) Depth to water table minus depth to bottom of trench must be > thickness of capillary fringe, which is based on the soil type (typ. around 30 cm). Use 400 cm for screening purposes.

(4) $D_T^{eff} = L_T / (((L_{WT} - L_{cz} - L_F) / D_v^{eff}) + (L_{cz} / D_{cz}^{eff}))$

(5) $Q_{soil} = \Delta P * k_v * L_{soil}) / \mu_{TS}$; not from above reference

(6) $\alpha = [D_T^{eff} * A_B/(Q_{trench} * L_T)]/[(D_T^{eff} * A_B/(Q_{soil} * L_T))+1]$; assumes no resistance (Peclet number is infinite)

(7) A function of the ratio T_B/T_C:

T_B/T_C	n
<0.57	0.30
0.57-0.71	$0.74(T_B/T_C)-0.116$
>0.71	0.41

If values are not available for calculation, result is NA.

(8) $\Delta H_{v,TS} = \Delta H_{v,B} * [(1-T_S/T_C)/(1-T_B/T_C)]^n$; if values are not available for calculation, result is NA.

(9) $H_{TS} = EXP[-\Delta H_{v,TS}/R_c * (1/T_S - 1/T_R)] * H_R$; if values are not available for calculation, result assumed to be H_R

(10) Refer to 12 SCS soil types - if no site-specific information is available, use SCL for screening.

(11) Refer to 12 SCS soil types - if no site-specific information is available, use SCL for screening.

(12) $L_{cz} = 0.15 / (0.2 * D_{cz})$

(13) $D_v^{eff} = D_a * (\theta_{a,v}^{3.33}/n_v^2) + (D_w/H'_{TS})(\theta_{w,v}^{3.33}/n_v^2)$

(14) $D_{cz}^{eff} = D_a * (\theta_{a,cz}^{3.33}/n_{cz}^2) + (D_w/H'_{TS})(\theta_{w,cz}^{3.33}/n_{cz}^2)$

(15) $\theta_{w,cz} = \theta_{r,cz} + ((\theta_{s,cz} - \theta_{r,cz})/(2^{Mcz}))$, where the value 2 in the formula is used for screening, but may be refined based on soil parameters.

(16) $\mu_w = \mu_{w-10} * (T'_S / 283.15)^{0.5}$

(17) $k_{i,v} = K_{s,v} * 1/Conv02 * \mu_w / (\rho_w * g)$

(18) $S_{te} = (\theta_{w,v} - \theta_{r,v}) / (n_v - \theta_{r,v})$

(19) $k_{rg} = (1 - S_{te})^{0.5} * (1 - S_{te}^{1/Mv})^{2Mv}$

(20) $k_v = k_{i,v} * k_{rg}$; note that the model is very sensitive to this parameter and if site-specific values are available, they should be used.

(21) For screening, assume a trench 4 ft deep, 3 ft wide, 30 ft long and an air exchange rate of 60/hr. The air exchange rate is based on the assumption that the wind speed in the trench is a small fraction of the ground wind speed and that it could take up to 1 minute for a contaminant to be cleared from the trench air space.

TABLE 5. SUMMARY OF MODELED AIR DATA
GROUNDWATER TO OUTDOOR AIR (TRENCH)

	Outdoor Air Concentrations (ug/m^3)
Analyte	
1,1,1-Trichloroethane	1.9E-05
1,1,2,2-Tetrachloroethane	1.0E-09
1,1-Dichloroethane	1.1E-05
1,1-Dichloroethene	7.1E-06
1,2,3-Trichlorobenzene	2.9E-08
1,2-Dichlorobenzene	1.0E-07
1,2-Dichloroethane	5.1E-07
1,2-Dichloropropane	1.1E-07
1,3-Dichlorobenzene	1.8E-08
1,4-Dichlorobenzene	6.6E-07
Acetone	1.1E-08
Benzene	1.6E-05
Bromochloromethane	3.9E-08
Carbon Tetrachloride	1.8E-04
Chlorobenzene	7.1E-06
Chloroethane	2.4E-06
Chloromethane	1.9E-06
cis-1,2-Dichloroethene	2.0E-07
cis-1,3-Dichloropropene	2.1E-06
Cyclohexane	1.6E-06
Dichlorodifluoromethane	5.7E-05
Ethylbenzene	3.5E-07
Isopropylbenzene	1.6E-07
Methyl acetate	1.1E-08
Methyl tert-butyl ether	1.1E-07
Methylcyclohexane	8.2E-06
Methylene Chloride	7.7E-09
Tetrachloroethene	3.1E-05
Toluene	1.5E-07
trans-1,2-Dichloroethene	2.9E-07
Trichloroethene	3.4E-06
Trichlorofluoromethane	6.2E-07
Vinyl Chloride	1.1E-06
Xylene (total)	6.8E-05
2-Methylnaphthalene	1.5E-08
Acenaphthene	3.7E-09
Acenaphthylene	1.7E-10
Anthracene	9.4E-10
Benzaldehyde	1.2E-09
Bis(2-chloroethyl)ether	3.8E-10
Fluorene	2.7E-09
Naphthalene	1.7E-08
Phenanthrene	7.6E-09

INHALATION FROM SHOWERING/BATHING

TABLE 6
FOSTER AND CHROSTOWSKI SHOWER MODEL
SITE-WIDE GROUNDWATER (Overburden & Bedrock Combined)

	Estimation of Gas-Phase Mass Transfer Coefficient (cm/hr) $k_{g(VOC)}$			Estimation of Liquid-Phase Mass Transfer Coefficient (cm/hour) $k_{l(VOC)}$			Estimation of Overall Mass Transfer Coefficient (cm/hr) K_L			Temperature Adjusted Overall Mass Transfer Coefficient (cm/hr) -- K'L K'_L					Maximum Concentration Leaving the Shower Droplet C_{wd}				VOC Generation Rate in the Shower Room S			VOC Air Concentration in the Shower Room (for t <= D_S) $C_a(t)$			
	$k_{g(VOC)} = k_{g\,(H20)}\,(18 / MW)^{0.5}$			$k_{l(VOC)} = k_{l(CO2)}\,(44 / MW)^{0.5}$			$K_L = (1/k_{l(VOC)} + RT / H\,k_{g(VOC)})^{-1}$			$K'_L = K_L\,(T_l\,u_s / T_s\,u_l)^{-0.5}$					$C_{wd} = C_{wo}\,(1 - \exp[-K_{al}\,t_s / 60\,d])$				$S = C_{wd}\,(FR) / SV$			$C_a(t) = (S/R)\,(1 - \exp[-R\,t])$			
	$k_{g\,(H20)}$	MW	$k_{g(VOC)}$	$k_{l\,(CO2)}$	MW	$k_{l(VOC)}$	H	RT	K_L	T_l	Ts	u_l	u_s	K'_L	C_{wo}	t_s	d	C_{wd}	FR	SV	S	R	D_s	t	$C_a(t)$
Analyte	cm/hr	g/mole	cm/hr	cm/hr	g/mole	cm/hr	atm-m^3/mole	atm-m^3/mole	cm/hr	K	K	cp	cp	cm/hr	ug/L	sec	mm	ug/L	l/min	m^3	ug/m^3-min	min^{-1}	min	min	mg/m^3
Future Scenario - Site-Wide Groundwater (Overburden & Bedrock)																									
1,1,1-Trichloroethane	3.00E+03	1.33E+02	1.10E+03	2.00E+01	1.33E+02	1.15E+01	1.72E-02	2.40E-02	1.13E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.53E+01	2.20E+01	2.00E+00	1.00E+00	8.77E+00	1.00E+01	6.00E+00	1.46E+01	8.33E-03	1.50E+01	5.00E+00	7.16E-02
1,1,2,2-Tetrachloroethane	3.00E+03	1.68E+02	9.82E+02	2.00E+01	1.68E+02	1.02E+01	3.44E-04	2.40E-02	5.93E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	7.99E+00	7.70E-02	2.00E+00	1.00E+00	1.80E-02	1.00E+01	6.00E+00	3.00E-02	8.33E-03	1.50E+01	5.00E+00	1.47E-04
1,1-Dichloroethane	3.00E+03	9.90E+01	1.28E+03	2.00E+01	9.90E+01	1.33E+01	5.61E-03	2.40E-02	1.28E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.72E+01	3.80E+01	2.00E+00	1.00E+00	1.66E+01	1.00E+01	6.00E+00	2.76E+01	8.33E-03	1.50E+01	5.00E+00	1.35E-01
1,1-Dichloroethene	3.00E+03	9.69E+01	1.29E+03	2.00E+01	9.69E+01	1.35E+01	2.60E-02	2.40E-02	1.33E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.80E+01	4.80E+00	2.00E+00	1.00E+00	2.17E+00	1.00E+01	6.00E+00	3.61E+00	8.33E-03	1.50E+01	5.00E+00	1.77E-02
1,2,3-Trichlorobenzene	3.00E+03	1.81E+02	9.45E+02	2.00E+01	1.81E+02	9.85E+00	1.25E-03	2.40E-02	8.21E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.11E+01	2.30E-01	2.00E+00	1.00E+00	7.09E-02	1.00E+01	6.00E+00	1.18E-01	8.33E-03	1.50E+01	5.00E+00	5.79E-04
1,2-Dichlorobenzene	3.00E+03	1.47E+02	1.05E+03	2.00E+01	1.47E+02	1.09E+01	1.90E-03	2.40E-02	9.67E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.30E+01	1.50E+00	2.00E+00	1.00E+00	5.28E-01	1.00E+01	6.00E+00	8.81E-01	8.33E-03	1.50E+01	5.00E+00	4.31E-03
1,2-Dichloroethane	3.00E+03	9.90E+01	1.28E+03	2.00E+01	9.90E+01	1.33E+01	9.77E-04	2.40E-02	1.06E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.43E+01	2.30E+01	2.00E+00	1.00E+00	8.72E+00	1.00E+01	6.00E+00	1.45E+01	8.33E-03	1.50E+01	5.00E+00	7.12E-02
1,2-Dichloropropane	3.00E+03	1.13E+02	1.20E+03	2.00E+01	1.13E+02	1.25E+01	2.79E-03	2.40E-02	1.15E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.54E+01	8.10E-01	2.00E+00	1.00E+00	3.26E-01	1.00E+01	6.00E+00	5.43E-01	8.33E-03	1.50E+01	5.00E+00	2.66E-03
1,3-Dichlorobenzene	3.00E+03	1.47E+02	1.05E+03	2.00E+01	1.47E+02	1.09E+01	3.09E-03	2.40E-02	1.01E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.36E+01	1.60E-01	2.00E+00	1.00E+00	5.85E-02	1.00E+01	6.00E+00	9.75E-02	8.33E-03	1.50E+01	5.00E+00	4.77E-04
1,4-Dichlorobenzene	3.00E+03	1.47E+02	1.05E+03	2.00E+01	1.47E+02	1.09E+01	2.39E-03	2.40E-02	9.91E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.34E+01	7.50E+00	2.00E+00	1.00E+00	2.69E+00	1.00E+01	6.00E+00	4.49E+00	8.33E-03	1.50E+01	5.00E+00	2.20E-02
Acetone	3.00E+03	5.81E+01	1.67E+03	2.00E+01	5.81E+01	1.74E+01	3.87E-05	2.40E-02	2.33E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	3.14E+00	5.40E+00	2.00E+00	1.00E+00	5.37E-01	1.00E+01	6.00E+00	8.96E-01	8.33E-03	1.50E+01	5.00E+00	4.39E-03
Benzene	3.00E+03	7.81E+01	1.44E+03	2.00E+01	7.81E+01	1.50E+01	5.54E-03	2.40E-02	1.44E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.94E+01	5.90E+01	2.00E+00	1.00E+00	2.81E+01	1.00E+01	6.00E+00	4.68E+01	8.33E-03	1.50E+01	5.00E+00	2.29E-01
Bromochloromethane	3.00E+03	1.29E+02	1.12E+03	2.00E+01	1.29E+02	1.17E+01	1.47E-03	2.40E-02	9.97E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.34E+01	1.40E+00	2.00E+00	1.00E+00	5.05E-01	1.00E+01	6.00E+00	8.42E-01	8.33E-03	1.50E+01	5.00E+00	4.13E-03
Carbon Tetrachloride	3.00E+03	1.54E+02	1.03E+03	2.00E+01	1.54E+02	1.07E+01	3.03E-02	2.40E-02	1.06E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.43E+01	1.20E+02	2.00E+00	1.00E+00	4.55E+01	1.00E+01	6.00E+00	7.58E+01	8.33E-03	1.50E+01	5.00E+00	3.71E-01
Chlorobenzene	3.00E+03	1.13E+02	1.20E+03	2.00E+01	1.13E+02	1.25E+01	3.69E-03	2.40E-02	1.17E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.58E+01	4.60E+01	2.00E+00	1.00E+00	1.88E+01	1.00E+01	6.00E+00	3.14E+01	8.33E-03	1.50E+01	5.00E+00	1.54E-01
Chloroethane	3.00E+03	6.45E+01	1.58E+03	2.00E+01	6.45E+01	1.65E+01	8.80E-03	2.40E-02	1.61E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	2.17E+01	7.20E+00	2.00E+00	1.00E+00	3.70E+00	1.00E+01	6.00E+00	6.17E+00	8.33E-03	1.50E+01	5.00E+00	3.02E-02
Chloromethane	3.00E+03	5.05E+01	1.79E+03	2.00E+01	5.05E+01	1.87E+01	8.80E-03	2.40E-02	1.82E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	2.45E+01	7.10E+00	2.00E+00	1.00E+00	3.96E+00	1.00E+01	6.00E+00	6.60E+00	8.33E-03	1.50E+01	5.00E+00	3.23E-02
cis-1,2-Dichloroethene	3.00E+03	9.69E+01	1.29E+03	2.00E+01	9.69E+01	1.35E+01	4.07E-03	2.40E-02	1.27E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.71E+01	2.40E+00	2.00E+00	1.00E+00	1.04E+00	1.00E+01	6.00E+00	1.74E+00	8.33E-03	1.50E+01	5.00E+00	8.52E-03
cis-1,3-Dichloropropene	3.00E+03	1.11E+02	1.21E+03	2.00E+01	1.11E+02	1.26E+01	2.38E-03	2.40E-02	1.14E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.54E+01	8.60E+00	2.00E+00	1.00E+00	3.45E+00	1.00E+01	6.00E+00	5.74E+00	8.33E-03	1.50E+01	5.00E+00	2.81E-02
Cyclohexane	3.00E+03	8.22E+01	1.40E+03	2.00E+01	8.22E+01	1.46E+01	4.55E-02	2.40E-02	1.46E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.96E+01	3.50E-01	2.00E+00	1.00E+00	1.68E-01	1.00E+01	6.00E+00	2.80E-01	8.33E-03	1.50E+01	5.00E+00	1.37E-03
Dichlorodifluoromethane	3.00E+03	1.21E+02	1.16E+03	2.00E+01	1.21E+02	1.21E+01	3.42E-01	2.40E-02	1.21E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.63E+01	3.50E+00	2.00E+00	1.00E+00	1.46E+00	1.00E+01	6.00E+00	2.44E+00	8.33E-03	1.50E+01	5.00E+00	1.19E-02
Ethylbenzene	3.00E+03	1.06E+02	1.24E+03	2.00E+01	1.06E+02	1.29E+01	7.86E-03	2.40E-02	1.25E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.68E+01	1.10E+00	2.00E+00	1.00E+00	4.72E-01	1.00E+01	6.00E+00	7.87E-01	8.33E-03	1.50E+01	5.00E+00	3.85E-03
Isopropylbenzene	3.00E+03	1.20E+02	1.16E+03	2.00E+01	1.20E+02	1.21E+01	1.46E-02	2.40E-02	1.19E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.60E+01	3.40E-01	2.00E+00	1.00E+00	1.41E-01	1.00E+01	6.00E+00	2.35E-01	8.33E-03	1.50E+01	5.00E+00	1.15E-03
Methyl acetate	3.00E+03	7.41E+01	1.48E+03	2.00E+01	7.41E+01	1.54E+01	1.18E-04	2.40E-02	4.94E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	6.66E+00	1.80E+00	2.00E+00	1.00E+00	3.58E-01	1.00E+01	6.00E+00	5.97E-01	8.33E-03	1.50E+01	5.00E+00	2.92E-03
Methyl tert-butyl ether	3.00E+03	8.81E+01	1.36E+03	2.00E+01	8.81E+01	1.41E+01	6.23E-04	2.40E-02	1.01E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.36E+01	3.40E+00	2.00E+00	1.00E+00	1.24E+00	1.00E+01	6.00E+00	2.06E+00	8.33E-03	1.50E+01	5.00E+00	1.01E-02
Methylcyclohexane	3.00E+03	9.22E+01	1.33E+03	2.00E+01	9.22E+01	1.38E+01	1.03E-01	2.40E-02	1.38E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.86E+01	1.70E+00	2.00E+00	1.00E+00	7.85E-01	1.00E+01	6.00E+00	1.31E+00	8.33E-03	1.50E+01	5.00E+00	6.41E-03
Methylene Chloride	3.00E+03	8.49E+01	1.38E+03	2.00E+01	8.49E+01	1.44E+01	2.18E-03	2.40E-02	1.29E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.74E+01	6.50E-02	2.00E+00	1.00E+00	2.86E-02	1.00E+01	6.00E+00	4.77E-02	8.33E-03	1.50E+01	5.00E+00	2.34E-04
Tetrachloroethene	3.00E+03	1.66E+02	9.88E+02	2.00E+01	1.66E+02	1.03E+01	1.84E-02	2.40E-02	1.02E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.37E+01	3.90E+01	2.00E+00	1.00E+00	1.43E+01	1.00E+01	6.00E+00	2.38E+01	8.33E-03	1.50E+01	5.00E+00	1.17E-01
Toluene	3.00E+03	9.21E+01	1.33E+03	2.00E+01	9.21E+01	1.38E+01	6.62E-03	2.40E-02	1.33E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.80E+01	5.20E-01	2.00E+00	1.00E+00	2.34E-01	1.00E+01	6.00E+00	3.90E-01	8.33E-03	1.50E+01	5.00E+00	1.91E-03
trans-1,2-Dichloroethene	3.00E+03	9.69E+01	1.29E+03	2.00E+01	9.69E+01	1.35E+01	9.36E-03	2.40E-02	1.31E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.77E+01	2.10E+00	2.00E+00	1.00E+00	9.36E-01	1.00E+01	6.00E+00	1.56E+00	8.33E-03	1.50E+01	5.00E+00	7.64E-03
Trichloroethene	3.00E+03	1.31E+02	1.11E+03	2.00E+01	1.31E+02	1.16E+01	1.03E-02	2.40E-02	1.13E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.52E+01	7.50E+01	2.00E+00	1.00E+00	2.99E+01	1.00E+01	6.00E+00	4.98E+01	8.33E-03	1.50E+01	5.00E+00	2.44E-01
Trichlorofluoromethane	3.00E+03	1.49E+02	1.04E+03	2.00E+01	1.49E+02	1.09E+01	9.68E-02	2.40E-02	1.08E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.46E+01	7.05E-01	2.00E+00	1.00E+00	2.72E-01	1.00E+01	6.00E+00	4.53E-01	8.33E-03	1.50E+01	5.00E+00	2.22E-03
Vinyl Chloride	3.00E+03	6.25E+01	1.61E+03	2.00E+01	6.25E+01	1.68E+01	2.69E-02	2.40E-02	1.66E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	2.24E+01	7.40E-01	2.00E+00	1.00E+00	3.89E-01	1.00E+01	6.00E+00	6.49E-01	8.33E-03	1.50E+01	5.00E+00	3.18E-03
Xylene (total)	3.00E+03	1.06E+02	1.24E+03	2.00E+01	1.06E+02	1.29E+01	6.73E-03	2.40E-02	1.24E+01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.67E+01	2.50E+02	2.00E+00	1.00E+00	1.07E+02	1.00E+01	6.00E+00	1.78E+02	8.33E-03	1.50E+01	5.00E+00	8.72E-01
2-Methylnaphthalene	3.00E+03	1.42E+02	1.07E+03	2.00E+01	1.42E+02	1.11E+01	5.17E-04	2.40E-02	7.50E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.01E+01	1.20E+00	2.00E+00	1.00E+00	3.43E-01	1.00E+01	6.00E+00	5.72E-01	8.33E-03	1.50E+01	5.00E+00	2.80E-03
Acenaphthene	3.00E+03	1.54E+02	1.02E+03	2.00E+01	1.54E+02	1.07E+01	1.55E-04	2.40E-02	4.08E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	5.50E+00	1.00E+00	2.00E+00	1.00E+00	1.68E-01	1.00E+01	6.00E+00	2.79E-01	8.33E-03	1.50E+01	5.00E+00	1.37E-03
Acenaphthylene	3.00E+03	1.52E+02	1.03E+03	2.00E+01	1.52E+02	1.08E+01	1.14E-04	2.40E-02	3.36E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	4.54E+00	1.50E-02	2.00E+00	1.00E+00	2.10E-03	1.00E+01	6.00E+00	3.51E-03	8.33E-03	1.50E+01	5.00E+00	1.72E-05
Anthracene	3.00E+03	1.78E+02	9.53E+02	2.00E+01	1.78E+02	9.94E+00	6.51E-05	2.40E-02	2.05E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	2.77E+00	7.40E-01	2.00E+00	1.00E+00	6.52E-02	1.00E+01	6.00E+00	1.09E-01	8.33E-03	1.50E+01	5.00E+00	5.32E-04
Benzaldehyde	3.00E+03	1.06E+02	1.24E+03	2.00E+01	1.06E+02	1.29E+01	2.37E-05	2.40E-02	1.12E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.51E+00	2.00E+00	2.00E+00	1.00E+00	9.79E-02	1.00E+01	6.00E+00	1.63E-01	8.33E-03	1.50E+01	5.00E+00	7.99E-04
Bis(2-chloroethyl)ether	3.00E+03	1.43E+02	1.06E+03	2.00E+01	1.43E+02	1.11E+01	1.80E-05	2.40E-02	7.43E-01	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.00E+00	7.00E-01	2.00E+00	1.00E+00	2.30E-02	1.00E+01	6.00E+00	3.83E-02	8.33E-03	1.50E+01	5.00E+00	1.88E-04
Fluorene	3.00E+03	1.66E+02	9.88E+02	2.00E+01	1.66E+02	1.03E+01	6.34E-05	2.40E-02	2.08E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	2.81E+00	1.80E+00	2.00E+00	1.00E+00	1.61E-01	1.00E+01	6.00E+00	2.68E-01	8.33E-03	1.50E+01	5.00E+00	1.31E-03
Naphthalene	3.00E+03	1.28E+02	1.12E+03	2.00E+01	1.28E+02	1.17E+01	4.82E-04	2.40E-02	7.71E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.04E+01	1.10E+00	2.00E+00	1.00E+00	3.22E-01	1.00E+01	6.00E+00	5.37E-01	8.33E-03	1.50E+01	5.00E+00	2.63E-03
Phenanthrene	3.00E+03	1.78E+02	9.53E+02	2.00E+01	1.78E+02	9.94E+00	3.57E-05	2.40E-02	1.24E+00	2.93E+02	3.18E+02	1.00E+00	5.96E-01	1.67E+00	2.10E+00	2.00E+00	1.00E+00	1.14E-01	1.00E+01	6.00E+00	1.90E-01	8.33E-03	1.50E+01	5.00E+00	9.30E-04

Notes:

MW = Molecular weight (g/mole)
$k_{g\,(H20)}$ = Gas phase mass transfer coefficient for H_20 (cm/hr)
$k_{g(VOC)}$ = Gas-phase mass-transfer coefficient for the analyte (cm/hr)
$k_{l\,(CO2)}$ = Liquid phase mass transfer coefficient for CO_2 (cm/hr)
$k_{l(VOC)}$ = Liquid-phase mass-transfer coefficient for the analyte (cm/hr)
H = Henry's Law Constant (atm-m^3/mole)
RT = Gas constant-temp factor (atm-m^3/mole)
K_L = Overall Mass-Transfer Coefficient (cm/hr)
T_l = Calibration water temperature of K_L (K)
Ts = Shower water temperature (range 300-320 K)
u_l = Water viscosity at T_l (at 20 C), centipoise (cp)
u_s = Water viscosity at T_s (at 45 C), centipoise (cp)

K'_L = Temp adjusted mass-transfer coefficient (cm/hr)
C_{wo} = Shower water concentration (tap water conc. - ug/L)
t_s = Shower droplet drop time (sec)
d = Shower droplet diameter (millimeters, mm)
C_{wd} = Concentration leaving shower droplet after time t_s (ug/L)
FR = Shower water flow rate (liters/minute, l/m)
SV = Shower room air volume (m^3)
S = VOC generation rate in the shower room (ug/m^3-min)
R = Air exchange rate (min-1)
D_s = Shower duration (min)
t = time (min)
$C_a(t)$ = Time dependent indoor concentration

TABLE 7. SUMMARY OF MODELED AIR DATA
GROUNDWATER TO INDOOR AIR (BATHING)

	Indoor Air Concentrations (ug/m^3)
Analyte	
1,1,1-Trichloroethane	7.2E+01
1,1,2,2-Tetrachloroethane	1.5E-01
1,1-Dichloroethane	1.4E+02
1,1-Dichloroethene	1.8E+01
1,2,3-Trichlorobenzene	5.8E-01
1,2-Dichlorobenzene	4.3E+00
1,2-Dichloroethane	7.1E+01
1,2-Dichloropropane	2.7E+00
1,3-Dichlorobenzene	4.8E-01
1,4-Dichlorobenzene	2.2E+01
Acetone	4.4E+00
Benzene	2.3E+02
Bromochloromethane	4.1E+00
Carbon Tetrachloride	3.7E+02
Chlorobenzene	1.5E+02
Chloroethane	3.0E+01
Chloromethane	3.2E+01
cis-1,2-Dichloroethene	8.5E+00
cis-1,3-Dichloropropene	2.8E+01
Cyclohexane	1.4E+00
Dichlorodifluoromethane	1.2E+01
Ethylbenzene	3.9E+00
Isopropylbenzene	1.1E+00
Methyl acetate	2.9E+00
Methyl tert-butyl ether	1.0E+01
Methylcyclohexane	6.4E+00
Methylene Chloride	2.3E-01
Tetrachloroethene	1.2E+02
Toluene	1.9E+00
trans-1,2-Dichloroethene	7.6E+00
Trichloroethene	2.4E+02
Trichlorofluoromethane	2.2E+00
Vinyl Chloride	3.2E+00
Xylene (total)	8.7E+02
2-Methylnaphthalene	2.8E+00
Acenaphthene	1.4E+00
Acenaphthylene	1.7E-02
Anthracene	5.3E-01
Benzaldehyde	8.0E-01
Bis(2-chloroethyl)ether	1.9E-01
Fluorene	1.3E+00
Naphthalene	2.6E+00
Phenanthrene	9.3E-01

ATTACHMENT 3

DATA TREATMENT

Data Treatment

This attachment discussed the use and treatment of the analytical data prior to use in the baseline human health risk assessment.

The following criteria were applied to the analytical data:

- If a value is not flagged, the value was used as reported (a detected value);
- If a value is flagged with "J", the value was used as reported (a detected value);
- If a value is flagged with "R" or "UR", the value was considered not to exist and was not used (a rejected value); and
- If the value is flagged with "U" or "UJ", the result was considered a nondetected (an undetected) value.

Prior to using analytical data for a primary sample with an associated field duplicate, the analytical values for the primary sample and the field duplicate were averaged together to provide a single set of values for the field duplicate pair. The following conventions were used for averaging field duplicate samples together:

- If both samples have detected values (flagged with "J" or unflagged), both values were averaged together. If one value or both values are flagged with "J" prior to averaging, the resulting averaged value was flagged with "J".
- If both samples have nondetected values (flagged with "U" or "UJ"), the lower value and its flag were used.
- If one sample has a nondetected value (flagged with "U" or "UJ") and the other sample has a detected value (flagged with "J" or unflagged) the following is done:

  -If the detected value is less than or equal to the nondetected value, the detected value and its flag were used; or

  - If the detected value is greater than the nondetected value, the detected value and 1/2 the nondetected value were averaged together. The resulting averaged value was flagged with "J".

- If one sample has a nonrejected value (flagged with "J", "U", "UJ" or unflagged) and one sample has a rejected value (flagged with "R" or "UR"), the nonrejected value and its flag were used.

The range of detection limits was determined based on the individual sample-specific detection limit (or sample quantitation limit; SQL) for each analyte. Because of sample dilution and/or sample weights, laboratory detection limits for individual samples can be higher than the method-specified detection limits. Minimum and maximum SQLs were determined for each analyte using each sample's SQL for all samples analyzed, regardless of whether the analyte was detected in any particular sample.

The frequency of detection is the number of samples with detected values per the number of samples analyzed. The number of samples with detected values was determined by totaling all samples with detected values (flagged with "J" or unflagged). The number of samples analyzed was determined by totaling all samples with detected or nondetected values (flagged with "U", "UJ", "J" or unflagged). Rejected values (flagged with "R" or "UR") were not included in the total number of samples analyzed. The mean of the field duplicate sample and corresponding sample was included when determining the number of samples analyzed and the number of detected values.

Arithmetic mean concentrations and 95% Upper Confidence Limits (UCLs) were calculated using all detected values (flagged with "J" or unflagged) and ½ of the SQL for non-detected values (flagged with "U" or "UJ"). In some cases, the mean or 95% UCL was greater than the maximum value because of high or widely varying detection limits, because a detected value is below the SQL (flagged with "J" on the laboratory report), or because a small dataset was used. Detected values below the SQL are considered to be estimated concentrations, but are used in the risk assessment.

ATTACHMENT 4

DERMAL CALCULATIONS

TABLE 1. DERMAL SCREENING - GROUNDWATER INORGANICS

(Variable Definitions follow Table)

Timeframe	Receptor	Exposure Point	Chemical	Conc ug/L	Conc mg/cm3	Kp (cm/hr)	Isc cm	IR cm^3/day	ABSGI	A cm^2	t_event hr/event	EV event/day	DA_event mg/cm2-evt	Derm/Drink Kp	Chem Assess
Future	Resident-Adult	Site-Wide (OB + BR)													
			Aluminum	7.1E+03	7.1E-03	1.0E-03	1.0E-03	2000	0.01	18000	0.58	1	**4.1E-06**	**52%**	Y
			Antimony	4.2E+00	4.2E-06	1.0E-03	1.0E-03	2000	0.15	18000	0.58	1	**2.4E-09**	**3%**	N
			Arsenic	2.8E+02	2.8E-04	1.0E-03	1.0E-03	2000	0.95	18000	0.58	1	**1.6E-07**	**1%**	N
			Barium	8.4E+02	8.4E-04	1.0E-03	1.0E-03	2000	0.07	18000	0.58	1	**4.9E-07**	**7%**	N
			Cadmium	2.2E+01	2.2E-05	1.0E-03	1.0E-03	2000	0.025	18000	0.58	1	**1.3E-08**	**21%**	Y
			Chromium	3.2E+01	3.2E-05	2.0E-03	1.0E-03	2000	0.025	18000	0.58	1	**3.7E-08**	**42%**	Y
			Cobalt	3.4E+02	3.4E-04	4.0E-04	1.0E-03	2000	0.97	18000	0.58	1	**7.9E-08**	**0%**	N
			Lead	2.9E+01	2.9E-05	1.0E-04	1.0E-03	2000	0.5	18000	0.58	1	**1.7E-09**	**0%**	N
			Manganese	2.3E+04	2.3E-02	1.0E-03	1.0E-03	2000	0.06	18000	0.58	1	**1.3E-05**	**9%**	N
			Nickel	2.9E+02	2.9E-04	2.0E-04	1.0E-03	2000	0.04	18000	0.58	1	**3.3E-08**	**3%**	N
			Silver	2.3E+01	2.3E-05	6.0E-04	1.0E-03	2000	0.04	18000	0.58	1	**8.2E-09**	**8%**	N
			Vanadium	1.6E+01	1.6E-05	1.0E-03	1.0E-03	2000	0.026	18000	0.58	1	**9.3E-09**	**20%**	Y
Future	Resident-Child	Site-Wide (OB + BR)													
			Aluminum	7.1E+03	7.1E-03	1.0E-03	1.0E-03	2000	0.01	6600	1	1	**7.1E-06**	**33%**	Y
			Antimony	4.2E+00	4.2E-06	1.0E-03	1.0E-03	2000	0.15	6600	1	1	**4.2E-09**	**2%**	N
			Arsenic	2.8E+02	2.8E-04	1.0E-03	1.0E-03	2000	0.95	6600	1	1	**2.8E-07**	**0%**	N
			Barium	8.4E+02	8.4E-04	1.0E-03	1.0E-03	2000	0.07	6600	1	1	**8.4E-07**	**5%**	N
			Cadmium	2.2E+01	2.2E-05	1.0E-03	1.0E-03	2000	0.025	6600	1	1	**2.2E-08**	**13%**	Y
			Chromium	3.2E+01	3.2E-05	2.0E-03	1.0E-03	2000	0.025	6600	1	1	**6.4E-08**	**26%**	Y
			Cobalt	3.4E+02	3.4E-04	4.0E-04	1.0E-03	2000	0.97	6600	1	1	**1.4E-07**	**0%**	N
			Lead	2.9E+01	2.9E-05	1.0E-04	1.0E-03	2000	0.5	6600	1	1	**2.9E-09**	**0%**	N
			Manganese	2.3E+04	2.3E-02	1.0E-03	1.0E-03	2000	0.06	6600	1	1	**2.3E-05**	**6%**	N
			Nickel	2.9E+02	2.9E-04	2.0E-04	1.0E-03	2000	0.04	6600	1	1	**5.7E-08**	**2%**	N
			Silver	2.3E+01	2.3E-05	6.0E-04	1.0E-03	2000	0.04	6600	1	1	**1.4E-08**	**5%**	N
			Vanadium	1.6E+01	1.6E-05	1.0E-03	1.0E-03	2000	0.026	6600	1	1	**1.6E-08**	**13%**	Y
Future	Construction Worker	Site-Wide Overburden													
			Aluminum	7.1E+03	7.1E-03	1.0E-03	1.0E-03	2000	0.01	3300	1	1	**7.1E-06**	**17%**	Y
			Antimony	4.2E+00	4.2E-06	1.0E-03	1.0E-03	2000	0.15	3300	1	1	**4.2E-09**	**1%**	N
			Arsenic	2.8E+02	2.8E-04	1.0E-03	1.0E-03	2000	0.95	3300	1	1	**2.8E-07**	**0%**	N
			Barium	8.4E+02	8.4E-04	1.0E-03	1.0E-03	2000	0.07	3300	1	1	**8.4E-07**	**2%**	N
			Cadmium	2.2E+01	2.2E-05	1.0E-03	1.0E-03	2000	0.025	3300	1	1	**2.2E-08**	**7%**	N
			Chromium	3.2E+01	3.2E-05	2.0E-03	1.0E-03	2000	0.025	3300	1	1	**6.4E-08**	**13%**	Y
			Cobalt	2.2E+02	2.2E-04	4.0E-04	1.0E-03	2000	0.97	3300	1	1	**9.0E-08**	**0%**	N
			Manganese	2.2E+04	2.2E-02	1.0E-03	1.0E-03	2000	0.06	3300	1	1	**2.2E-05**	**3%**	N
			Vanadium	1.6E+01	1.6E-05	1.0E-03	1.0E-03	2000	0.026	3300	1	1	**1.6E-08**	**6%**	N

DERMAL ABSORPTION CALCULATION EXAMPLE

Note: This EPA spreadsheet utilized as basis for Attachment 4 calculations.

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

Concentration (mg/L*L/1000 cm3):	Conc =	0.001	mg/cm3 (default value for purpose of illustration)
Input site specific concentrations in Column marked "Conc"		= 1 mg/L (1 ppm)	= 1 ug/cm3 = 1000 ppb
Area exposed (cm2):	SA=	18000	cm2
Event time (hr/event):	t_event =	0.58	hr/event (35 minutes/event)
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	350	days/yr
Exposure duration (years):	ED =	30	years
Body weight (kg):	BW =	70	kg
Averaging time (days):	AT =	25550	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	2000	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		
Condition for screening: "Y" when Dermal is 10% of Drinking			

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min)	Q =	1135500	(cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
Antimony	1.0E-03	default	1.0E-03	5.8E-07	6.2E-05	15%	3.50%	N	0.00%

TABLE 2.RME. DERMALLY ABSORBED DOSE CALCULATIONS - GROUNDWATER

(Variable Definitions follow Table)

Timeframe	Receptor	Exposure Point	Chemical	Conc ug/L	Conc mg/cm3	CAS No.	MWT	logKow	Kp (cm/hr) predicted	Isc cm	IR cm^3/day	ABSGI	B	tau (hr)	FA for tau>3	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Future	Resident - Adult	Site-Wide (OB + BR)																				
			1,1,2,2-Tetrachloroethan	7.7E-02	7.7E-08	79345	167.9	2.39	6.9E-03	1.0E-03	2000	1	0.035	**0.92**	1.0	-3.74E+00	1.82E-04	**1.82E-07**	3.2E-01	3.6E-01	N/A	2.20
			1,2-Dichloroethane	2.3E+01	2.3E-05	107062	99.0	1.48	4.2E-03	1.0E-03	2000	1	0.016	**0.38**	1.0	-3.35E+00	4.42E-04	**4.42E-07**	3.1E-01	3.4E-01	N/A	0.90
			1,2-Dichloropropane	8.1E-01	8.1E-07	78875	113.0	2.00	7.8E-03	1.0E-03	2000	1	0.032	**0.45**	1.0	-3.43E+00	3.69E-04	**3.69E-07**	3.2E-01	3.5E-01	N/A	1.08
			1,4-Dichlorobenzene	7.5E+00	7.5E-06	106467	147.0	3.39	4.2E-02	1.0E-03	2000	1	0.196	**0.70**	1.0	-3.62E+00	2.38E-04	**2.38E-07**	4.4E-01	4.7E-01	N/A	1.68
			Benzene	5.9E+01	5.9E-05	71432	78.1	2.13	1.5E-02	1.0E-03	2000	1	0.051	**0.29**	1.0	-3.24E+00	5.79E-04	**5.79E-07**	3.3E-01	3.7E-01	N/A	0.69
			Bromochloromethane	1.4E+00	1.4E-06	74975	129.4	0.15	3.7E-04	1.0E-03	2000	1	0.002	**0.56**	1.0	-3.52E+00	2.99E-04	**2.99E-07**	3.0E-01	3.3E-01	N/A	1.34
			Carbon Tetrachloride	1.2E+02	1.2E-04	56235	153.8	2.83	1.6E-02	1.0E-03	2000	1	0.078	**0.76**	1.0	-3.66E+00	2.18E-04	**2.18E-07**	3.5E-01	3.9E-01	N/A	1.83
			Chlorobenzene	4.6E+01	4.6E-05	108907	112.6	2.84	2.8E-02	1.0E-03	2000	1	0.115	**0.45**	1.0	-3.43E+00	3.71E-04	**3.71E-07**	3.8E-01	4.1E-01	N/A	1.08
			Chloroethane	7.2E+00	7.2E-06	75003	64.5	1.43	6.1E-03	1.0E-03	2000	1	0.019	**0.24**	1.0	-3.16E+00	6.90E-04	**6.90E-07**	3.1E-01	3.5E-01	N/A	0.58
			cis-1,3-Dichloropropene	8.6E+00	8.6E-06	10061015	111.0	1.98	7.7E-03	1.0E-03	2000	1	0.031	**0.44**	1.0	-3.42E+00	3.79E-04	**3.79E-07**	3.2E-01	3.5E-01	N/A	1.06
			Tetrachloroethene	3.9E+01	3.9E-05	127184	165.8	3.40	3.3E-02	1.0E-03	2000	1	0.166	**0.89**	1.0	-3.73E+00	1.87E-04	**1.87E-07**	4.1E-01	4.5E-01	N/A	2.14
			Trichloroethene	7.5E+01	7.5E-05	79016	131.4	2.42	1.2E-02	1.0E-03	2000	1	0.051	**0.57**	1.0	-3.54E+00	2.91E-04	**2.91E-07**	3.4E-01	3.7E-01	N/A	1.37
			Vinyl Chloride	7.4E-01	7.4E-07	75014	62.5	1.36	5.6E-03	1.0E-03	2000	1	0.017	**0.24**	1.0	-3.15E+00	7.08E-04	**7.08E-07**	3.1E-01	3.4E-01	N/A	0.57
			Xylene (total)	2.5E+02	2.5E-04	1330207	106.2	3.15	4.9E-02	1.0E-03	2000	1	0.195	**0.41**	1.0	-3.39E+00	4.03E-04	**4.03E-07**	4.4E-01	4.7E-01	N/A	0.99
			2-Methylnaphthalene	1.2E+00	1.2E-06	91576	142.2	4.13	1.4E-01	1.0E-03	2000	1	0.638	**0.66**	1.0	-3.60E+00	2.53E-04	**2.53E-07**	8.7E-01	8.4E-01	2.6	1.58
			3-Nitroaniline	6.2E+00	6.2E-06	99092	138.1	1.37	2.1E-03	1.0E-03	2000	1	0.010	**0.62**	1.0	-3.57E+00	2.67E-04	**2.67E-07**	3.1E-01	3.4E-01	N/A	1.50
			Atrazine	1.9E+00	1.9E-06	1912249	215.7	2.61	5.2E-03	1.0E-03	2000	1	0.030	**1.70**	1.0	-4.01E+00	9.82E-05	**9.82E-08**	3.2E-01	3.5E-01	N/A	4.07
			Bis(2-chloroethyl)ether	7.0E-01	7.0E-07	111444	143.0	1.29	1.8E-03	1.0E-03	2000	1	0.008	**0.66**	1.0	-3.60E+00	2.51E-04	**2.51E-07**	3.1E-01	3.4E-01	N/A	1.60
			Naphthalene	1.1E+00	1.1E-06	91203	128.2	3.30	4.7E-02	1.0E-03	2000	1	0.203	**0.55**	1.0	-3.52E+00	3.03E-04	**3.03E-07**	4.4E-01	4.8E-01	N/A	1.32
			Dieldrin	1.3E-02	1.3E-08	60571	381.0	4.56	1.2E-02	1.0E-03	2000	1	0.092	**14.30**	0.8	-4.93E+00	1.17E-05	**1.17E-08**	3.6E-01	4.0E-01	N/A	34.33
Future	Resident - Child	Site-Wide (OB + BR)																				
			1,1,2,2-Tetrachloroethan	7.7E-02	7.7E-08	79345	167.9	2.39	6.9E-03	1.0E-03	2000	1	0.035	**0.92**	1.0	-3.74E+00	1.82E-04	**1.82E-07**	3.2E-01	3.6E-01	N/A	2.20
			1,2-Dichloroethane	2.3E+01	2.3E-05	107062	99.0	1.48	4.2E-03	1.0E-03	2000	1	0.016	**0.38**	1.0	-3.35E+00	4.42E-04	**4.42E-07**	3.1E-01	3.4E-01	N/A	0.90
			1,2-Dichloropropane	8.1E-01	8.1E-07	78875	113.0	2.00	7.8E-03	1.0E-03	2000	1	0.032	**0.45**	1.0	-3.43E+00	3.69E-04	**3.69E-07**	3.2E-01	3.5E-01	N/A	1.08
			1,4-Dichlorobenzene	7.5E+00	7.5E-06	106467	147.0	3.39	4.2E-02	1.0E-03	2000	1	0.196	**0.70**	1.0	-3.62E+00	2.38E-04	**2.38E-07**	4.4E-01	4.7E-01	N/A	1.68
			Benzene	5.9E+01	5.9E-05	71432	78.1	2.13	1.5E-02	1.0E-03	2000	1	0.051	**0.29**	1.0	-3.24E+00	5.79E-04	**5.79E-07**	3.3E-01	3.7E-01	N/A	0.69
			Bromochloromethane	1.4E+00	1.4E-06	74975	129.4	0.15	3.7E-04	1.0E-03	2000	1	0.002	**0.56**	1.0	-3.52E+00	2.99E-04	**2.99E-07**	3.0E-01	3.3E-01	N/A	1.34
			Carbon Tetrachloride	1.2E+02	1.2E-04	56235	153.8	2.83	1.6E-02	1.0E-03	2000	1	0.078	**0.76**	1.0	-3.66E+00	2.18E-04	**2.18E-07**	3.5E-01	3.9E-01	N/A	1.83
			Chlorobenzene	4.6E+01	4.6E-05	108907	112.6	2.84	2.8E-02	1.0E-03	2000	1	0.115	**0.45**	1.0	-3.43E+00	3.71E-04	**3.71E-07**	3.8E-01	4.1E-01	N/A	1.08
			Chloroethane	7.2E+00	7.2E-06	75003	64.5	1.43	6.1E-03	1.0E-03	2000	1	0.019	**0.24**	1.0	-3.16E+00	6.90E-04	**6.90E-07**	3.1E-01	3.5E-01	N/A	0.58
			cis-1,3-Dichloropropene	8.6E+00	8.6E-06	10061015	111.0	1.98	7.7E-03	1.0E-03	2000	1	0.031	**0.44**	1.0	-3.42E+00	3.79E-04	**3.79E-07**	3.2E-01	3.5E-01	N/A	1.06
			Tetrachloroethene	3.9E+01	3.9E-05	127184	165.8	3.40	3.3E-02	1.0E-03	2000	1	0.166	**0.89**	1.0	-3.73E+00	1.87E-04	**1.87E-07**	4.1E-01	4.5E-01	N/A	2.14
			Trichloroethene	7.5E+01	7.5E-05	79016	131.4	2.42	1.2E-02	1.0E-03	2000	1	0.051	**0.57**	1.0	-3.54E+00	2.91E-04	**2.91E-07**	3.4E-01	3.7E-01	N/A	1.37
			Vinyl Chloride	7.4E-01	7.4E-07	75014	62.5	1.36	5.6E-03	1.0E-03	2000	1	0.017	**0.24**	1.0	-3.15E+00	7.08E-04	**7.08E-07**	3.1E-01	3.4E-01	N/A	0.57
			Xylene (total)	2.5E+02	2.5E-04	1330207	106.2	3.15	4.9E-02	1.0E-03	2000	1	0.195	**0.41**	1.0	-3.39E+00	4.03E-04	**4.03E-07**	4.4E-01	4.7E-01	N/A	0.99
			2-Methylnaphthalene	1.2E+00	1.2E-06	91576	142.2	4.13	1.4E-01	1.0E-03	2000	1	0.638	**0.66**	1.0	-3.60E+00	2.53E-04	**2.53E-07**	8.7E-01	8.4E-01	2.6	1.58
			3-Nitroaniline	6.2E+00	6.2E-06	99092	138.1	1.37	2.1E-03	1.0E-03	2000	1	0.010	**0.62**	1.0	-3.57E+00	2.67E-04	**2.67E-07**	3.1E-01	3.4E-01	N/A	1.50
			Atrazine	1.9E+00	1.9E-06	1912249	215.7	2.61	5.2E-03	1.0E-03	2000	1	0.030	**1.70**	1.0	-4.01E+00	9.82E-05	**9.82E-08**	3.2E-01	3.5E-01	N/A	4.07
			Bis(2-chloroethyl)ether	7.0E-01	7.0E-07	111444	143.0	1.29	1.8E-03	1.0E-03	2000	1	0.008	**0.66**	1.0	-3.60E+00	2.51E-04	**2.51E-07**	3.1E-01	3.4E-01	N/A	1.60
			Naphthalene	1.1E+00	1.1E-06	91203	128.2	3.30	4.7E-02	1.0E-03	2000	1	0.203	**0.55**	1.0	-3.52E+00	3.03E-04	**3.03E-07**	4.4E-01	4.8E-01	N/A	1.32
			Dieldrin	1.3E-02	1.3E-08	60571	381.0	4.56	1.2E-02	1.0E-03	2000	1	0.092	**14.30**	0.8	-4.93E+00	1.17E-05	**1.17E-08**	3.6E-01	4.0E-01	N/A	34.33
Future	Construction Worker	Site-Wide Overburden																				
			1,1,2,2-Tetrachloroethan	7.7E-02	7.7E-08	79345	167.9	2.39	6.9E-03	1.0E-03	2000	1	0.035	**0.92**	1.0	-3.74E+00	1.82E-04	**1.82E-07**	3.2E-01	3.6E-01	N/A	2.20
			1,2-Dichloroethane	1.1E+01	1.1E-05	107062	99.0	1.48	4.2E-03	1.0E-03	2000	1	0.016	**0.38**	1.0	-3.35E+00	4.42E-04	**4.42E-07**	3.1E-01	3.4E-01	N/A	0.90
			1,2-Dichloropropane	8.1E-01	8.1E-07	78875	113.0	2.00	7.8E-03	1.0E-03	2000	1	0.032	**0.45**	1.0	-3.43E+00	3.69E-04	**3.69E-07**	3.2E-01	3.5E-01	N/A	1.08
			1,4-Dichlorobenzene	7.5E+00	7.5E-06	106467	147.0	3.39	4.2E-02	1.0E-03	2000	1	0.196	**0.70**	1.0	-3.62E+00	2.38E-04	**2.38E-07**	4.4E-01	4.7E-01	N/A	1.68
			Benzene	5.9E+01	5.9E-05	71432	78.1	2.13	1.5E-02	1.0E-03	2000	1	0.051	**0.29**	1.0	-3.24E+00	5.79E-04	**5.79E-07**	3.3E-01	3.7E-01	N/A	0.69
			Bromochloromethane	2.6E-01	2.6E-07	74975	129.4	0.15	3.7E-04	1.0E-03	2000	1	0.002	**0.56**	1.0	-3.52E+00	2.99E-04	**2.99E-07**	3.0E-01	3.3E-01	N/A	1.34
			Carbon Tetrachloride	1.2E+02	1.2E-04	56235	153.8	2.83	1.6E-02	1.0E-03	2000	1	0.078	**0.76**	1.0	-3.66E+00	2.18E-04	**2.18E-07**	3.5E-01	3.9E-01	N/A	1.83
			Chlorobenzene	4.6E+01	4.6E-05	108907	112.6	2.84	2.8E-02	1.0E-03	2000	1	0.115	**0.45**	1.0	-3.43E+00	3.71E-04	**3.71E-07**	3.8E-01	4.1E-01	N/A	1.08
			cis-1,3-Dichloropropene	8.6E+00	8.6E-06	10061015	111.0	1.98	7.7E-03	1.0E-03	2000	1	0.031	**0.44**	1.0	-3.42E+00	3.79E-04	**3.79E-07**	3.2E-01	3.5E-01	N/A	1.06
			Tetrachloroethene	3.9E+01	3.9E-05	127184	165.8	3.40	3.3E-02	1.0E-03	2000	1	0.166	**0.89**	1.0	-3.73E+00	1.87E-04	**1.87E-07**	4.1E-01	4.5E-01	N/A	2.14
			Trichloroethene	7.0E+00	7.0E-06	79016	131.4	2.42	1.2E-02	1.0E-03	2000	1	0.051	**0.57**	1.0	-3.54E+00	2.91E-04	**2.91E-07**	3.4E-01	3.7E-01	N/A	1.37
			Vinyl Chloride	6.6E-01	6.6E-07	75014	62.5	1.36	5.6E-03	1.0E-03	2000	1	0.017	**0.24**	1.0	-3.15E+00	7.08E-04	**7.08E-07**	3.1E-01	3.4E-01	N/A	0.57
			Xylene (total)	2.5E+02	2.5E-04	1330207	106.2	3.15	4.9E-02	1.0E-03	2000	1	0.195	**0.41**	1.0	-3.39E+00	4.03E-04	**4.03E-07**	4.4E-01	4.7E-01	N/A	0.99
			2-Methylnaphthalene	1.2E+00	1.2E-06	91576	142.2	4.13	1.4E-01	1.0E-03	2000	1	0.638	**0.66**	1.0	-3.60E+00	2.53E-04	**2.53E-07**	8.7E-01	8.4E-01	2.6	1.58
			Atrazine	1.9E+00	1.9E-06	1912249	215.7	2.61	5.2E-03	1.0E-03	2000	1	0.030	**1.70**	1.0	-4.01E+00	9.82E-05	**9.82E-08**	3.2E-01	3.5E-01	N/A	4.07
			Bis(2-chloroethyl)ether	7.0E-01	7.0E-07	111444	143.0	1.29	1.8E-03	1.0E-03	2000	1	0.008	**0.66**	1.0	-3.60E+00	2.51E-04	**2.51E-07**	3.1E-01	3.4E-01	N/A	1.60
			Naphthalene	1.1E+00	1.1E-06	91203	128.2	3.30	4.7E-02	1.0E-03	2000	1	0.203	**0.55**	1.0	-3.52E+00	3.03E-04	**3.03E-07**	4.4E-01	4.8E-01	N/A	1.32
			Dieldrin	1.3E-02	1.3E-08	60571	381.0	4.56	1.2E-02	1.0E-03	2000	1	0.092	**14.30**	0.8	-4.93E+00	1.17E-05	**1.17E-08**	3.6E-01	4.0E-01	N/A	34.33

TABLE 2.RME. DERMALLY ABSORBED DOSE CALCULATIONS - GROUNDWATER

(Variable Definitions follow Table)

Timeframe	Receptor	Exposure Point	Chemical	t_star (hr)	A cm^2	t_event hr/event	EV event/day	DA_event mg/cm2-evt	Derm/Drink Kp	Chem Assess
Future	Resident - Adult	Site-Wide (OB + BR)								
			1,1,2,2-Tetrachloroethan	2.20	18000	0.58	1	**1.1E-09**	**13%**	Y
			1,2-Dichloroethane	0.90	18000	0.58	1	**1.2E-07**	**5%**	N
			1,2-Dichloropropane	1.08	18000	0.58	1	**8.9E-09**	**10%**	N
			1,4-Dichlorobenzene	1.68	18000	0.58	1	**5.5E-07**	**67%**	Y
			Benzene	0.69	18000	0.58	1	**9.9E-07**	**15%**	Y
			Bromochloromethane	1.34	18000	0.58	1	**8.1E-10**	**1%**	N
			Carbon Tetrachloride	1.83	18000	0.58	1	**3.6E-06**	**27%**	Y
			Chlorobenzene	1.08	18000	0.58	1	**1.8E-06**	**36%**	Y
			Chloroethane	0.58	18000	0.58	1	**4.6E-08**	**6%**	N
			cis-1,3-Dichloropropene	1.06	18000	0.58	1	**9.3E-08**	**10%**	N
			Tetrachloroethene	2.14	18000	0.58	1	**2.6E-06**	**60%**	Y
			Trichloroethene	1.37	18000	0.58	1	**1.4E-06**	**17%**	Y
			Vinyl Chloride	0.57	18000	0.58	1	**4.3E-09**	**5%**	N
			Xylene (total)	0.99	18000	0.58	1	**1.7E-05**	**60%**	Y
			2-Methylnaphthalene	2.60	18000	0.58	1	**2.9E-07**	**214%**	Y
			3-Nitroaniline	1.50	18000	0.58	1	**2.2E-08**	**3%**	N
			Atrazine	4.07	18000	0.58	1	**2.7E-08**	**13%**	Y
			Bis(2-chloroethyl)ether	1.60	18000	0.58	1	**2.1E-09**	**3%**	N
			Naphthalene	1.32	18000	0.58	1	**8.0E-08**	**65%**	Y
			Dieldrin	34.33	18000	0.58	1	**1.0E-09**	**70%**	Y
Future	Resident - Child	Site-Wide (OB + BR)								
			1,1,2,2-Tetrachloroethan	2.20	6600	1	1	**1.4E-09**	**6%**	N
			1,2-Dichloroethane	0.90	6600	1	1	**1.7E-07**	**2%**	N
			1,2-Dichloropropane	1.08	6600	1	1	**1.2E-08**	**5%**	N
			1,4-Dichlorobenzene	1.68	6600	1	1	**7.3E-07**	**32%**	Y
			Benzene	0.69	6600	1	1	**1.4E-06**	**8%**	N
			Bromochloromethane	1.34	6600	1	1	**1.1E-09**	**0%**	N
			Carbon Tetrachloride	1.83	6600	1	1	**4.7E-06**	**13%**	Y
			Chlorobenzene	1.08	6600	1	1	**2.4E-06**	**17%**	Y
			Chloroethane	0.58	6600	1	1	**6.4E-08**	**3%**	N
			cis-1,3-Dichloropropene	1.06	6600	1	1	**1.2E-07**	**5%**	N
			Tetrachloroethene	2.14	6600	1	1	**3.4E-06**	**29%**	Y
			Trichloroethene	1.37	6600	1	1	**1.8E-06**	**8%**	N
			Vinyl Chloride	0.57	6600	1	1	**6.1E-09**	**3%**	N
			Xylene (total)	0.99	6600	1	1	**2.2E-05**	**30%**	Y
			2-Methylnaphthalene	2.60	6600	1	1	**3.7E-07**	**103%**	Y
			3-Nitroaniline	1.50	6600	1	1	**2.9E-08**	**2%**	N
			Atrazine	4.07	6600	1	1	**3.6E-08**	**6%**	N
			Bis(2-chloroethyl)ether	1.60	6600	1	1	**2.8E-09**	**1%**	N
			Naphthalene	1.32	6600	1	1	**1.1E-07**	**32%**	Y
			Dieldrin	34.33	6600	1	1	**1.3E-09**	**34%**	Y
Future	Construction Worker	Site-Wide Overburden								
			1,1,2,2-Tetrachloroethan	2.20	3300	1	1	**1.4E-09**	**3%**	N
			1,2-Dichloroethane	0.90	3300	1	1	**8.1E-08**	**1%**	N
			1,2-Dichloropropane	1.08	3300	1	1	**1.2E-08**	**2%**	N
			1,4-Dichlorobenzene	1.68	3300	1	1	**7.3E-07**	**16%**	Y
			Benzene	0.69	3300	1	1	**1.4E-06**	**4%**	N
			Bromochloromethane	1.34	3300	1	1	**2.0E-10**	**0%**	N
			Carbon Tetrachloride	1.83	3300	1	1	**4.7E-06**	**7%**	N
			Chlorobenzene	1.08	3300	1	1	**2.4E-06**	**9%**	N
			cis-1,3-Dichloropropene	1.06	3300	1	1	**1.2E-07**	**2%**	N
			Tetrachloroethene	2.14	3300	1	1	**3.4E-06**	**14%**	Y
			Trichloroethene	1.37	3300	1	1	**1.7E-07**	**4%**	N
			Vinyl Chloride	0.57	3300	1	1	**5.4E-09**	**1%**	N
			Xylene (total)	0.99	3300	1	1	**2.2E-05**	**15%**	Y
			2-Methylnaphthalene	2.60	3300	1	1	**3.7E-07**	**51%**	Y
			Atrazine	4.07	3300	1	1	**3.6E-08**	**3%**	N
			Bis(2-chloroethyl)ether	1.60	3300	1	1	**2.8E-09**	**1%**	N
			Naphthalene	1.32	3300	1	1	**1.1E-07**	**16%**	Y
			Dieldrin	34.33	3300	1	1	**1.3E-09**	**17%**	Y

DERMAL ABSORPTION CALCULATION EXAMPLE

Note: This EPA spreadsheet utilized as basis for Attachment 4 calculations.

FOR ORGANIC CHEMICALS IN WATER (updated on 11/99)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (updated 11/99)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells G5-G18

Concentration (mg/L*L/1000 cm3):	Conc =	1.0E-03	mg/cm3 (default value for purpose of illustration)
Input site specific concentrations in Column marked "Conc"		= 1 mg/L (1 ppm)	= 1 ug/cm3 = 1000 ppb
Area exposed (cm2):	A =	5672.0	cm2
Event time (hr/event):	t_event =	0.5	hr/event (35 minutes/event)
Event frequency (events/day):	EV =	1.0	event/day
Exposure frequency (days/year):	EF =	26.0	days/yr
Exposure duration (years):	ED =	7.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days):	AT =	2555.0	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	lsc =	1.0E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	2000.0	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data

95% LCI and UCI are evaluated by Dr. Paul Pinsky in NCEA using SAS

	CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Chemicals outside EPD (*)	Derm/ Drink Kp	Chem Assess	B	tau (hr)	t_star (hr)
118	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01		**14%**	Y	0.1	**12.99**	31.16

FA for tau>3	Conc (mg/cm3)	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
0.8	1.4E-09	**6.8E-11**	**3.9E-10**	-4.89E+00	1.28E-05	**1.28E-08**	3.4E-01	3.8E-01	#NUM!	31.16

Table 3.RME. Dermal Worksheet
Intermediate Variables for Calculating DA(event)
IRON HORSE PARK SUPERFUND SITE - OU4 - GROUNDWATER

Timeframe	Receptor	Exposure Point	Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
						Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Future	Resident - Adult	Site-Wide (OB + BR)													
			1,1,2,2-Tetrachloroethane	Groundwater	--	1	6.9E-03	cm/hr	0.58	hr/event	0.92	hr	2.20	hr	0.0346
			1,2-Dichloroethane	Groundwater	--	1	4.2E-03	cm/hr	0.58	hr/event	0.38	hr	0.90	hr	0.0161
			1,2-Dichloropropane	Groundwater	--	1	7.8E-03	cm/hr	0.58	hr/event	0.45	hr	1.08	hr	0.0317
			1,4-Dichlorobenzene	Groundwater	--	1	4.2E-02	cm/hr	0.58	hr/event	0.70	hr	1.68	hr	0.1957
			Benzene	Groundwater	--	1	1.5E-02	cm/hr	0.58	hr/event	0.29	hr	0.69	hr	0.0505
			Bromochloromethane	Groundwater	--	1	3.7E-04	cm/hr	0.58	hr/event	0.56	hr	1.34	hr	0.0016
			Carbon Tetrachloride	Groundwater	--	1	1.6E-02	cm/hr	0.58	hr/event	0.76	hr	1.83	hr	0.0778
			Chlorobenzene	Groundwater	--	1	2.8E-02	cm/hr	0.58	hr/event	0.45	hr	1.08	hr	0.1152
			Chloroethane	Groundwater	--	1	6.1E-03	cm/hr	0.58	hr/event	0.24	hr	0.58	hr	0.0188
			cis-1,3-Dichloropropene	Groundwater	--	1	7.7E-03	cm/hr	0.58	hr/event	0.44	hr	1.06	hr	0.0313
			Tetrachloroethene	Groundwater	--	1	3.3E-02	cm/hr	0.58	hr/event	0.89	hr	2.14	hr	0.1655
			Trichloroethene	Groundwater	--	1	1.2E-02	cm/hr	0.58	hr/event	0.57	hr	1.37	hr	0.0513
			Vinyl Chloride	Groundwater	--	1	5.6E-03	cm/hr	0.58	hr/event	0.24	hr	0.57	hr	0.0170
			Xylene (total)	Groundwater	--	1	4.9E-02	cm/hr	0.58	hr/event	0.41	hr	0.99	hr	0.1953
			2-Methylnaphthalene	Groundwater	--	1	1.4E-01	cm/hr	0.58	hr/event	0.66	hr	2.60	hr	0.6381
			3-Nitroaniline	Groundwater	--	1	2.1E-03	cm/hr	0.58	hr/event	0.62	hr	1.50	hr	0.0097
			Atrazine	Groundwater	--	1	5.2E-03	cm/hr	0.58	hr/event	1.70	hr	4.07	hr	0.0296
			Bis(2-chloroethyl)ether	Groundwater	--	1	1.8E-03	cm/hr	0.58	hr/event	0.66	hr	1.60	hr	0.0082
			Naphthalene	Groundwater	--	1	4.7E-02	cm/hr	0.58	hr/event	0.55	hr	1.32	hr	0.2031
			Dieldrin	Groundwater	--	0.8	1.2E-02	cm/hr	0.58	hr/event	14.30	hr	34.33	hr	0.0918
Future	Resident - Child	Site-Wide (OB + BR)													
			1,1,2,2-Tetrachloroethane	Groundwater	--	1	6.9E-03	cm/hr	1	hr/event	0.92	hr	2.20	hr	0.0346
			1,2-Dichloroethane	Groundwater	--	1	4.2E-03	cm/hr	1	hr/event	0.38	hr	0.90	hr	0.0161
			1,2-Dichloropropane	Groundwater	--	1	7.8E-03	cm/hr	1	hr/event	0.45	hr	1.08	hr	0.0317
			1,4-Dichlorobenzene	Groundwater	--	1	4.2E-02	cm/hr	1	hr/event	0.70	hr	1.68	hr	0.1957
			Benzene	Groundwater	--	1	1.5E-02	cm/hr	1	hr/event	0.29	hr	0.69	hr	0.0505
			Bromochloromethane	Groundwater	--	1	3.7E-04	cm/hr	1	hr/event	0.56	hr	1.34	hr	0.0016
			Carbon Tetrachloride	Groundwater	--	1	1.6E-02	cm/hr	1	hr/event	0.76	hr	1.83	hr	0.0778
			Chlorobenzene	Groundwater	--	1	2.8E-02	cm/hr	1	hr/event	0.45	hr	1.08	hr	0.1152
			Chloroethane	Groundwater	--	1	6.1E-03	cm/hr	1	hr/event	0.24	hr	0.58	hr	0.0188
			cis-1,3-Dichloropropene	Groundwater	--	1	7.7E-03	cm/hr	1	hr/event	0.44	hr	1.06	hr	0.0313
			Tetrachloroethene	Groundwater	--	1	3.3E-02	cm/hr	1	hr/event	0.89	hr	2.14	hr	0.1655
			Trichloroethene	Groundwater	--	1	1.2E-02	cm/hr	1	hr/event	0.57	hr	1.37	hr	0.0513
			Vinyl Chloride	Groundwater	--	1	5.6E-03	cm/hr	1	hr/event	0.24	hr	0.57	hr	0.0170
			Xylene (total)	Groundwater	--	1	4.9E-02	cm/hr	1	hr/event	0.41	hr	0.99	hr	0.1953
			2-Methylnaphthalene	Groundwater	--	1	1.4E-01	cm/hr	1	hr/event	0.66	hr	2.60	hr	0.6381
			3-Nitroaniline	Groundwater	--	1	2.1E-03	cm/hr	1	hr/event	0.62	hr	1.50	hr	0.0097
			Atrazine	Groundwater	--	1	5.2E-03	cm/hr	1	hr/event	1.70	hr	4.07	hr	0.0296
			Bis(2-chloroethyl)ether	Groundwater	--	1	1.8E-03	cm/hr	1	hr/event	0.66	hr	1.60	hr	0.0082
			Naphthalene	Groundwater	--	1	4.7E-02	cm/hr	1	hr/event	0.55	hr	1.32	hr	0.2031
			Dieldrin	Groundwater	--	0.8	1.2E-02	cm/hr	1	hr/event	14.30	hr	34.33	hr	0.0918

Table 3.RME. Dermal Worksheet
Intermediate Variables for Calculating DA(event)
IRON HORSE PARK SUPERFUND SITE - OU4 - GROUNDWATER

Timeframe	Receptor	Exposure Point	Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
						Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Future	Construction Worker	Site-Wide Overburden													
			1,1,2,2-Tetrachloroethane	Groundwater	--	1	6.9E-03	cm/hr	1	hr/event	0.92	hr	2.20	hr	0.0346
			1,2-Dichloroethane	Groundwater	--	1	4.2E-03	cm/hr	1	hr/event	0.38	hr	0.90	hr	0.0161
			1,2-Dichloropropane	Groundwater	--	1	7.8E-03	cm/hr	1	hr/event	0.45	hr	1.08	hr	0.0317
			1,4-Dichlorobenzene	Groundwater	--	1	4.2E-02	cm/hr	1	hr/event	0.70	hr	1.68	hr	0.1957
			Benzene	Groundwater	--	1	1.5E-02	cm/hr	1	hr/event	0.29	hr	0.69	hr	0.0505
			Bromochloromethane	Groundwater	--	1	3.7E-04	cm/hr	1	hr/event	0.56	hr	1.34	hr	0.0016
			Carbon Tetrachloride	Groundwater	--	1	1.6E-02	cm/hr	1	hr/event	0.76	hr	1.83	hr	0.0778
			Chlorobenzene	Groundwater	--	1	2.8E-02	cm/hr	1	hr/event	0.45	hr	1.08	hr	0.1152
			cis-1,3-Dichloropropene	Groundwater	--	1	7.7E-03	cm/hr	1	hr/event	0.44	hr	1.06	hr	0.0313
			Tetrachloroethene	Groundwater	--	1	3.3E-02	cm/hr	1	hr/event	0.89	hr	2.14	hr	0.1655
			Trichloroethene	Groundwater	--	1	1.2E-02	cm/hr	1	hr/event	0.57	hr	1.37	hr	0.0513
			Vinyl Chloride	Groundwater	--	1	5.6E-03	cm/hr	1	hr/event	0.24	hr	0.57	hr	0.0170
			Xylene (total)	Groundwater	--	1	4.9E-02	cm/hr	1	hr/event	0.41	hr	0.99	hr	0.1953
			2-Methylnaphthalene	Groundwater	--	1	1.4E-01	cm/hr	1	hr/event	0.66	hr	2.60	hr	0.6381
			Atrazine	Groundwater	--	1	5.2E-03	cm/hr	1	hr/event	1.70	hr	4.07	hr	0.0296
			Bis(2-chloroethyl)ether	Groundwater	--	1	1.8E-03	cm/hr	1	hr/event	0.66	hr	1.60	hr	0.0082
			Naphthalene	Groundwater	--	1	4.7E-02	cm/hr	1	hr/event	0.55	hr	1.32	hr	0.2031
			Dieldrin	Groundwater	--	0.8	1.2E-02	cm/hr	1	hr/event	14.30	hr	34.33	hr	0.0918

FA = Fraction Absorbed Water
Kp = Dermal Permeability Coefficient of Compound in Water

T(event) = Event Duration
Tau = Lag Time

T* = Time to Reach Steady-State
B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis

ATTACHMENT 5

TOXICITY PROFILES FOR COPCs

INTRODUCTION

This attachment contains toxicity criteria and toxicity profiles for the chemicals selected as chemicals of potential concern (COPCs) for the Iron Horse Park Superfund Site OU-4 supplemental human health risk assessment. The oral toxicity criteria for COPCs are summarized in Tables 5.1 and 6.1. Inhalation toxicity criteria are summarized in Tables 5.2 and 6.2. Table 1 in this attachment presents the absolute oral bioavailability factors (i.e., oral to dermal adjustment factors) used to adjust the oral toxicity criteria for the COPCs evaluated in the dermal exposure pathways, as discussed in Section 4.0, subsection 4.3. Toxicity profiles for the COPCs are provided in the following pages.

VOLATILE ORGANICS

Benzene

Benzene is a clear, volatile, highly flammable, aromatic hydrocarbon which exists naturally and is produced by volcanoes and forest fires. Benzene is also a very common industrial solvent, produced from petroleum. It is used as a solvent for fats, inks, paints, plastics, rubber, in the extraction of oils from seeds and nuts, in photogravure printing, as a chemical intermediate and in the manufacture of detergents, explosives, pharmaceuticals and dyestuffs. It is also a component of gasoline and other petroleum-based fuels. Exposure to benzene can occur via inhalation, ingestion, especially of contaminated drinking water, and dermal contact (as in contact with liquid benzene found in gasoline) (Sittig, 1981; ATSDR, 2002).

Benzene is readily absorbed through ingestion, moderately absorbed through inhalation and poorly absorbed through intact skin. Once in the bloodstream, benzene is distributed throughout the body, with the concentration in any one compartment dependent on the degree of perfusion of tissues by blood. Since benzene is lipid-soluble, it accumulates in fat, but the rate of accumulation is slow since fat is poorly perfused. The metabolites of benzene are responsible for its toxic effects. These include phenol (which is either formed via an unstable benzene oxide precursor or directly from benzene), catechol, hydroquinone and conjugated phenolic compounds. The primary site of benzene metabolism is the liver via the cytochrome P450 mixed function oxidase system. Some benzene metabolism may also occurs in the bone marrow via the same enzyme system. Benzene is excreted either unchanged from the lungs or as metabolites in the urine (ATSDR, 2002).

Benzene targets its effects on the hemopoietic, immune and nervous systems (ATSDR, 2002). Exposure to benzene has produced irritation of the skin, eyes and upper respiratory tract. Acute exposure has produced central nervous system depression, headache, dizziness, nausea, convulsions, coma and death at extremely high concentrations (Sittig, 1981). Health effects in humans have been reported starting as low as 50 ppm via inhalation. Twenty-five ppm for 6 hrs had no obvious effects though benzene was detected in blood (Sandmeyer, 1981). Early autopsy reports found benzene-induced hemorrhages of the brain, pericardium, urinary tract, mucous membranes and skin (Sittig, 1981). Chronic exposure to benzene produces blood changes involving an initial increase in levels of erythrocytes, leukocytes and thrombocytes, followed by aplastic anemia indicated by anemia, leukopenia and thrombocytopenia (Sittig, 1981).

The following effects have been produced experimentally in laboratory animals, following exposure to benzene: decreased leukocyte and/or erythrocyte counts, reduction in cellular immunity and bone marrow depression (reduced number of granulopoietic stem cells). Animal studies do not indicate that benzene is teratogenic, but the following fetotoxic effects have been found: reduced fetal weight, altered fetal hematopoiesis, fetal skeletal variations and increased resorptions in pregnant exposed animals. In addition, benzene has produced histopathological changes in ovaries and testes of test animals (ATSDR, 2002).

Benzene and its metabolites have been shown to be mutagenic in a number of in vitro and in vivo studies. Genotoxic effects produced experimentally include structural and numerical chromosome aberrations in humans, animals and cell cultures, and sister chromatid exchanges and micronuclei in vivo animal studies. Benzene exposure has been found to produce an increase in the number of chromosome aberrations associated with myelotoxicity (Sittig, 1981). In addition, sperm head abnormalities, inhibition of DNA and RNA synthesis, DNA binding and interference with cell cycle progression have been shown in vitro studies (ATSDR, 2002). The epidemiologic data indicate that benzene is leukemogenic. The evidence is most convincing for acute myelogenous and acute erythroleukemia, although a correlation has also been found with chronic leukemia. Benzene has been designated a group A human carcinogen (leukemogen) by inhalation. Although data are insufficient to validate the carcinogenicity of benzene via ingestion, it would not be unreasonable that benzene is carcinogenic via this route as well if present in sufficient quantities. The carcinogenicity of benzene via dermal exposure is considered to be lower since benzene is absorbed poorly through the skin (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for benzene.* U.S. Public Health Service.

Sandmeyer, E.E. (1981) *Aromatic hydrocarbons.* In: Patty's Industrial Hygiene and Toxicology, Vol. 2, 3rd ed., Clayton G.D., Clayton F.E., eds. New York. Interscience Publishers. pp. 3253-3283.

Sittig, M. (1981) *Handbook of Toxic and Hazardous Chemicals.* Noyes Publications.

Bromochloromethane

Bromochloromethane is a clear colorless liquid with a sweet, chloroform-like odor. It is used in fire extinguishers, and has a high potential to leach into groundwater once released to the environment. Volatlization from soil or groundwater is expected to be significant. However, it is not expected to bioconcentrate in fish or other aqutic organisms, nor is it expected to adsorb to sediment or suspended organic material. Microbial degradation of bromochloromethane may occur in the environment under anoxic conditions.

Little information on bromochloromethane was located in available literature sources. Bromochloromethane was reported to be an eye and skin irritant, and may cause severe corrosion of the mouth and gastrointestinal tract, if swallowed. Prolonged exposure may cause nausea, headache, dizziness, and/or eye damage. The oral rat LD_{50} is 5000 mg/kg. Bromochloromethane is structurally similar to dichloromethane (methylene chloride) which is classified B2, probable human carcinogen.

Mutagenicity tests with bromochloromethane in microorganisms yielded consistently positive results. Osterman-Golkar et al. (1983) reported positive responses in reverse mutation assays with Salmonella typhimurium TA100 and TA1535 exposed to bromochloromethane in the absence of activation at 20-60 mM and with or without activation in the vapor phase at 10 uL/plate.

Similarly, Simmon (1978), Simmon et al. (1977), and Simmon and Tardiff (1978) reported positive results in S. typhimurium exposed without activation at 10- 50 uL/dessicator. Reverse mutations were observed at the tyr locus in Escherichia coli WU361089 exposed at 10 uL/plate without activation (Osterman- Golkar et al., 1983). Prophage induction was also observed in E. coli K394 exposed without activation at 10 uL/plate (Osterman-Golkar et al., 1983).

Osterman-Golkar, S., S. Hussain, S. Walles, B. Anderstam and K. Sigvardsson. 1983. Chemical reactivity and mutagenicity of some dihalomethanes. Chem.- Biol. Interact. 46(1): 121-130.

Simmon, V.F. 1978. Structural correlations of carcinogenic and mutagenic alkyl halides. U.S. DHEW Publ. FDA 78-1045. Struct. Correl. Carcinog. Mutagen. p. 163-171.

Simmon, V.F. and R.G. Tardiff. 1978. Mutagenic activity of halogenated compounds found in chlorinated drinking water. Water Chlorination: Environ. Health Eff. Proc. Conf. 2: 417-431.

Simmon, V.F., K. Kauhanen and R.G. Tardiff. 1977. Mutagenic activity of chemicals identified in drinking water. Dev. Toxicol. Environ. Sci. 2(Prog. Genet. Toxicol.): 249-258.

U.S. EPA. 1990. Health and Environmental Effects Document for Bromochloromethane. Prepared by the Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Solid Waste and Emergency Response, Washington, DC.

Carbon Tetrachloride

Humans are sensitive to carbon tetrachloride intoxication by oral, inhalation and dermal routes. Oral and inhalation exposure to high concentrations of carbon tetrachloride results in acute central nervous system effects including dizziness, vertigo, headache, depression, confusion, incoordination and, in severe cases, respiratory failure, coma and death. Gastrointestinal problems including nausea, abdominal pain and diarrhea, often accompany these narcotic effects. Liver and kidney damage can appear after the acute symptoms subside. All symptoms can occur following a single oral or inhalation exposure. Milder narcotic effects followed by liver and kidney damage have been reported following dermal exposure. Although an inhalation exposure of about 1000 ppm for a few minutes to hours will cause the narcotic effects in 100% of the population, large variations in sensitivity are seen. Alcohol intake greatly increases human sensitivity to carbon tetrachloride; consequently, exposure to 250 ppm for 15 minutes can be life threatening to an alcoholic.

Subchronic and chronic exposure to doses as low as 10 ppm can result in liver and kidney damage (ATSDR, 2002). Lung damage has also been reported in animals and humans but is not route specific and is believed to be secondary to kidney damage (Sax and Lewis, 1989). Prolonged exposure has been observed to cause visual effects in both humans and animals. Changes in the visual field, reduced corneal sensitivity, subnormal dark adaption, and changes in color perception have been reported in humans exposed by inhalation to a minimum concentration of 6.4 ppm, 1 hour/day for an average of 7.7 years. Increased hepatic enzyme activities indicative of liver damage have also been observed (ATSDR, 2002).

Maternal toxicity and fetotoxic effects have been reported in rats following oral or inhalation exposure to carbon tetrachloride during gestation (Wilson, 1954; Schwetz *et al*., 1974). Repeated inhalation exposure of male rats to carbon tetrachloride concentrations of 200 ppm or greater has been reported to cause degeneration of the testicular germinal epithelium as well as severe liver and kidney damage (Adams *et al*., 1952).

Although data for the carcinogenicity of carbon tetrachloride in humans are inconclusive, there is ample evidence in animals that the chemical can cause liver cancer. Hepatocellular carcinomas have been induced in hamsters, rats and mice after oral carbon tetrachloride treatment for 16 to 76 weeks. Liver tumors have also been demonstrated in rats following inhalation exposure, but the doses were not quantitatively established. The EPA weight-of-evidence classification for both oral and inhalation exposure is B2, probable human carcinogen based on adequate animal evidence.

Adams, E.M., H.C. Spencer, V.K. Rowe, D.D. McCollister and D.D. Irish. 1952. Vapor toxicity of carbon tetrachloride determined by experiments on laboratory animals. *Arch. Ind. Hyg. Occup. Med.* 6: 50-66.

ATSDR (Agency for Toxic Substances and Disease Registry). 2002. *Toxicological Profile for Carbon Tetrachloride.* U.S. Public Health Service.

Bruckner, J.V., W.F. MacKenzie, S. Muralidhara, U. Luthra, G.M. Kyle and D. Aconta. 1986. Oral toxicity of carbon tetrachloride: Acute, subacute and subchronic studies in rats. *Fund. Appl. Toxicol.* 6(1): 16-34.

Della Porta, G., B. Terracini and P Shubik. 1961 Induction with carbon tetrachloride of liver cell carcinomas in hamsters. *J. Natl. Cancer Inst.* 26: 855-863.

Edwards, J., W.E. Heston and A. J. Dalton. 1942. Induction of the carbon tetrachloride hepatoma in strain L mice. *J. Natl. Cancer Inst.* 3: 297-301.

Edwards, J., and A. Dalton. 1942. Induction of cirrhosis of the liver and hepatomas in mice with carbon tetrachloride. *J. Natl. Cancer Inst.* 3: 19-41.

NCI (National Cancer Institute). 1976a. *Report on Carcinogenesis Bioassay of Chloroform.* Carcinogenesis Program, Division of Cancer Cause and Prevention, Bethesda, MD.

NCI (National Cancer Institute). 1976b. *Report on Carcinogenesis Bioassay of Trichloroethylene.* National Cancer Institute Carcinogenesis Technical Report Series, No. 2. NCI-CG-TR-2.

Sax, N.I., and R.J. Lewis. 1989. *Dangerous Properties of Industrial Materials. 7th ed.* Vol. II.

Van Nostrand Reinhold, New York.

Schwetz, B.A., B.K.J. Leong and P.J. Gehring. 1974. Embryo and fetotoxicity of inhaled carbon tetrachloride, 1,1-dichloroethane and methyl ethyl ketone in rats. *Toxicol. Appl. Pharmacol.* 28: 452-464.

Weisburger, E.K. 1977. Carcinogenicity studies on halogenated hydrocarbons. *Environ. Health Perspect.* 21: 7-16.

Wilson, J.T. 1954. Influence of the offspring of altered physiologic states during pregnancy in the rat. *Ann. NY Acad. Sci.* 57: 517-525.

Chlorobenzene

The chemical formula for chlorobenzene is C_6H_5Cl, and its molecular weight is 112.56 g/mol. Chlorobenzene occurs as a colorless flammable liquid, with low solubility in water. Chlorobenzene has an aromatic, almond-like odor, with an odor threshold of 1 to 8 mg/m^3. The vapor pressure for chlorobenzene is 8.8 mm Hg at 20 EC, and its log octanol/water partition coefficient (log K_{ow}) is 2.84. The primary uses of chlorobenzene are as a solvent for pesticide formulations, diisocyanate manufacture, and degreasing automobile parts and for the production of nitrochlorobenzene. In the past, chlorobenzene was used as an intermediate in phenol and DDT production (ATSDR, 2002).

Human exposure to chlorobenzene appears to be primarily occupational. In urban areas, chlorobenzene may be released to the ambient air during its manufacture and use. Chlorobenzene or its breakdown products can be detected in urine, exhaled breath, blood, and body fat to determine whether or not exposure has occurred. A child who ingested chlorobenzene became unconscious and cyanotic and had muscle spasms but recovered completely (ATSDR, 2002) Acute (short-term) inhalation exposure of cats to chlorobenzene produced narcosis, restlessness, tremors, and muscle spasms (HSDB, 1993). Acute animal tests, such as the LC_{50} and LD_{50} tests in rats, mice, rabbits, and guinea pigs, have demonstrated chlorobenzene to have low acute toxicity by inhalation and moderate acute toxicity from oral exposure (RTECS, 1993).

Chronic (long-term) exposure of humans to chlorobenzene affects the CNS. Signs of neurotoxicity include numbness, cyanosis, hyperesthesia (increased sensation), and muscle spasms. Headaches and irritation of the mucosa of the upper respiratory tract and eyes have also been reported in humans chronically exposed via inhalation (USEPA, 1989). The CNS, liver, and kidneys have been affected in animals chronically exposed to chlorobenzene by inhalation (ATSDR, 2002). Chronic ingestion of chlorobenzene has resulted in damage to the kidneys and liver in animals (USEPA, 1989).

No information is available on the reproductive or developmental effects of chlorobenzene in

humans. Chronic inhalation exposure of rats to chlorobenzene did not adversely affect reproductive performance or fertility. However, a slight increase in the incidence of degenerative testicular changes was observed. Chlorobenzene does not appear to be a developmental toxicant and did not produce structural malformations in rats and rabbits acutely exposed via inhalation (USEPA, 1989).

No information is available on the carcinogenic effects of chlorobenzene in humans.In a study of rats and mice exposed to chlorobenzene via gavage (experimentally placing the chemical in the stomach), an increased incidence of neoplastic nodules of the liver in male rats was observed but not in mice or female rats (ATSDR, 2002). EPA has classified chlorobenzene as a Group D, not classifiable as to human carcinogenicity.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological Profile for Chlorobenzene*. U.S. Public Health Service.

U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.

U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.

U.S. Environmental Protection Agency (USEPA). *Updated Health Effects Assessment for Chlorobenzene*. EPA/600/8-89/099. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development, Cincinnati, OH. 1989.

Chloroethane

Chloroethane, also called ethyl chloride, is a colorless gas at room temperature and atmospheric pressure that is produced for use as an alkylating agent. It has a characteristically sharp odor that can be detected by scent at levels above 4 ppm. Chloroethane exists as a liquid in pressurized containers, but evaporates quickly when exposed to air. It was used predominantly for the manufacture of tetraethyl lead. Currently, its major use is as a blowing agent in foamed plastics. Chloroethane is also used as a topical anesthetic, a refrigerant and in the manufacture of pharmaceuticals, dyes and other chemicals. It's previous use as a general anesthetic has been discontinued due to the risk of accidental death.

Most of the chloroethane released to the environment ends up in the atmosphere with smaller amounts entering groundwater as a result of passage through soil. Once in the atmosphere, it breaks down rapidly (half-life of 40 days) by reaction with other substances in the air. In groundwater, chloroethane changes slowly to ethanol and salt. Humans may be exposed to

chloroethane from environmental , occupational and consumer sources.

Chloroethane can enter the body via inhalation of air containing chloroethane vapor. It may also enter the body through the skin although most of it quickly evaporates from the skin surface. When water containing chloroethane is ingested, it may enter into the bloodstream through the digestive tract. Once the cholorethane enters the body, it is excreted primarily through the lungs. Breakdown products of chloroethane (e.g., acetate) may exit via urine.

Brief exposure to high levels of chloroethane vapor can produce temporary feelings of drunkenness, lack of muscle coordination and un consciousness. Individuals have felt dizzy and suffered from decreased reaction times laong with experiencing stomach cramps, nausea, vomiting, and eye irritation. Workers exposed to chloroethane for longer periods of time (1.5 to 3 years) have experience decrease immune responsiveness and neurological effects such as jerking eye movements, inability to control voluntary muscle movements, difficulty in speaking, decreased reflexes, seizures, disorientation, memory loss and hallucinations.

It is not known whether chloroethane produces cancer in humans. However, long-term high-level inhalation exposure has been shown to produce cancer in mice. No studies ahve been performed demonstrating the ability of chloroethane to cause cancer when either ingested or applied to the skin. It is classified as a Group D carcinogen.

Agency for Toxic Substances and Dusease registry (ATSDR). 2002. *Toxicological profile for chloroethane*. U.S. Department of Health and Human Services.

Chloromethane

Chloromethane, also known as methyl chloride, is a clear, colorless gas. It has a faint, sweet odor that is noticeable only at toxic levels. It is heavier than air and extremely flammable. Chloromethane is produced in industry, but it also occurs naturally with up to 99% of it released to the environment emanating from natural sources. Natural sources include chemical reactions occurring in the oceans or the burning of grass, wood, charcoal and coal.

In the past, chloromethane was widely used as a refrigerant, foam-blowing agent and as a pesticide or fumigant. Today, nearly all commercially produced chloromethane is used to make silicones, agricultural chemicals, methyl cellulose, quaternary amines and butyl rubber. It is also found as a pollutant in municipal waste streams and industrial waste streams as a result of formation or incomplete removal.

Most releases of chloromethane will be to the air. It breaks down very slowly (months to years) in the air. Chloromethane can dissolve in water, and small amounts may be found in surface water. Because chloromethane is a gas at room temperature, it evaporates quickly from water. Small amounts may move below the surface to groundwater where it breaks down slowly (months to years) unless acted upon by certain bacteria. Chloromethane does not concentrate in

sediments, or in animals and fish in the food chain.

Chloromethane may enter the body by inhalation or ingestion. It rapidly enters the blood stream by both pathways, and distributes throughout the body. Most chloromethane is chemically changed in the body. It's breakdown products are eliminated by exhalation. A small amount of the breakdown products are eliminated in urine within a few days of exposure. Because chloromethane is a gas at room temperature, dermal contact is unlikely.

Brief exposures to high levels of chloromethane can cause convulsions, coma, and death. Low exposure levels result in blurred or double vision, dizziness, fatigue, personality changes, confusion, tremors, uncoordinated movements, nausea and vomiting. Symptoms can last for several months or years. Chloromethane can also cause liver and kidney damage, and can affect heart rate and blood pressure. Young animals exposed to chloromethane exhibited slow growth and brain damage. Male animals may have reduced fertility or sterility. Pregnant females lost their developing young upon exposure. It is not known whether chloromethane can cause sterility, miscarriages, birth defects or cancer in humans.

Male mice, after inhalation exposure to chloromethane for 2 years, developed kidney tumors. This effect was not noted in female mice or male/female rats. The EPA has classified chloromethane into Group C, possible carcinogen.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological Profile for Chloromethane*. U.S. Department of Health and Human Services. Public Health Service.

1,4-Dichlorobenzene

1,4-Dichlorobenzene, also referred to as para-DCB, p-DCB, paracide, Paramoth®, Parazene®, PDB, and Santochlor®, has a benzene ring with two chlorine atoms attached at the 1 and 4 carbon atoms; it does not occur naturally (ATSDR, 2002). Two additional isomers, 1,3-dichlorobenzene and 1,2-dichlorobenzene, also exist. 1,4-Dichlorobenzene is used to make mothballs, deodorant blocks used in restrooms, and in animal holding facilities to control odors (ATSDR, 2002). It also has applications in fumigants, insecticides, lacquers, paints, and seed disinfection products (Leber and Benya, 1994). Of the 1300 sites on the United States Environmental Protection Agency's National Priorities List, dichlorobenzenes have been identified on at least 244 sites. Drinking water samples from U.S. surface water sources, environmental hazardous waste sites, and food have been reported to contain dichlorobenzenes (ATSDR, 2002).

Detectable concentrations of dichlorobenzenes were found in adipose tissue and blood samples taken from Tokyo residents (Morita and Ohi, 1975; Morita *et al*., 1975). A national survey of various volatile organic chemicals demonstrated dichlorobenzenes in the three adipose tissues sampled. In addition, studies have shown that babies can receive dichlorobenzenes from mother's milk (ATSDR, 2002). Dichlorobenzenes are absorbed by experimental animals via inhalation, gavage, or subcutaneous injection (Hawkins *et al*., 1980). Data from oral administration of

1,4-dichlorobenzene to rabbits indicated oxidation to 2,5-dichlorophenol, which was found in the urine as a conjugate of glucuronic and sulfuric acids (Azouz *et al*., 1955). Other metabolites identified in the blood and urine of rats were 2,5-dichlorophenyl methyl sulfoxide and 2,5-dichlorophenyl methyl sulfone.

Severe hypochromic, microcytic anemia with excessive polychromasia, marginal nuclear hypersegmentation of the neutrophils, and a small number of red blood cells with Heinz bodies developed in a pregnant woman (21 years old) who consumed 1–2 blocks of 1,4-dichlorobenzene toilet air freshener per week throughout her pregnancy (Campbell and Davidson, 1970). A 19-year-old female who consumed 4–5 moth pellets containing 1,4-dichlorobenzene on a daily basis for 2.5 years developed symmetrical, well-demarcated areas of increased pigmentation over various parts of her body, which disappeared over a 4-month period after discontinuing the ingestion (Frank and Cohen, 1961).

In rats, 13-week gavage studies resulted in decreased hematocrit levels, red blood cell counts, and hemoglobin concentrations at 300 mg/kg/day (NTP, 1987). Oral administration of 1200 and 1500 mg/kg/day resulted in degeneration and necrosis of rat hepatocytes. Increased incidences of hepatocellular degeneration and individual cell necrosis were observed in male and female mice gavaged with 600–1800 mg/kg/day.

Rats exposed via inhalation to 96–341 ppm of 1,4-dichlorobenzene intermittently for 5–7 months had cloudy swelling and degeneration of hepatic parenchymal cells in the central zone of the liver. Increased liver weights in the male and/or female rats occurred above 96 ppm (Hollingsworth *et al*., 1956). During a 2-generation study, adult rats exposed to 538 ppm exhibited tremors, ataxia, and hyperactivity; decreased grooming behavior; and an unkempt appearance (Tyl and Neeper-Bradley, 1989). Both generations of offspring in the 538 ppm group had lower body weights at lactation day 4, and average litter size and survival were decreased. Selected animals from the first filial generation still had reduced body weights at 5 weeks post-exposure.

No epidemiologic studies or case reports addressing the carcinogenicity of 1,4-dichlorobenzene in humans were available. In a 2-year study, female rats and male and female mice were gavaged with 300 and 600 mg/kg/day and male rats were gavaged with 150 and 300 mg/kg/day (NTP, 1987). Nephropathy, epithelial hyperplasia of the renal pelvis, mineralization of the collecting tubules in the renal medulla, and focal hyperplasia of the renal tubular epithelium were noted in male rats receiving 150 and 300 mg/kg/day. Female rats gavaged with 300 and 600 mg/kg/day had an increased incidence of nephropathy and minimal hyperplasia of the renal pelvis or tubules. The following tumors were described as being present in the animals: renal tubular adenocarcinomas in male rats (controls, 2%; low dose, 6%; high dose, 14%), a marginal increase in mononuclear cell leukemia in male rats (control, 10%; low dose, 14%; high dose, 22%), hepatocellular carcinomas in male mice (controls, 28%; low dose, 22.5%; high dose, 64%) and in female mice (controls, 10%; low dose, 10.4%; high dose, 38%), and hepatocellular adenomas in male mice (controls, 10%; low dose, 26.2%; high dose, 32%) and in female mice (controls, 20%; low dose, 12.5%; high dose, 42%). In this NTP study, the tumor incidence in female controls was

higher than the historical control. In both male and female mice, hepatocellular degeneration with resultant initiation of tissue repair was present. These findings resulted in a speculation by NTP (1987) that 1,4-dichlorobenzene was acting as a tumor promotor for liver tumors in male and female mice.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological Profile for 1,4-Dichlorobenzene.* U.S. Public Health Service.

Azouz, W. M., D. V. Parke, and R. T. Williams. 1955. "Studies in detoxication. The metabolism of halogenobenzenes. Ortho- and para-dichlorobenzenes," *Biochem. J.* 59: 410–415.

Campbell, D. M. and R. J. Davidson. 1970. "Toxic haemolytic anemia in pregnancy due to a pica for paradichlorobenzene," *J. Obstet. Gynaec. Br. Commonw.* 77: 657–659.

Frank, S. B. and H. J. Cohen. 1961. "Fixed drug eruption due to paradichlorobenzene," *NY State J. Med*. 61:4079.

Hawkins, D. R., L. F. Chasse, R. N. Woodhouse and D. G. Cresswell. 1980. "The distribution, excretion, and biotransformation of p-dichloro[^{14}C]benzene in rats after repeated inhalation, oral, and subcutaneous doses," *Xenobiotica* 10: 81–95.

Hollingsworth, R. L., V. K. Rowe, F. Oyen, *et al*. (1956). "Toxicity of paradichlorobenzene: Determinations on experimental animals and human subjects," *AMA Arch. Ind. Health* 14: 138–147.

Leber, A. P. and T. J. Benya. 1994. "Halogenated Benzene," in *Patty's Industrial Hygiene and Toxicology*, Fourth Edition, Volume II, Part B, edited by G. D. Clayton and F. E. Clayton.

Morita, M. and G. Ohi. 1975. "Para-dichlorobenzene in human tissue and atmosphere in Tokyo metropolitan area," *Environ. Pollut*. 8: 269–274.

Morita, M. S., Minur, G. Ohi, el at. 1975. "A systematic determination of chlorinated benzenes in human adipose issues," *Environ. Pollut*. 9: 175–179.

NTP (National Toxicology Program). 1987. *Toxicology and Carcinogenesis Studies of 1,4-Dichlorobenzene (CAS No. 106-46-7) in F344/N Rats and B6C3F1 Mice (gavage studies)*. NTP TR 319, NIH Publication No. 87-2575, Research Triangle Park, North Carolina.

Tyl, R. W. and T. L. Neeper-Bradley. 1989. "Paradichlorobenzene: Two Generation Reproductive Study of Inhaled Paradichlorobenzene in Sprague-Dawley (CD) Rats," Laboratory Project 86-81-90605. Washington, D.C., Chemical Manufacturers Association, Chlorobenzene Producers Association.

1,1-Dichloroethane

1,1-Dichloroethane (1,1-DCA) is a colorless, oily, flammable liquid that evaporates quickly at room temperature and has an ether-like odor. It is primarily used in the synthesis of 1,1,1-trichloroethane and a number of other chemicals. It is also used as a solvent and degreasing fluid. Historically, 1,1-DCA was used as a surgical anesthetic (ATSDR, 2002).

Following releases to the environment, 1,1-DCA is seen to exist primarily in air. Although it has a low solubility in water, 1,1-DCA is also found at low levels in groundwater following releases to soil. This compound is also found in the environment due to the anaerobic breakdown of 1,1,1-trichloroethane in landfills. Its half-life in air is approximately 2 months (ATSDR, 2002).

1,1-DCA can enter the body by the inhalation, ingestion, and dermal contact pathways. Absorption is most efficient following oral or inhalation exposures. Following absorption, it is widely and quickly distributed throughout the body. Elimination of the unchanged compound in expired air occurs within two days. A small fraction of the intake dose is metabolized to water-soluble breakdown products that are excreted primarily in urine (ATSDR, 2002).

Brief, high-level (16,000 ppm) exposures to 1,1-DCA in laboratory animals have resulted in death. Long-term inhalation studies in rodents have demonstrated that the kidney is the primary target organ. Delayed growth was observed in the offspring of animals exposed to high concentrations of 1,1-DCA during pregnancy. No reliable information is available to indicate that these effects occur in humans.

1,1-DCA showed evidence of increased incidence of cancer in rats and mice orally dosed with 3,000 mg/kg-day for a lifetime. Hemangiosarcomas and mammary carcinomas were reported in female rats, and liver carcinomas and benign uterine polyps were reported in mice. Based on no human carcinogenicity data and limited evidence of carcinogenicity in rodents, 1,1-DCA is classified into Group C - possible human carcinogen (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for 1,1-dichloroethane.* U.S. Public Health Service.

1,2-Dichloroethane

1,2-Dichloroethane (1,2-DCA or ethylene dichloride) is a clear, colorless, volatile liquid with a pleasant odor. Approximately 80% of 1,2-dichloroethane is used to produce vinyl chloride. It is also used to produce vinylidene chloride, 1,1,1- trichloroethane, TCE, PCE, aziridines and ethylene diamines. Minor applications include various solvent functions, use as a fumigant for grains, upholstery and carpets and as a lead-scavenging agent in gasoline (IRP, 1985).

1,2-DCA is readily absorbed through the lungs following inhalation exposure in both humans and animals (ATSDR, 2002). Absorption from the gastrointestinal tract is rapid and complete. Excretion of unmetabolized 1,2-DCA is almost exclusively via the lungs. However, metabolism and excretion of metabolites by other routes is extensive and dose related. Tissue distribution of 1,2-DCA is consistent with its lipophilic nature. It crosses the blood-brain and placental barriers and distributes into breast milk (U.S. EPA, 1985).

Short-term ingestion or inhalation of 1,2-DCA results in symptoms of CNS depression, gastrointestinal upset and systemic injury to the liver, kidneys and lungs (Clayton and Clayton, 1981). Long term exposure of workers to 1,2-DCA in an occupational environmment have been associated with loss of appetite, nausea, vomiting, epigastric pain, irritation of the mucous membrane, neurologic changes and liver and kidney impairment (IRP, 1985).

Acute inhalation exposure of a number of animal species to 1,2-DCA resulted in death in rats and guinea pigs at 400 ppm and in mice, rabbits and dogs at 1500 ppm (Heppel *et al*., 1945, 1946; Spencer *et al*., 1951). Liver and kidney effects were noted, as well as associated adverse effects to the respiratory and cardiovascular systems. A 15 percent increase in fat accumulation and an increase in liver triglycerides were observed in rats fed 80 mg/kg/day in the diet for 5 to 7 weeks (Alumot *et al*., 1976). No changes in liver weight was reported at this dose level. No hepatic effects were noted in the same study at 30 mg/kg/day. No hepatotoxicity was noted in mice administered up to 189 mg/kg/day in drinking water for 90 days (Munson *et al*., 1982). Chronic exposure of rats to 25 mg/kg/day in food for two years did not result in abnormalities in liver function as measured by transaminases and cholesterol values (Alumot *et al*., 1976). No dose-related reproductive effects were seen in mice fed 5-50 mg/kg/day in drinking water (Lane *et al*., 1982) or rats fed diets containing 12.5 or 25 mg/kg/day (Alumot *et al*., 1976). Intermittent exposure (7 hr/day) of female rats to 4.69 +/- 7 ppm of 1,2-DCA for 4 months prior to the mating period followed by inhalation exposure during pregnancy resulted in a statistically significant increase in embryo mortality (Vozavaya, 1977).

In-vivo exposure of mice to 1000 ppm of 1,2-DCA vapors for 4 hours or to a single nontoxic oral dose of 100 mg/kg resulted in irreversible DNA damage as revealed by single-stranded breaks in the hepatocytes of mice (Storer *et al*., 1984). 1,2-DCA has been found to be carcinogenic in rats and mice following oral gavage exposure (NCI, 1978). A dose of 47 mg/kg/day administered to rats produced tumors at locations remote from the site of administration. Statistically significant increases in multiple tumor types (malignant and nonmalignant) were noted in treated animals of both species. An increased incidence of fibromas of the subcutaneous tissue and hemangiosarcomas of the spleen, liver, pancreas and adrenal gland was observed in male rats exposed to 47 or 95 mg/kg/day. Male rats exposed to 95 mg/kg/day were observed to have an increase in squamous-cell carcinomas of the forestomach, and female rats at this dosage had increased adenocarcinomans and fibroadenomas of the mammary gland.

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for 1,2-dichloroethane.* U.S. Public Health Service.

Alumot, E., Nachtomi, E. and Mandel, E. (1976) *Tolerance and acceptable daily intake of chlorinated fumigants in the rat diet*. Food Cosmet. Toxicol. 14:105-110.

Clayton, G.D. and Clayton, F.E. (1981) Patty's Industrial Hygiene and Toxicology. 3rd. rev. ed. Toxicology. New York, John Wiley and Sons, Inc.

Heppel, L.A., Neal, P.A. and Perrin, T.L. (1945) *The toxicology of 1,2 DCA III. Its acute toxicity and effect of protective agents*. J. Pharmocol. Exp. Ther. 84:53-63.

Heppel, L.A., Neal, P.A. and Perrin, P.L. (1946) *The toxicology of 1,2 DCA V. The effects of daily inhalation*. J. Ind. Hyg. Toxicol. 28:113-120.

Installation Restoration Program Toxicology Guide (IRP). Vol 1. (1985) Arthur D. Little, Cambridge, MA.

Lane, R.W., Riddle, B.L. and Borzelleca, J.F. (1982) *Effects of 1,2-DCA and 1,1,1-TCA in drinking water on reproduction and development in mice*. Toxicol. Appl. Pharmacol. 63:409-421.

Munson, A.E., Sanders, V.M. and Douglas, K.A. (1982) *In vivo assessment of immunotoxicity*. Environ. Health Perspect. 43:41-52.

NCI (1978) Bioassay of technical grade 1,2-DCA for possible carcinogenicity. Bethesda, MD. National Cancer Institute, Division of Cancer Cause and Prevention, Carcinogenesis Testing Program. NCI-CG-TR 55.

Spencer, H.C., Rowe, V.K. and Adams, E.M. (1951) *Vapor toxicity of ethylene dichloride determined by experiments on laboratory animals*. AMA Arch. Ind. Hyg. Occup. Med. 4:482-493.

Storer, R.D., Jackson, N.M. and Conolly, R.B. (1984) *In vivo genotoxicity and acute hepatotoxicity of 1,2-DCA in mice: Comparison of oral, intraperitoneal, and inhalation routes of exposure*. Cancer Res. 44:4267-4271.

U.S. Environmental Protection Agency (U.S. EPA) (1985) Health assessment document for 1,2 DCA. Office of Health and Environmental Assessment. EPA/600/8-84/006F.

Vozovaya, M. (1977) *The effect of dichlorethane on the sexual cycle and embryogenesis of experimental animals*. Akusk. Ginekol. (Moscow) 2:57-59.

cis- and trans-1,2-Dichloroethene

1,2-Dichloroethene is a highly flammable, colorless liquid with a sharp, harsh odor. There are two isomers of 1,2-dichloroethene: cis- and trans-. Both forms may be present in a mixture, or the

individual isomers may be used in their pure form. 1,2-Dichloroethene is used to produce solvents and in chemical mixtures. It enters the environment through industrial activity. It may be released from chemical factories during its manufacture, from landfills and hazardous waste sites, from chemical spills, from burning objects made of vinyl and from the breakdown of other chlorinated solvents.

1,2-Dichloroethene evaporates rapidly when exposed to air. It's half-life in air is 5 to 12 days. If present in soil, it may seep deeper into the soil and dissolve into groundwater. It's half-life in groundwater is 13 to 48 weeks. Small amounts of 1,2-dichloroethene may break down into vinyl chloride, a more hazardous chemical.

1,2-Dichloroethene enters the body through the lungs when contaminated air is breathed, through the stomach and intestines when contaminated food and water are ingested, or through the skin upon dermal contact with the chemical. Once absorbed, it rapidly distributes into blood and other tissues and is broken down into other compounds by the liver.

Inhalation of high levels of 1,2-dichloroethene can result in nausea, drowsiness, and fatigue. Higher levels can result in death. The lungs, liver and heart may be damaged after prolonged inhalation exposures. Oral doses have produced effects on the liver and blood (e.g., anemia). Animal studies suggest that exposure in utero may result in developmental delay. No studies have been done to determine the carcinogenic potential of 1,2-dichloroethene in humans or animals.

Agency for Toxic Substances and Dusease Registry (ATSDR). 2002. *Toxicological profile for 1,2-dichloroethene.* U.S. Department of Health and Human Services.

<u>1,2-Dichloropropane</u>

1,2-Dichloropropane is a colorless liquid with a chloroform-like odor. It is currently used only in research and industry. However, prior to the early 1980s, it was used as a soil fumigant and was found in paint strippers, varnished, and furniture finish removers. Because 1,2-dichloropropane evaporates quickly at room temperature, much of what is released to the environment ends up in air. However, 1,2-dichloropropane also percolates quickly through soil and therefore, may also be found in groundwater. Breakdown in both air and groundwater is slow with half-lives estimated to be between 6 months and 2 years (ATSDR, 2002).

1,2-Dichloropropane may enter the body by the oral, dermal, and inhalation routes of exposure. Animal experiments have shown that, once absorbed, 1,2-dichloropropane is rapidly eliminated from the body in urine, feces, and expired air.

Oral exposure to high levels of 1,2-dichloropropane in humans has resulted in dizziness, headache, nausea, liver and kidney damage, anemia, coma, and ultimately death. High-level inhalation exposures have resulted in similar signs and symptoms. There are no reports of adverse effects

following low-level inhalation or oral exposures in humans (ATSDR, 2002).

In animals, short term and long term low-level inhalation exposures are associated with damage to the liver, kidneys, and respiratory system. High-level exposures have resulted in irritation to the eyes and throat, liver and kidney damage, and death. Irritation of the skin has been reported in rabbits following dermal contact. A delay in the growth of bones has been seen in fetal rats following exposure of maternal rats (ATSDR, 2002).

Long-term low-level oral exposures in rodents have produced evidence of liver cancer in mice and breast cancer in female rats. An increased incidence of cancer in humans following either inhalation or oral exposures has not been reported (ATSDR, 2002). 1,2-Dichloropropane is classified into Group B2 - probable human carcinogen.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for 1,2-dichloropropane*. U.S. Department of Health and Human Services.

1,3-Dichloropropene

1,3-Dichloropropene is a colorless liquid with a sweet smell that dissolves in water and easily evaporates. There are two isomers of this compound: cis- and trans-. Both isomers are closely related and behave similarly from a chemical and physical standpoint. Mixtures of the two isomers are as pesticides (ATSDR, 2002).

Once ingested, inhaled, or dermally contacted, 1,3-dichloropropene is absorbed into the bloodstream and widely distributed throughout the body. It is rapidly eliminated from the body, with most removal occurring within two days of exposure. The most common route of elimination is in urine, with lesser amounts being excreted in feces and expired air (ATSDR, 2002).

The main health effects seen in humans following inhalation exposure are nausea, vomiting, irritation of the skin and mucous membranes, coughing, difficulty breathing, headache, and fatigue. This compound did not cause birth defects in rodents studies. However, litter size was significantly reduced in exposed dams. In addition, ingestion studies in rodents suggest that 1,3-dichloropropene is carcinogenic, evidenced by the production of cancer of the stomach and liver following lifetime low-level exposures in rats and cancer of the stomach, urinary bladder, and lungs in mice (ATSDR, 2002).

High level inhalation exposures in rats and rabbits produced lung damage, eye irritation, and CNS effects (e.g., difficulty walking). Mice displayed damage to the bladder lining following lower level chronic exposures. Acute ingestion studies in rats indicated stomach and lung damage, including hemorrhage. Liver and kidney weights were also increased in dosed animals, indicating potential toxicity of 1,3-dichloropropene to these organs. Dermal exposured in rabbits and guinea

pigs resulted in irritated skin, hair loss, open sores, and allergic reactions. System effects following dermal dosing included difficulty breathing and walking, and bleeding from the lungs and stomach (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for 1,3-dichloropropene.* U.S. Department of Health and Human Services.

Methyl tert-butyl ether

The chemical formula for methyl *tert*-butyl ether is $C_5H_{12}O$, and its molecular weight is 88.15 g/mol. Methyl *tert*-butyl ether occurs as a colorless liquid, with a vapor pressure of 245 mm Hg at 25 EC. Methyl *tert*-butyl ether is used as an octane booster in unleaded gasoline. It is also used in the manufacture of isobutene (HSDB, 1993; Merck, 1989).

The general population may be exposed to methyl *tert*-butyl ether via the inhalation of air contaminated from its use as an octane booster or a pollution reducer in unleaded gasoline or by dermal contact. Workers may be occupationally exposed via inhalation or dermal contact. Acute (short-term) exposure of humans to methyl *tert*-butyl ether has occurred via injection into the gallbladder during its use as a medical treatment to dissolve cholesterol gallstones. Nausea, vomiting, and sleepiness have been observed; in one case renal failure was reported (HSDB, 1993). Acute inhalation exposure has resulted in ataxia and abnormal gait in rats. Acute animal tests, such as the LC_{50} and LD_{50} test in rats, have demonstrated methyl *tert*-butyl ether to have low acute toxicity via inhalation and moderate acute toxicity via ingestion (RTECS, 1993).

No information is available on the chronic (long-term) health effects of methyl *tert*-butyl ether in humans. Increased liver and kidney weights, decreased brain weight, swollen periocular tissue, and ataxia have been reported in rats following chronic inhalation exposure. Increased severity of spontaneous renal lesions and increased prostration (lying flat or exhaustion) were reported in females only. Increased liver, kidney, spleen, and adrenal weights; ataxia; and decreased brain weight, body weight, and body weight gain have been observed in mice chronically exposed to methyl *tert*-butyl ether by inhalation. Increased prostration was reported in females (HSDB, 1993).

No information is available on the reproductive or developmental effects of methyl *tert*-butyl ether in humans. In rats exposed via inhalation, reduced body weight and body weight gain in pups and decreased pup viability have been reported. A decreased number of viable implantations, increased maternal toxicity, dead fetuses, and late resorptions; and skeletal variations have been reported in mice exposed via inhalation (HSDB, 1993).

No information is available on the carcinogenic effects of methyl *tert*-butyl ether in humans or animals. EPA has not classified methyl *tert*-butyl ether with respect to potential carcinogenicity.

U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.

U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.

The Merck Index. An Encyclopedia of Chemicals, Drugs, and Biologicals. 11th ed. Ed. S. Budavari. Merck and Co. Inc., Rahway, NJ. 1989.

1,1,2,2-Tetrachloroethane

1,1,2,2-Tetrachlroethane is a colorless pure to pale-yellow liquid. Sweetish, suffocating, chloroform-like odor. Corrosive liquid will attack some forms of plastics, rubber and coatings.

May cause transient increases in liver enzymes. Fatty liver disease has also been reported. Hepatic edema may be noted. May cause transient renal impairment. Skin vesications and erythema may occur with prolonged contact. Allergic contact dermatitis has been reported.

1,1,2,2-Tetrachloroethane is a central nervous system and respiratory depressant, as well as a skin and mucous membrane irritant. Like many solvents, 1,1,1-tetrachloroethane will defat the skin, causing redness and scaliness. Absorption through the skin can occur but is not a significant route of toxic exposure. 1,1,1-Tetrachloroethane is one of the least toxic of the chlorinated hydrocarbons used as a solvent.

Human systemic effects by ingestion and inhalation include: conjunctival irritation, hallucinations or distorted perceptions, motor activity changes, irritability, aggression, hypermotility, diarrhea, nausea or vomiting and other gastrointestinal changes. Contact with eyes will result in superficial and transient conjunctival irritation and hyperemia. Following an acute exposure, hypotension and cardiac arrhythmias due to myocardial sensitization have led to ventricular fibrillation and death. Respiratory depression and pulmonary edema may be noted following acute exposure.

Toxic solvent encephalopathy, including memory and balance defects, has been described in workers chronically exposed. Nausea, vomiting, diarrhea, and burns of the esophagus have been noted after large ingestions. Moodiness, irritability, and other neuropsychiatric effects have been described in chronically exposed workers. The acute lethal dose to the human has been established at 500 to 5,000 mg/kg.

Groups of 50 male and 50 female 5 wk old b6c3f1 hybrid mice were Admin technical-grade 1,1,2,2-tetrachloroethane in corn oil by Gavage on 5 days/wk. for 78 wk. The measured, Time-

weighted avg doses were 142 (low-dose) and 284 (high-dose) Mg/kg body wt/day. In males, hepatocellular carcinomas occurred in 2/19 untreated controls, 1/18 vehicle-treated controls, in 13/50 low-dose animals and in 44/49 high-dose animals; in females, the respective incidences were 0/19, 0/20, 30/48, and 43/47.

The ability of 1,1,2,2-tetrachloroethane to induce morphological transformation in the BALB/3T3 mouse cell line (cell transformation assay) was evaluated. Based on Preliminary toxicity tests, concentrations of 1, 10, 100 and 250 ug/ml were used with corresponding survival rates ranging From 104% to 60% of controls. The test compound did not induce Any statistically significant transformation.

There is inadequate evidence of carcinogenicity in humans and only limited evidence of carcinogenicity in animals. Classification: C; possible human carcinogen. Basis for classification: Increased incidence of hepatocellular carcinomas in mice.

1,1,2,2-tetrachloroethane was mutagenic in salmonella Typhimurium strains TA1530 and TA1535, showing a linear incr in reversion frequency with increasing concn; negative results were obtained in strain TA1538. 1,1,2,2-tetrachloroethane Inhibited the growth of DNA polymerase-deficient (pol a-) Escherichia coli; the ratio of the areas of inhibition of pol A-:pol a+ was 1.88 with a concn of 10 ul/plate. 1,1,2,2-tetrachloroethane was non-mutagenic in the Salmonella/mammalian microsome assay as shown by no incr in His+ reversions.

The mutagenicity of 1,1,2,2-tetrachloroethane was evaluated In salmonella tester strains TA98, TA100, TA1535 and TA1537 (Ames test), both in the presence and absence of added metabolic activation by aroclor-induced rat or mouse (male or female) liver S9 fraction. Based on the results of preliminary bacterial toxicity determinations, 1,1,2,2-tetrachlroethane was not mutagenic in any of the tests, either with or without activation. The tests were conducted using a protocol in which the chemical is tested over a minimum of 6 dose levels, the highest nontoxic dose level being 10 mg/plate unless solubility, mutagenicity, or toxicity dictates a lower upper limit.

The effects of 1,1,2,2-tetrachloroethane in dimethylsulfoxide were examined in the rat hepatocyte primary culture/dna repair Assay. Based on preliminary toxicity tests, 1,1,2,2-tetrachloroethane was tested at concentrations of 1% to 1x10-7%. Concentrations of 1x10-2% and above were both cytotoxic and genotoxic. Lower concentrations were neither cytotoxic nor genotoxic.

Parker JC *et al.*; Chloroethanes: review of toxicity; Am Ind Hyg Assoc J 40 (3): a-46, a-48, a-50, a-52-a-60 (1979).

Harkov R *et al.*; J Environ Sci Health Part A A20 (5): 491-501 (1985)

USEPA; Ambient Water Quality Criteria Doc: Chlorinated Ethanes (1980) EPA 440/5-80-0269

USEPA/ECAO; Health Effects Assessment for 1,1,2,2-Tetrachloroethane (1986) EPA 540/1-86-032

ATSDR; Toxicological Profile for 1,1,2,2-Tetrachloroethane. 2002. U.S. Public Health Service.

DHEW/NCI; Bioassay of 1,1,2,2-Tetrachloroethane for Possible Carcinogenicity (1978) Technical Rpt Series No. 27 DHEW Pub No. (NIH) 78-827

Deguchi T; Osaka City Med J 21: 187 (1972) as cited in USEPA; Ambient Water Quality Criteria Doc: Chlorinated Ethanes p.C-40 (1980) EPA 440/5-80-0269]

Athur D Little, Inc.; Cell Transformation Assay of 11 Chlorinated Hydrocarbon Analogs, Final Report TCAIR work Assignment No. 10 (1983), EPA Document No. 40-8324457, Fiche No. Ots0509392

Naylor Dana Institute; DNA Repair Tests of 11 Chlorinated Hydrocarbon Analogs Final Report ICAIR work assignment no. 04. (1983), EPA Document No. 40-8324292, Fiche No. Ots0509403

U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS) on 1,1,2,2-Tetrachloroethane (79-34-5) from the National Library of Medicine's TOXNET System, August 12, 1994

SRI International; Investigations Of The Species Sensitivity And Mechanism Of Carcinogenicity Of Halogenated Hydrocarbons. (1984), EPA Document No. 40-8424225, Fiche No. Ots0509408

Tetrachloroethene

Tetrachloroethene (PCE) is readily absorbed following inhalation and oral exposure (ATSDR, 2002). Tetrachloroethene vapors and liquid also can be absorbed through the skin (USEPA 1985a,b). The principal toxic effects of tetrachloroethene in humans and animals following acute and longer-term exposures include CNS depression and fatty infiltration of the liver and kidney with concomitant changes in serum enzyme activity levels indicative of tissue damage (U.S. EPA 1985a,b; Buben and O'Flaherty 1985). Mice subchronically exposed to tetrachloroethene did not show any adverse liver effects at 20 mg/kg/day (Buben and O'Flaherty 1985).

In an NCI (1977) bioassay, increased incidence of hepatocellular carcinoma were observed in both sexes of B6C3F1 mice administered tetrachloroethylene (386–1,072 mg/kg/day) in corn oil by gavage for 78 weeks. Tetrachloroethene is currently under review by the Carcinogen Risk Assessment Verification Endeavor (CRAVE) and estimates of cancer potency were withdrawn by USEPA (1995). However, the USEPA National Center for Environmental Assessment currently classifies tetrachloroethene as a Group B2/C carcinogen (Probable/Possible Human Carcinogen).

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for tetrachloroethene.* Draft. U.S. Department of Health and Human Services. October.

Buben, J.A., and O'Flaherty, E.J. 1985. Delineation of the role of metabolism in the hepatotoxicity of trichloroethylene and perchloroethylene: A dose-effect study. *Toxicol. Appl. Pharmacol.* 78:105-122.

International Agency for Research on Cancer (IARC). 1979. *IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans. Vol. 20: Some Halogenated Hydrocarbons.* Lyon, France: World Health Organization.

National Cancer Institute (NCI). 1977. *Bioassay of tetrachloroethylene for possible carcinogenicity.* CAS No. 127-18-4. NCI Carcinogenesis Technical Report Series No. 13. DHEW (NIH) Publication No. 77-813

U.S. Environmental Protection Agency (USEPA). 1985a. *Health assessment document for tetrachloroethylene (perchloroethylene).* Washington, D.C.: Office of Health and Environmental Assessment. July 1985. EPA 600/8-82-005F.

U.S. Environmental Protection Agency (USEPA). 1985b. *Drinking water criteria Document for tetrachloroethylene.* Washington, D.C.: Office of Drinking Water, Criteria and Standards Division. June 1985.

U.S. Environmental Protection Agency (USEPA). 1995. *Health effects assessment summary tables.* Cincinnati, OH: Office of Health and Environmental Assessment, Environmental Assessment and Criteria Office, Washington, D.C.: Office of Solid Waste and Emergency Response, Office of Remedial Response. FY-1995.

1,2,3-Trichlorobenzene

1,2,3-Trichlorobenzene is usually present in a mixture of three trichlorobenzene isomers and has been used as a solvent in the manufacturing of chemicals, dyes and intermediates, dielectric fluid, synthetic transformer oils, lubricants, heat-transfer medium, and insecticides (Lewis, 1993). It is also used in degreasing agents, septic tank and drain cleaners, wood preservatives, and abrasive formulations (McNamara *et al.*, 1981). It is a white crystalline solid with an aromatic odor.

All three isomers of trichlorobenzene are absorbed from the GI tract, intact skin, and lung (USEPA, 1980). After oral administration of radioactively labeled 1,2,4-trichlorobenzene, the bladder, kidney, fat, skin, liver, and adrenals, showed high 1,2,4-trichlorobenzene activity up to 24 hr post treatment (Chu *et al.*, 1987). Lingg *et al.*, (1980) demonstrated that there is a sharp distinction between the types of conjugates formed by rats and rheusus monkeys. Glucuronide conjugates and unconjugated trichlorophenols comprised the majority of the urinary metabolites

after oral and i.v. administration of 1,2,4-trichlorobenzene to rheusus monkeys. Cysteine conjugates and isomers of trichlorothiophenol comprised the majority of the urinary metabolites after oral and i.v. administration of 1,2,4-trichlorobenzene to rats.

There is limited information regarding the human toxicity of 1,2,3-trichlorobenzene. Industrial experience has shown this compound to be a skin, eye and throat irritant. There is the potential for trichlorobenzene induced hepatic toxicity in situations where exposures to high concentrations are encountered (ACGIH, 1992). Prolonged dermal exposure may produce drying, cracking, and reddening of the skin. The rat oral LD_{50} in 1830 mg/kg.

Weanling rats fed 1,2,3-trichlorobenzene in the diet at levels up to 78 mg/kg/day for 13 weeks exhibited reduced weight gain and increased liver and kidney weights at high doses. Liver enzyme activity and blood chemistry were not affected by the treatment (Cote *et al.*, 1988)

Rats fed up to 600 mg/kg of 1,2,3-trichlorobenzene by stomach tube on days 6 through 15 of gestation exhibited no major signs of toxicity. Reduced body weight gain and increased liver and kidney weights and mild anemia were noted at high doses. There was no evidence of teratogenicity and fetotoxicity (Black *et al.*, 1988).

A positive result was reported in an in vivo micronucleus test in mice following intraperitoneal injection at a dose of 250 mg/kg. This route of exposure is not considered relevant to occupational situations (NIOSH, 2000).

American Conference of Governmental Industrial Hygienists, Inc. (ACGIH). 1992. Documentation of the Threshold Limit Values and Biological Exposure Indices. 6th ed. Volumes I, II, III. Cincinnati, OH: ACGIH, p. 1605.

Black *et al.*, 1988. Assessment of teratogenic potential of 1,2,3-, 1,2,4-, and 1,3,5-trichlorobenzenes in rats. Bull. Environ. Contam. Toxicol. Vol. 41, p. 719-726.

Cote *et al.*, 1988. Trichlorobenzenes: Results of a thirteen week feeding study in the rat. Drug Chem. Toxicol. Vol. 11, No. 1, p. 11-28.

Chu I, Murdoch, DJ., Villeneuve, DC, Viau, A. 1987. Tissue Distribution and Elimination of Trichlorobenzenes in the Rat. J Environ Sc Health Part B: Pesticides, Foods, Contaminants, and Agricultural Wastes, 22 (4): 439-53.

Lewis, R.J., Sr (Ed.). 1993. Hawley's Condensed Chemical Dictionary. 12th ed. New York, NY: Van Nostrand Rheinhold Co., p.1169.

Lingg, RD, Kaylor, WH, Pyle, SM, Kopfler, FC, Smith, CC, Wolfe, GF, Cragg, S. 1982.

Comparative Metabolism Of 1,2,4-Trichlorobenzene In The Rat And Rhesus Monkey. Drug Metab Dispos 10 (2): 134-41.

McNamara PW *et al*. 1981. Exposure and Risk Assessment for 1,2,4-Trichlorobenzene. USEPA-440/4-85-017.

NIOSH, 2000. Benzene, 1,2,3-trichloro. In: registry of Toxic Effect of Chemical Substances (RTECS). Last updated July 2000.

USEPA, 1980. Ambient Water Quality Criteria Doc: Chlorinated Benzenes p. C-35, EPA 440/5-80-028.

Trichloroethene

Absorption of trichloroethene (TCE) from the gastrointestinal tract is virtually complete. Absorption following inhalation exposure is proportional to concentration and duration of exposure (USEPA, 1985). TCE is a CNS depressant following acute and chronic exposures. In humans, single oral doses of 15–25 mL (21–35 grams) have resulted in vomiting and abdominal pain, followed by transient unconsciousness (Stephens, 1945). High-level exposure can result in death due to respiratory and cardiac failure (ATSDR, 2002). Hepatotoxicity has been reported in human and animal studies following acute exposure to TCE (ATSDR, 2002). Industrial use of TCE is often associated with adverse dermatological effects including reddening and skin burns on contact with the liquid form. These effects are usually the result of contact with concentrated solvent. However, no effects have been reported following exposure to TCE in dilute, aqueous solutions (USEPA, 1985).

TCE has caused significant increases in the incidence of hepatocellular carcinomas in mice (NCI, 1976), and renal tubular-cell neoplasms in rats exposed by gavage (NTP, 1983). TCE was mutagenic in *Salmonella typhimurium* and in *E. coli* (strain K-12), utilizing liver microsomes for activation (Greim *et al*., 1977).

USEPA is currently reviewing the carcinogenicity of TCE. The National Center for Environmental Assessment (NCEA) currently classifies TCE as a Group B2/C (Probable/Possible Human Carcinogen) based on inadequate evidence in humans and sufficient evidence of carcinogenicity from animal studies.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for trichloroethylene.* August 2002.

Greim, H., D. Bimboes, G. Egert, W. Giggelmann and M. Kramer. 1977. Mutagenicity and chromosomal aberrations as an analytical tool for *in vitro* detection of mammalian enzyme-mediated formation of reactive metabolites. *Arch. Toxicol.* 39:159.

National Cancer Institute (NCI). 1976. *Carcinogenesis bioassay of trichloroethylene.* CAS No. 79-01-6. Carcinogenesis Technical Report Series No. 2. PB-264 122.

National Toxicology Program (NTP). 1983. *Carcinogenesis studies of trichloroethylene (without epichlorohydrin), CAS No. 79-01-6, in F344/N rats and B6C3F$_1$ mice (gavage studies).* Draft. NTP 81-84, NTP TR 243. August 1983.

Stephens, C. 1945. Poisoning by accidental drinking of trichloroethylene. *Br. Med. J.* 2:218.

U.S. Environmental Protection Agency (USEPA). 1985. *Health assessment document for trichloroethylene.* Environmental Criteria and Assessment Office. EPA/600/8-82/006F.

Vinyl Chloride

Vinyl chloride, a colorless gas, is a halogenated aliphatic hydrocarbon with the empirical formula of C_2H_3Cl. It is used primarily as an intermediate in the manufacture of polyvinyl chloride (PVC); limited quantities are used as a refrigerant and as an intermediate in the production of chlorinated compounds (ATSDR, 2002).

Vinyl chloride is rapidly absorbed from the gastrointestinal tract. Metabolism of vinyl chloride occurs primarily in the liver via oxidation by hepatic microsomal enzymes to polar compounds which can be conjugated with glutathione and/or cysteine. These covalently bound metabolites are then excreted in the urine (U.S. EPA, 1980, 1985).

For the oral route of exposure, the primary target organ of vinyl chloride toxicity in animals is the liver. Chronic oral administration of 1.7-14.1 mg/kg/day of vinyl chloride induced dose-related increases in nonneoplastic lesions of the liver of rats (Feron *et al*., 1981). Evidence of developmental toxicity was seen in rats exposed to vinyl chloride during the first trimester of gestation (Ungvary *et al*., 1978).

The carcinogenicity of vinyl chloride in humans has been demonstrated in a number of epidemiological studies and case reports, many of which associated occupational exposure to vinyl chloride to the development of angiosarcomas of the liver (U.S. EPA, 1985). Vinyl chloride has been shown to be carcinogenic in numerous animal studies. Oral administration of vinyl chloride induced liver, lung, and kidney tumors in rodents (Feron *et al*., 1981; Maltoni, 1977). EPA has classified vinyl chloride as a Group A chemical, human carcinogen (U.S. EPA, 1985).

Xylenes

Xylenes are colorless liquid organic molecules with a sweet odor and a high degree of lipid solubility. There are three isomers of xylene: meta- ortho- and para-xylene (m-, o- and p-xylene,

respectively). The term "total xylenes" is used to designate a mixture of the three possible isomers, in any proportions. They are commonly used as industrial solvents, as components of paints, varnishes, cleaners, degreasers and gasoline and as chemical intermediates in the manufacture of other chemicals, plastics and synthetic fibers. Xylenes are volatile molecules and therefore, evaporate quickly. They are also flammable and may pose a fire hazard if handled improperly (ATSDR, 2002).

Xylenes are readily absorbed by all routes of exposure. Xylenes are very soluble in blood and therefore are absorbed easily into the systemic circulation during exposure (Astrand, 1982). Following absorption, distribution occurs rapidly to all organs, including fetal tissue, with greatest distribution occurring to organs having a high lipid content, such as adipose tissue, bone marrow and brain (Astrand, 1982; Engstron and Bjurstrom, 1978; Riihimaki *et al*., 1979). In humans, xylenes are primarily metabolized by the mixed function oxidase enzyme system to methylbenzyl alcohols which are further oxidized by alcohol and aldehyde dehydrogenase to yield methyl benzoic acids. The acids are readily conjugated and excreted in urine (Fishbein, 1985). In addition, a small percentage (3-6%) is exhaled unchanged due to the volatile nature of these compounds.

Human data suggests that the three xylene isomers all produce qualitatively similar effects, although the individual isomers are not necessarily equal in potency with regard to a given effect (ATSDR, 2002). Exposure, by any route, results in primarily central nervous system effects that may include headaches, nausea, mental confusion, narcosis, impaired learning and memory, dizziness, tremors, unconsciousness and coma, depending on dose and length of exposure. High doses may result in death. The respiratory system may also be a target of xylene toxicity in humans, producing respiratory tract irritation, pulmonary edema and inflammation after inhalation. Ocular irritation may result following exposure to xylene vapors. Skin irritation, dryness and scaling may result following dermal exposure. Limited data are available concerning effects of exposure on the hepatic, renal, cardiovascular, musculoskeletal or hematological system. Insufficient information is available regarding the developmental and reproductive toxicity of xylenes in humans.

Exposure to xylenes produces similar effects in humans and laboratory animals. The central nervous system is the primary target for both short-term and long-term exposures. Respiratory effects are observed following inhalation exposure. Data from animal studies provide limited evidence that xylene may produce cardiovascular effects (arrhythmias, atrial fibrillation and alterations in blood vessels and blood flow) (Morvai *et al*., 1976, 1987), hepatic effects (enzyme induction, increased liver weight, ultrastructural alterations) (Condie *et al*., 1988; Elovaara *et al*., 1980; Elovaara, 1982) and renal effects (enzyme induction, renal atrophy, tubular alterations) (Condie *et al*., 1988; Elovaara, 1982; Toftgard and Nilsen, 1982). These results suggest that humans might be at increased risk of developing such effects following exposure. Findings in animal studies suggest that xylenes may produce developmental defects including increased fetal death, decreased fetal weight, delayed skeletal development and gross anomalies (Marks *et al*., 1982; Ungvary *et al*., 1980). No animal data exists suggesting effects on reproductive organs, the

musculoskeletal system or hematological system.

Xylenes have been tested for genotoxicity in a variety of in vitro and in vivo assays. Results of the various assays indicate that xylenes are nongenotoxic following in vitro and in vivo exposure (ATSDR, 2002). No evidence of carcinogenicity exists in humans or laboratory animals (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for total xylenes.* U.S. Public Health Service.

Astrand, I. (1982) *Work load and uptake of solvents in tissues of man*. In: Mehlman, M.A., ed. Advances in modern environmental toxicology. Vol. 2, Princeton Junction, N.J.: Senate Press, pp. 141-152.

Condie, L.W., Hill, J.R. and Borzelleca, J.F. (1988) *Oral toxicology studies with xylene isomers and mixed xylenes*. Drug Chem. Toxicol. 11:329-354.

Elovaara, E. (1982) *Dose-related effects of m-xylene inhalation on the xenobiotic metabolism of the rat*. Xenobiotica 12:345-352.

Elovaara, E., Collan, Y. and Pfaffli, P. (1980) *The combined toxicity of technical grade xylene and ethanol in the rat*. Xenobiotica 10:435-445.

Engstrom, J. and Bjurstrom, R. (1978) *Exposure to xylene and ethylbenzene. II. Concentration in subcutaneous adipose tissue*. Scand. J. Work Environ. Health 4:195-203.

Fishbein, L. (1985) *An overview of the environmental and toxicological aspects of aromatic hydrocarbons: III. Xylene*. Sci. Total Environ. 43:165-183.

Marks, T.A., Ledoux, T.A. and Moore, J.A. (1982) *Teratogenicity of a commercial xylene mixture in the mouse*. J. Toxicol. Environ. Health 9:97-105.

Morvai, V., Hudak, A. and Ungvary, G. (1976) *ECG changes in benzene, toluene and xylene poisoned rats*. Acta. Med. Acad. Sci. Hung. 33:275-286.

Morvai, V., Ungvary, G. and Herrmann, H.J. (1987) *Effects of quantitative under nourishment, ethanol and xylene on coronary microvessels of rats*. Acta Morphol. Hung. 35:199-206.

Riihimaki, V., Pfaffli, P. and Savolainen, K. (1979) *Kinetics of m-xylene in man: General features of absorption, distribution, biotransformation and excretion in repetitive inhalation exposure*. Scand. J. Work Environ. Health 5:217-231.

Toftgard, R. and Nilsen, O.G. (1982) *Effects of xylene and xylene isomers on cytochrome P-450 and in vitro enzymatic activities in rat liver, kidney and lung*. Toxicology 23:197-212.

Ungvary, G., Tatrai, E., Hudak, A. (1980) *Studies on the embryo toxic effects of ortho-, meta- and para-xylene*. Toxicology 18:61-74.

SEMIVOLATILE ORGANICS

Atrazine

Atrazine (2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine), is a chlorinated triazine herbicide used to control certain weeds in corn, sorghum, sugarcane, pineapple, macadamia nuts, and citrus fruits. It is also used for general weed control on industrial and nonagricultural land.

Herbicides with atrazine as the active ingredient have been sold under trade names of Atrazine, AAtrex, Atratol, Gesaprim, and Zeaphos. Atrazine is also a component of other herbicides such as Alazine, Bicep, Bullet, Extrazine, Prozine, Rastra, Stuazine, and Tomahawk. Manufacturers of atrazine include Ciba-Geigy Corp., E.I. du Pont de Nemours and Co. Inc., Drexel Chemical Co., Oxon Italia, and Industria Prodotti Chimici.

Atrazine has been widely used in the United States since 1958. The most recent market estimates from the U.S. Environmental Protection Agency (EPA) show that more atrazine (70 to 90 million pounds of active ingredient annually) is used than any other U.S. pesticide, excluding wood preservatives.

According to the National Institute for Occupational Safety and Health, atrazine is a mild skin irritant and a severe eye irritant. The oral LD_{50}, the dose that will kill 50 percent of a population of test animals, is 672 milligrams per kilogram of body weight (mg/kg) in rats. If the human LD_{50} is similar, less than two ounces would be a toxic dose for a typical (70 kilogram) adult male.

Chronic toxicity tests of technical grade atrazine have demonstrated diminished weight gain, increased irritability, and probable anemia in rats. (The No Observable Effect Level (NOEL) for these effects was 70 parts per million (ppm). NOELs are used by EPA and other regulatory agencies to establish permissible exposure standards. Chronic feeding studies in dogs demonstrated increased mortality, decreased food consumption and weight gain, increased liver, ovary and heart weights (in females) with related electrocardiographic changes in the heart accompanied by detectable pathology in both sexes. (The NOEL for these effects was 15 ppm.) Other studies have also demonstrated changes in liver and kidney function.

Tests of atrazine's ability to cause cancer in rats using technical atrazine (the active ingredient only, not formulated products) found dose-related breast tumors in females and tumors in the testicles of males. Another rat study found a dose related increase in combined

leukemia/lymphoma (cancer of the lymph system) incidence, an increase in benign mammary tumors in males, and an increase in cancer of the uterus in females. Commercial (formulated) atrazine products given by injection under the skin or into the viscera of mice at 2 ppm resulted in the development of lymphomas and mesotheliomas (another cancer).

In humans, use of triazine herbicides has been associated with an increase in tumors of the ovary. Women previously exposed to triazines developed the tumors 2.7 times as frequently as unexposed women. A study of eastern Nebraska residents found that exposure to atrazine was associated with an elevated risk of another cancer, non-Hodgkin's lymphoma. Atrazine is classified by EPA as a possible human carcinogen (Class C) based on the increased incidence of mammary tumors in female rats.

While neither atrazine nor extracts from untreated plants appeared mutagenic, a water soluble extract from maize plants grown in the presence of Aatrex 80W (with active ingredient atrazine) contained a mutagenic agent(s) when tested on strains of yeast. Rats given high oral doses of atrazine suffered DNA lesions in the stomach, kidney, and liver. In addition, field tests with commercial atrazine products have demonstrated genotoxic effects on maize pollen.

Treatment of rat mothers with atrazine and one of its metabolites during pregnancy and nursing resulted in slow maturation of their offsprings' sexual organs. As a consequence, pituitary activity was modified in both male and female offspring, and certain hormone receptors were strongly inhibited.

Treatment of rat mothers with atrazine caused a reduction in the weight of their offspring. The NOEL for this effect was 0.5 mg/kg/day. Atrazine also produced a dose-related pattern of toxicity in the mothers, including mortality at high doses and decreases in food consumption, body weight, and body weight gain. The maternal NOEL was estimated to be 10 mg/kg per day. At high doses (700 mg/kg/day) maternal mortality was 78 percent and clinical signs included salivation, bloody vulvae, and swollen abdomens. Rabbits also experienced similar effects: bloody vulvae, reduction in feed consumption, body weight, and body weight gain in mothers. Reduced fetal weights, increased skeletal abnormalities, and increases in embryo loss were associated with this maternal toxicity. The maternal NOEL was 1 mg/kg/day and the fetal NOEL was 5 mg/kg/day.

U. S. EPA. 1989. Health advisory summary: Atrazine. Washington, D.C.

U. S. EPA. Office of Public Affairs. 1990. EPA restricts pesticide atrazine. Press advisory. Washington, D.C. (January 26.)

1991 Farm Chemicals Handbook.

Aspelin, A.L., A. H. Grube, and V. Kibler. 1991. *Pesticide Industry Sales and Usage: 1989 Market Estimates*. Washington, D.C.: U.S. EPA. Economic Analysis Branch.

U.S. Department of Health and Human Services. National Institute for Occupational Safety and Health. 1991. *Registry of Toxic Effects of Chemical Substances*. Cincinnati, OH.

California Department of Food and Agriculture. 1990. Summary of toxicology data: Atrazine. Sacramento, CA.

Santa Maria, C *et al*. 1986. Subacute atrazine effects on rat renal function. *Bull. Environ. Contam. Toxicol*. 36: 325-331.

Santa Maria, C., J Moreno and J.L. Lopez-Campos. 1987. Hepatotoxicity induced by the herbicide atrazine in the rat. *J. Appl. Toxicol.* 7(6) :373-378.

Pinter, A. *et al*. 1990. Long-term carcinogenicity bioassay of the herbicide atrazine in F344 rats. *Neoplasma* 37(5): 533 - 544.

Donna, A. *et al*. 1981. Preliminary experimental contribution to the study of possible carcinogenic activity of two herbicides containing atrazine-simazine and trifuralin as active principles. *Pathologica* 73: 707-721.

Donna, A. *et al*. 1989. Triazine herbicide and ovarian epithelial neoplasms. *Scand. J. Work Environ. Health* 15: 47-53.

Weisenburger, D.D. 1990. Environmental epidemiology of non-Hodgkin's lymphoma in eastern Nebraska. *Amer. J. Ind. Med.* 18: 303-305.

Plewa, M. and J. Gentile. 1976. Mutagenicity of atrazine: a maize-microbe bioassay. *Mutation Research* 38: 287-292.

Pino, A., A. Maura, and P. Grillo. 1988. DNA damage in stomach, kidney, liver, and lung of rats treated with atrazine. *Mutation Research.* 209: 145-147.

Plewa, M. *et al*. 1984. An evaluation of the genotoxic properties of herbicides following plant and animal activation. *Mutation Research* 136: 233-245.

Kniewald, J. *et al*. 1987. Indirect influence of s-triazines on rat gonadotropic mechanism at early postnatal period. *Journal of Steroid Biochemistry*. 27(4-6): 1095-1100.

Infurna, R. *et al*. 1988. Teratological evaluations of atrazine technical, a triazine herbicide, in rats and rabbits. *J. Toxicol. Environ. Health*. 24: 307-319.

U.S. EPA. Office of Drinking Water. 1988. Atrazine health advisory. Washington, D.C.

Bis(2-Chloroethyl)ether

Bis(2-chloroethyl)ether is a colorless nonflammable liquid with a strong unpleasant odor (ATSDR, 2002). The odor threshold for bis(2-chloroethyl)ether is 0.049 ppm (Amoore and Hautala, 1983). The chemical formula for bis(2-chloroethyl)ether is $C_4H_8Cl_2O$, and it has a molecular weight of 143.04 g/mol (ATSDR, 2002). The vapor pressure for bis(2-chloroethyl)ether is 0.71 mm Hg at 20 ^oC, and it has a log octanol/water partition coefficient (log K_{ow}) of 1.58. Bis(2-chloroethyl)ether is primarily used as a chemical intermediate for the manufacture of pesticides. A small amount of bis(2-chloroethyl)ether is used as a solvent. In the past, bis(2-chloroethyl)ether was used as a solvent for fats, waxes, greases, and esters. It has also been used as a constituent of paints and varnishes, as a cleaning fluid for textiles, and in the purification of oils and gasoline (ATSDR, 2002).

Acute (short-term) inhalation exposure to bis(2-chloroethyl)ether in humans results in extreme irritation of the respiratory tract and skin (ATSDR, 2002; Calabrese and Kenyon, 1991; HSDB, 1993). Animal studies have reported respiratory effects such as irritation of the nose and eyes; congestion, edema, and hemmorhage of the lung; congestion of the brain, liver, and kidneys; and central nervous system (CNS) effects from inhalation exposure to bis(2-chloroethyl)ether (ATSDR, 2002). Acute animal tests, such as the LC_{50} and LD_{50} tests in rats and mice, have shown bis(2-chloroethyl)ether to have high acute toxicity from inhalation and oral exposure and extreme acute toxicity from dermal exposure (ATSDR, 2002; RTECS, 1993).

No information is available on the chronic (long-term) effects of bis(2-chloro-ethyl)ether in humans (ATSDR, 2002). Animal studies have reported decreased body weights in rats exposed to bis(2-chloroethyl)ether orally (ATSDR, 2002).

No information is available on the developmental or reproductive effects of bis(2-chloroethyl)ether in humans (ATSDR, 2002). In one animal study, no effects were observed on the reproductive tissues of the animals, but no tests on reproductive function were performed (ATSDR, 2002).

No information is available on the carcinogenic effects of bis(2-chloroethyl)ether in humans (ATSDR, 2002). Animal studies have reported an increased incidence of liver tumors in mice exposed to bis(2-chloroethyl)ether via oral exposure (Calabrese and Kenyon; USEPA, 1993). EPA has classified bis(2-chloroethyl)ether as a Group B2, probable human carcinogen.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological Profile for Bis(2-Chloroethyl)ether*. U.S. Public Health Service.

E.J. Calabrese and E.M. Kenyon. *Air Toxics and Risk Assessment*. Lewis Publishers, Chelsea, MI. 1991.

U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.

U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.

U.S. Environmental Protection Agency. *Health Effects Assessment for Bis(2-Chloroethyl)ether*. EPA/600/8-88/023. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development, Cincinnati, OH. 1993.

J.E. Amoore and E. Hautala. Odor as an aid to chemical safety: Odor thresholds compared with threshold limit values and volatilities for 214 industrial chemicals in air and water dilution. *Journal of Applied Toxicology*, 3(6):272-290. 1983.

Naphthalene and 2-Methylnaphthalene

Naphthalene and 2-methylnaphthalene are members of the polycyclic aromatic hydrocarbon family. They are ubiquitous in nature and are both naturally occurring and man-made. Because the database for toxicological information on 2-methylnaphthalene is limited, its toxicity is generally assumed to be approximated by that of naphthalene.

Naphthalene is a white solid substance at room temperature. It has a distinct odor of mothballs or tar. Humidity and sunshine cause evaporation into the air within a few hours. When placed in water or soil, bacteria will destroy naphthalene, or will render it airborne within a few hours (ATSDR, 2002). Tobacco smoke is known to release 3 ug of naphthalene per cigarette (U.S. EPA, 1982). The compound is used in the production of dyes, solvents, lubricants, motor fuels (U.S. EPA, 1980) and is a major component of many moth ball preparations.

Humans can absorb naphthalene by dermal, inhalation and oral routes. Metabolism occurs via the P450 mixed function oxidase enzyme system to yield multiple intermediates which are then conjugated. Key metabolites are responsible for each toxicity endpoint following intraperitoneal administration: 2-naphthoquinones --> hemolysis; 1,2-naphthoquinones --> cataracts; 3-GSH adducts --> pulmonary toxicity (Buckpitt *et al*., 1984). Excretion of metabolites occurs via urine and feces (ATSDR, 2002).

Adults and children exposed to airborne naphthalene experience vomiting, abdominal pain and anemia (ATSDR, 2002). Most of the data is for inhalation of naphthalene from mothballs. The primary site of toxicity is the erythrocyte resulting in hemolytic crisis (hemolytic anemia). Jaundice is seen upon dermal, inhalation, and oral exposures, as are kidney effects (ATSDR, 2002). Near-blindness resulted in male and female subjects with 5 gram ingestion (ATSDR, 2002).

Oral doses in rats have hepatic effects. Dogs (1800 mg/kg) for 5 days of exposure showed signs of lethargy and ataxia, and decreased hemoglobin levels (ATSDR, 2002).

No studies of genotoxic effects in humans or laboratory animals were located. No human epidemiological evidence for cancer. Inconclusive evidence for cancer in rats and mice were found (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for naphthalene and 2-methylnapthalene.* U.S. Public Health Service.

Buckpitt, A. and Richieri, P. (1984) *Comparative biochemistry and metabolism: Part 2. Naphthalene lung toxicity.* Wright-Patterson Air Force Base, OH: Air Force Systems Command, Aerospace Medical Division. Air Force Aerospace Medical Research Laboratory. AFAMRL-TR-84-058.

U.S. Environmental Protection Agency (U.S. EPA) (1980) *Ambient water quality criteria for polycyclic aromatic hydrocarbons.* Office of Emergency and Remedial Response. Washington, DC.

3-Nitroaniline

3-Nitroaniline is a yellow crystalline solid material with a burning sweet odor that emits fumes of nitrogen oxides when heated. It is used primarily as a raw material for dyestuff materials.

Inhalation exposures in workers have been associated with cyanosis, headache, dizziness, nausea, confusion, convulsions, difficulty breathing and unconsciousness. Methemoglobinemia has been reported after acute exposure and liver injury after chronic exposure. Oral LD50s of 450 mg/kg (guinea pig), 535 mg/kg (rat), 308 mg/kg (mice) were noted (IRPTC).

In a rat 28-day gavage study, animals were dosed with concentrations of 15, 50 or 170 mg/kg-day. Cyanosis and methemoglobinemia were observed at a dose of 170 mg/kg-day. In creases in liver, kidney, and spleen weights were also noted in a dose-related fashion, along with a dose-related incidence in hemolytic anemia. Histological examination of tissues revealed lipofuscin deposition in the proximal renal tubules at the highest dose group, and hemosiderin deposition in the spleen, hepatocyte swelling, and erythroid hyperplasia in all dose groups. There were also some reproductive effects (e.g., testicular atrophy, decreased spermatogenesis) seen in males dosed at the highest concentration (Yoshida et al., 1991).

In a 42-day gavage study, male and female rats were dosed with 5, 15, or 50 mg/kg-day for 42 days (males) or from day 14 before mating through day 3 of lactation (females). High and mid-dose males and females revealed enlarged and/or dark colored spleens. Mating performance and fertility seemed unaffected by treatment. Two high-dose and 1 mid-dose female experienced difficult labour and all of their offspring dies by the day of parturition. There were not other reproductive or teratogenic effects noted (IRPTC).

3-Nitroaniline showed genotoxic effects in bacterial tests (e.g., Salmonella typhimurium strains TA98, TA100, TA1535, TA1537, TA1538), non-bacterial tests (e.coli. strain WP2 uvrA/pKM101), and in the micronucleus test using Crj:BDF1 mice.

IRPTC Data Profile. M-Nitroaniline.
www.inchem.org/documents/sids/sids/99092.pdf

Yoshida et al., 1991. *Twenty-eight day repeated dose toxicity test of m-nitroaniline in F344 rats.* Eisei Shikenjo Hokoku. Vo. 109:72-80.

Phenanthrene

Phenanthrene is a member of the polyaromatic hydrocarbons (PAH). PAHs constitute a class of non-polar compounds that contain two or more aromatic rings. They are ubiquitous in nature and are both naturally occurring and man-made. The database on the potential health effects of phenanthrene is limited.

Little data are available regarding the pharmacokinetics of phenanthrene. The intestinal absorption of phenanthrene is less dependent on the presence of bile in the stomach than is the absorption of the larger PAHs (such as benzo(a)pyrene) (Rahman *et al.*, 1986).

Phenanthrene has been shown to be a skin photosensitizer in humans (Sax, 1984). Phenanthrene has a reported LD 50 of 700 mg/kg in mice (Simmon *et al*., 1979). Rats injected intraperitoneally evidenced liver effects (Yoshikawa *et al.*, 1987).

There is equivocal evidence for cancer from dermal application of phenanthrene in rats (IARC, 1983). Phenanthrene is not a complete skin carcinogen (ATSDR, 2002). It is neither an initiator (LaVoie *et al.*, 1981; Roe, 1962) nor a promoter (Roe and Grant, 1964). Higgins and Yang (1962) reported no tumor production within two months after the ingestion of 200 mg of phenanthrene by rats. There are limited data that suggest that phenanthrene is mutagenic (Wood *et al*., 1979). However, the majority of tests are negative (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for polycyclic aromatic hydrocarbons.* U. S. Public Health Service.

Higgins, L. and Yang, Y. (1962) *Induction and extinction of mammary cancer*. Science 137:257-262.

International Agency for Research on Cancer (IARC) (1983) *Monograph on the evaluation of carcinogenic risk of chemicals to man, Phenanthrene*. 32:419-430.

LaVoie, K. *et al*. (1981) *Mutagenicity and tumor initiating activity and metabolism of phenanthrenes*. Cancer Res. 41:3441-3447.

Rahman, A., Barrowman, J.A., Rahimtula, A. (1986) *The influence of bile on the bioavailability of polynuclear aromatic hydrocarbons from the rat intestine*. Can J Physio Pharmacol 64:1214-1218.

Roe, F.J.C. (1962) *Effect of phenanthrene on tumour-initiation by 3,4-benzpyrene*. Br J Cancer 16:503-506.

Sax, N.I. (1984) *Dangerous Properties of Industrial Materials*. 6th edition. Van Nostrand Reinhold Company. N.Y.

Simmon, P. *et al*. (1979) *Mutagenic activity of chemicals carcinogens and related compounds in the intraperitoneal host-mediated assay*. J. Natl. Cancer Inst. 62:911-918.

Wood, R. *et al*. (1979) *Mutagenicity and tumorigenicity of phenanthrene and chrysene epoxides and diol epoxides*. Cancer Res. 39:4069-4077.

Yoshikawa, T. *et al*. (1987) *Toxicity of polycyclic aromatic hydrocarbons III. Effects of beta-naphtoflavone pretreatment on hepatotoxicity of compounds produced in the ozonation or NO2-nitration of phenanthrene and pyrene by rats.* Vetern Human Toxicol. 29:113-117.

Polycyclic Aromatic Hydrocarbons (Carcinogenic)

Polycyclic aromatic hydrocarbons (PAHs) occur in the environment as complex mixtures containing numerous PAHs of varying carcinogenic potencies. Only a few components of these mixtures have been adequately characterized, and only limited information is available on the relative potencies of different compounds.

PAH absorption following oral exposure is inferred from the demonstrated toxicity of PAHs following ingestion (USEPA, 1984a). PAHs are also absorbed following dermal exposure (Kao *et al*., 1985). Acute effects from direct contact with PAHs and related materials are limited primarily to phototoxicity; the primary effect is dermatitis (NIOSH, 1977). PAHs have also been shown to cause cytotoxicity in rapidly proliferating cells throughout the body; the hematopoietic system, lymphoid system, and testes are frequent targets (Santodonato *et al*., 1981). Destruction of the sebaceous glands, hyperkeratosis, hyperplasia, and ulceration have been observed in mouse skin following dermal application of the cPAHs (Santodonato *et al*., 1981). Benzo(a)pyrene has also been shown to have an immunosuppressive effect in animals (ATSDR, 2002). Nonneoplastic lesions have been observed in animals exposed to the more potent cPAHs, but only after exposure to levels well above those required to elicit a carcinogenic response. Benzo(a)pyrene has been demonstrated to induce adverse developmental and reproductive effects in experimental animals following oral exposure (ATSDR, 2002). These effects were manifested as reduced pup weights during postnatal development, sterility, reduced fertility, and an increased incidence of stillborns and resorptions (ATSDR, 2002). cPAHs are believed to induce tumors both at the site of application and systemically. Studies in laboratory animals have demonstrated that the cPAHs benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene,

dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene have the ability to induce skin tumors following dermal exposure (ATSDR, 2002). Neal and Rigdon (1967) reported that oral administration of 250 ppm benzo(a)pyrene for approximately 110 days led to forestomach tumors in mice.

Benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene are classified by USEPA in Group B2—Probable Human Carcinogen. USEPA has developed an oral slope factor for benzo(a)pyrene. Oral cancer slope factors for the other six cPAHs are derived by applying relative potency factors developed by USEPA (1993) to the oral slope factor for benzo(a)pyrene.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for polycyclic aromatic hydrocarbons (PAHs).* August 2002.

Brune, H., R.P. Deutsch-Wenzel, M. Habs, S. Ivankovic and D. Schmhl. 1981. Investigation of the tumorigenic response to benzo(a)pyrene in aqueous caffeine solution applied orally to Sprague-Dawley rats. *J. Cancer Res. Clin. Oncol.* 102:153-57.

Kao, J.K., F.K. Patterson and J. Hall. 1985. Skin penetration and metabolism of topically applied chemicals in six mammalian species including man: An *in vitro* study with benzo[a]pyrene and testosterone. *Toxicol. Appl. Pharmacol.* 81:502-516.

National Institute for Occupational Safety and Health (NIOSH). 1977. *Criteria for a Recommended Standard—Occupational Exposure to Coal Tar Products.* DHEW (NIOSH) 78-107.

Neal, J. and R.H. Rigdon. 1967. Gastric tumors in mice fed benzo(a)pyrene: A quantitative study. *Tex. Rep. Biol. Med.* 25:553-557.

Rabstein, L.S., R.L. Peters and G.H. Spahn. 1973. Spontaneous tumors an pathologic lesions in SWR/J mice. *J. Natl. Cancer Inst.* 50:751-758.

Santodonato, J., P. Howard and D. Basu. 1981. Health and ecological assessment of polynuclear aromatic hydrocarbons. *J. Environ. Pathol. Toxicol.* 5:1-364.

U.S. Environmental Protection Agency (USEPA). 1984. *Health effects assessment for polycyclic aromatic hydrocarbons (PAHs).* Environmental Criteria and Assessment Office. EPA 540/1-86-013. September 1984.

U.S. Environmental Protection Agency (USEPA). 1993. *Provisional guidance for quantitative risk assessment of polycyclic aromatic hydrocarbons.* Office of Research and Development. EPA/600/R-93/089. July 1993.

PESTICIDES AND POLYCHLORINATED BIPHENYLS

Dieldrin

Dieldrin is a chlorinated cyclodiene insecticide that is structurally related to aldrin. Both aldrin and dieldrin are well absorbed through the lungs, skin, and gastrointestinal tract (Shell, 1984; Heath and Vanderkar, 1964; Hunter and Robinson, 1967, 1969; Sundaram *et al*., 1978a,b; Iatropoulous *et al*., 1975). Aldrin is metabolically converted to dieldrin in fatty tissues (ACGIH, 1986) and both are considered to have similar chemical and toxic effects (USEPA, 1988). Several human and animal studies have shown that adipose tissue is the primary storage depot for dieldrin, followed by the liver, brain, and whole blood (ATSDR, 2002).

Acute symptoms of dieldrin intoxication in humans and animals following ingestion or inhalation indicate CNS stimulation manifested primarily as irritability, salivation, tremors, and convulsions. Experimental studies indicate that dogs exposed for longer periods of time to levels as low as 1 mg/kg developed hepatic and renal toxicity (Fitzhugh *et al*., 1964; Treon and Cleveland, 1955; Walker *et al*., 1969). Rats fed dieldrin for 2 years developed hepatic lesions and nephritis at doses of 0.5 and 50 ppm, respectively (Fitzhugh *et al*., 1964).

Dieldrin produced fetotoxic and/or teratogenic effects in hamsters fed a single oral dose of 50 mg/kg (approximately 84 ppm) and in mice fed a single oral dose of 25 mg/kg (approximately 6 ppm) (Ottolenghi *et al*., 1974). Dieldrin produced marked effects on fertility, gestation, viability, and lactation in mice given 25 mg/kg-day in a six-generation study (Deichmann, 1972).

Dieldrin produces chromosomal aberrations in mouse, rat, and human cells and unscheduled DNA synthesis in rats and humans (Probst *et al*., 1981). Chronic oral exposure to dieldrin has produced an increase in hepatocellular tumors in mice (Davis, 1965; Epstein, 1975; NCI, 1978). In contrast, chronic feeding studies with dieldrin in rats indicate that exposure was associated with nonneoplastic changes in the liver (NCI, 1978; Fitzhugh *et al*., 1964). Ingestion of dieldrin by laboratory animals results in a decreased immune response (Loose 1982; Loose *et al*., 1981).

USEPA classified dieldrin as group B2 - Probable Human Carcinogen based on the increased incidence of liver carcinoma observed in male and female C3H mice (Davis, 1965; Epstein, 1975) and in male B6C3F1 mice (NCI, 1978).

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for aldrin/dieldrin.* April 2002.

American Conference of Governmental Industrial Hygienists (ACGIH). 1986. *Documentation of the threshold limit values and biological exposure indices.* 5th ed. Cincinnati: ACGIH. pp. 17, 196.

Davis, L. 1965. Pathology report on mice fed dieldrin, aldrin, heptachlor, or heptachlor epoxide for two years. Internal FDA memorandum to Dr. A.J. Lehrman, July 19, 1965.

Deichmann, W. 1972. Toxicology of DDT and related chlorinated hydrocarbon pesticides. *J. Occup. Med.* 14:285.

Epstein, S. 1975. The carcinogenicity of dieldrin. Part 1. *Sci. Total Environ.* 4:1-52.

Fitzhugh, O., A. Nelson and M. Quaife. 1964. Chronic oral toxicity of aldrin and dieldrin in rats and dogs. *Food Cosmet. Toxicol.* 2:551-562.

Heath, D. and M. Vandekar. 1964. Toxicity and metabolism of dieldrin in rats. *Br. J. Ind. Med.* 21:269-279.

Hunter, C. and J. Robinson. 1967. Pharmacodynamics of dieldrin (HEOD). I.. Ingestion by human subjects for 18 months. *Arch. Environ. Health* 15:614-626.

Hunter, C. and J. Robinson. 1969. Pharmacodynamics of dieldrin (HEOD) ingestion by human subjects for 18 to 24 months, and postexposure for 8 months. *Arch. Environ. Health* 18:12-21.

Loose, L.D. 1982. Macrophage induction of T-suppressor cells in pesticide-exposed and protozoan-infected mice. *Environ. Health Perspect.* 43:89-97.

Loose, L.D., J.B. Silkworth and T. Charbonneau. 1981. Environmental chemical induced macrophage dysfunction. *Environ. Health Perspect.* 39:79-92.

Iatropoulos, M., A. Milling, W. Miller, G. Nohynek, K. Rozman, F. Coulston and F. Korte. 1975. Absorption, transport, and organotropism of dichlorobiphenyl (DCB), dieldrin, and hexachlorobenzene (HCB) in rats. *Environ. Res.* 10:384-389.

National Cancer Institute (NCI). 1978. *Bioassay of aldrin and dieldrin for possible carcinogenicity.* DHEW Publication No. (NIH) 78-821. Technical Report Series No. 21.

Ottolenghi, A., J. Haseman and F. Suggs. 1974. Teratogenic effects of aldrin, dieldrin, and endrin in hamsters and mice. *Teratology* 9:11-16.

Probst, G., R. McMahon, L. Hill, D. Thompson, J. Epp and S. Neal. 1981. Chemically-induced unscheduled DNA synthesis in primary rat hepatocyte cultures: A comparison with bacterial mutagenicity using 218 chemicals. *Environ. Mutagenesis* 3:11-32.

Shell. 1984. *Review of mammalian and human toxicology, aldrin and dieldrin.* Review series HSE 84.003. Shell International Petroleum Maatschappij. B.V. The Hague.

Sundaram, K., V. Damodaran and T. Venkitasubramanian. 1978a. Absorption of dieldrin through monkey and dog skin. *Indian J. Exp. Biol.* 16:101-103.

Sundaram, K., V. Damodaran and T. Venkitasubramanian. 1978b. Absorption of dieldrin through skin. *Indian J. Exp. Biol.* 16:1004-1007.

Treon, J. and F. Cleveland. 1955. Toxicity of certain chlorinated hydrogen insecticides for laboratory animals, with special reference to aldrin and dieldrin. *Agric. Food Chem.* 3:402-408.

U.S. Environmental Protection Agency (USEPA). 1988. *Chemical profiles for extremely hazardous substances. Aldrin.* June 1988.

Walker, A., D. Stevenson, J. Robinson, E. Thorpe and M. Roberts. 1969. The toxicology and pharmacodynamics of dieldrin (HEOD): Two-year oral exposures of rats and dogs. *Toxicol. Appl. Pharmacol.* 15:345-373.

INORGANICS

Aluminum

Aluminum is the most abundant metal in the earth's crust. Therefore, it is widely dsitributed and constitutes approximately 8 percent of the earth's surface layer. However, aluminum is a reactive element and is never found as a free metal in nature. It is typically found in combination with oxygen, silicon, and fluorine in soil, minerals, rocks, and clays. Aluminum is also found in water in either the dissolved or ionic form. Aluminum metal is light in weight and silvery-white in appearance. It is used to make beverage cans, pots, pans, airplanes, siding, roofing, and foil. Since pure aluminum is very soft, it is often mixed with small amounts of other metals to form aluminum alloys which are stronger and harder. Aluminum compounds are used in water-treatment plants, abrasives, furnace linings, explosives, and fire works. They are also found in antacids, astrignets, buffered aspirin, food additives, and antiperspirants.

Naturally occurring aluminum is redistributed in the environment by human activities. High levels of aluminum can be mobilized into the environment by mining, the processing of ores, and the production of aluminum metals and alloys. Acidic pH, found in some surface water bodies impacted by acid rain, may also increase the ability of aluminum to dissolve and enter lakes and streams. Aluminum can not be destroyed, but it can change form or be attached to or become separated from particles. It is not known to bioaccumulate in the food chain.

Routes of exposure may include the oral, dermal, and inhalation routes. Absorption into the body is dependent on the form of aluminum (e.g., soluble or insoluble forms). The higher the solubility, the higher the potential hazard associated with the particular form of aluminum. Most aluminum ingested leaves the body quickly in feces, suggesting minimal absorptive capacity. The small amount of aluminum absorbed into the bloodstream will be excreted in urine. Most studies indicate that oral absorption does not exceed 1%, even in children.

Workers exposed to high levels of airborne aluminum may experience coughing, decreased pulmonary function, and decreased performance in tests designed to evaluate nervous system

function. Individuals with kidney disease are unable to efficiently eliminate aluminum in urine and may be at risk of developing aluminum-related effects (e.g., bone or brain diseases). Bone disease has also been noted in children taking medicines containing aluminum. Some studies have suggested an association between high aluminum levels and Alzheimer's Disease. However, these reports have not been consistently confirmed by further study. People have also reported skin rashes from the aluminum compounds present in antiperspirants.

Similar to humans, rodents showed signs of respiratory impairment after breathing high levels of aluminum-containing dusts. Elevated lethality was noted in animals dosed with high levels of aluminum in drinking water. Aluminum does not appear to adversely affect reproductive success in animals, or to cause birth defects in the offspring of exposed females. However, effects on the nervous system of neonatal animals have been noted. Animals exposed to aluminum appeared weaker and less active than control animals, and some movements appeared less coordinated than those noted in animals without treatment. Aluminum also made some animals less tolerant to high temperatures.

Due to a lack of specific information concerning the potential carcinogenicity of aluminum, this compound is classified into category "D" - not classifiable as to carcinogenicity.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for aluminum.* October 2002.

Antimony

Antimony is a metal which occurs both in the trivalent and pentavalent oxidation states (USEPA, 1980). Absorption of this metal via oral routes of exposure is low (10% for antimony, tartrate; 1% for all other forms) (ATSDR, 2002). Organic antimony is more toxic than the inorganic compounds due to increased absorption. Humans and animals exposed acutely by oral or inhalation exposures to either the trivalent or pentavalent forms of antimony displayed electrocardiogram (ECG) changes and myocardial lesions (USEPA, 1980). Pneumoconiosis has been observed in humans exposed by acute inhalation and dermatitis has occurred in individuals exposed either orally or dermally. Following acute oral exposure to antimony trioxide or potassium antimony tartrate, both humans and laboratory animals (dogs) manifested nausea and vomiting (ATSDR, 2002). Humans and laboratory animals (i.e., rat and pig) chronically exposed to antimony compounds (antimony trioxide, pentoxide, and trisulfide) via inhalation manifested respiratory effects including macrophage proliferation, fibrosis and pneumonia at LOAELs ranging from 0.046 to 86.3 mg/m^3 (ATSDR, 2002). Chronic oral exposure in rats (0.35 mg/kg-day) resulted in altered blood glucose and blood cholesterol levels and decreased lifespan (Schroeder *et al*., 1970). A single report (Balyeava, 1967) noted an increase in spontaneous abortions, premature births, and gynecological problems in 318 female workers exposed to a mixture of antimony metal, antimony trioxide, and antimony pentasulfide dusts. No change in the incidence of cancer was observed in laboratory animals (i.e., rats, mice) fed 0.262 or 0.35 mg/kg-day antimony as potassium antimony tartrate for a lifetime.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for antimony*. October 2002.

Balyaeva, A.P. 1967. The effects of antimony on reproduction. *Gig. Truda Prof. Zabol*. 11:32.

Schroeder, H.A., M. Mitchner and A.P. Nasor. 1970. Zirconium, niobium, antimony, vanadium, and lead in rats: Life-term studies. *J. Nutr*. 4100:59-66.

U.S. Environmental Protection Agency (USEPA). 1980. *Ambient water quality criteria for antimony*. Office of Water Regulations and Standards.

Arsenic

Arsenic is difficult to characterize as a single analyte because it has complex chemistry. It may be trivalent or pentavalent and is widely distributed in nature (ATSDR, 2002). Both inorganic and organic forms of arsenic are readily absorbed via oral and inhalation routes. Soluble forms are more readily absorbed than insoluble forms (USEPA, 1984). Approximately 95% of soluble inorganic arsenic administered to rats is absorbed from the gastrointestinal tract (Coulson *et al*., 1935; Ray-Bettley and O'Shea, 1975). Approximately 70–80% of arsenic deposited in the respiratory tract of humans has been shown to be absorbed (Holland *et al*., 1959). Dermal absorption of the insoluble forms of arsenic is not significant (USEPA, 1984). At mining sites, arsenic is expected to occur in naturally occurring mineral assemblages with considerably lower bioavailability than expected in soluble inorganic arsenic salts (Davis *et al*., 1992).

Acute exposure in humans by ingestion of metallic arsenic has been associated with gastrointestinal effects, hemolysis, and neuropathy (USEPA, 1984). Chronic human arsenicism (by drinking water ingestion) is associated with increased risk of nonmelanoma, typically nonlethal, skin cancer and a peripheral vascular disorder that results in gangrene of the extremities, especially feet, known as blackfoot disease (Tseng, 1977). Additionally, there is strong evidence to suggest ingested inorganic arsenic causes cancers of the bladder, kidney, lung, and liver, and possibly other sites (Bates *et al*., 1992; Chen *et al*., 1992; Chen *et al*., 1986). It is well known that hyperpigmentation and keratosis are also associated with chronic arsenicism (Neubauer, 1947) and arsenic can produce toxic effects on both the peripheral and CNS, precancerous dermal lesions, and cardiovascular damage (USEPA, 1984; Tseng, 1977). Arsenic is embryotoxic, fetotoxic, and teratogenic in several animal species (USEPA, 1984). No evidence of reproductive toxicity was found (Calabrese and Kenyon, 1991). Epidemiological studies of workers in smelters and in plants manufacturing arsenical pesticides have shown inhalation of arsenic is strongly associated with lung cancer and less so, with hepatic angiosarcoma (USEPA, 1984).

There is substantial evidence that establishes the nutritional essentiality of trace levels of arsenic. Deficiency has been shown to depress growth and impair reproduction in rats, minipigs, chickens, and goats (USEPA, 1988; NRC, 1989). Methylation of arsenic to less toxic, more rapidly excreted chemical species provides an effective detoxification mechanism *in vivo*. In humans, this

system may become saturated at daily oral intake rates greater than 250–1,000 µg/day. For this reason, the dose-response curve for arsenic, for carcinogenicity and systemic toxicity, may have nonlinearities, i.e., a portion of the dose-response curve exists over which increases in dose do not result in comparable increases in physiological response (Petito and Beck, 1990).

USEPA classified arsenic as Group A - Human Carcinogen based on two epidemiological studies (Tseng *et al*., 1968; Tseng, 1977) which indicated an increased incidence of skin cancer in individuals exposed to arsenic in drinking water.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for arsenic*. April 2002.

Bates, M.N., A.H. Smith and C. Hopenhayn-Rich. 1992. Arsenic ingestion and internal cancers: a review. *Am. J. Epidemiol.* 135:462-476.

Calabrese, E.J. and E.M. Kenyon. 1991. *Air toxics and risk assessment*. Chelsea, MI: Lewis Publishers, Inc.

Chen, C-J., C-W. Chen, M-M. Wu and T-L. Kuo. 1992. Cancer potential in liver, lung, bladder, and kidney due to ingested inorganic arsenic in drinking water. *Br. J. Cancer* 66:888-892.

Chen, C-J., Y. Chuang, S. You, T. Lin and H. Wu. 1986. A retrospective study on malignant neoplasms of bladder, lung, and liver in blackfoot disease endemic area in Taiwan. *Br. J. Cancer* 53:399-405.

Coulson, E.J., R.E. Remington and K.M. Lynch. 1935. Metabolism in the rat of the naturally occurring arsenic of shrimp as compared with arsenic trioxide. *J. Nutr.* 10:255-270.

Davis, A., M.V. Ruby and P.D. Bergstrom. 1992. Bioavailability of arsenic and lead in soils from the Butte, Montana Mining District. *Environ. Sci. Technol.* 26:461-468.

Holland, R.H., M.S. McCall and H.C. Lanz. 1959. A study of inhaled arsenic-74 in man. *Cancer Res.* 19:1154-1156.

National Research Council (NRC). 1989. *Recommended dietary allowances*. National Academy Press.

Neubauer, O. 1947. Arsenical cancer — a review. *Br. J. Cancer* 1:192.

Petito, C.T. and B.D. Beck. 1990. Evaluation of evidence of nonlinearities in the dose-response curve for arsenic carcinogenesis. *Trace Sub. Environ. Health* 24:143-176.

Ray-Bettley, F. and J.A. O'Shea. 1975. The absorption of arsenic and its relation to carcinoma. *Br. J. Dermatol.* 92:563-568.

Tseng, W.P. 1977. Effects and dose-response relationships of skin cancer and blackfoot disease with arsenic. *Environ. Health Perspect.* 19:109-119.

Tseng, W.P., H.M. Chu, S.W. How, J.M. Fong, C.S. Lin and S. Yen. 1968. Prevalence of skin cancer in an endemic area of chronic arsenicism in Taiwan. *J. Natl. Cancer Inst.* 40:453-463.

U.S. Environmental Protection Agency (USEPA). 1984. *Health assessment document for inorganic arsenic.* Office of Health and Environmental Assessment. EPA 600/8-83-021F.

U.S. Environmental Protection Agency (USEPA). 1988. *Special report on ingested inorganic arsenic skin cancer: nutritional essentiality.* EPA/625/3-87/013F. July 1988.

Barium

The soluble salts of barium, an alkaline earth metal, are toxic in mammalian systems. They are absorbed rapidly from the gastrointestinal tract and are deposited in the muscles, lungs, and bone. Barium is excreted primarily in the feces.

At low doses, barium acts as a muscle stimulant and at higher doses affects the nervous system eventually leading to paralysis. Acute and subchronic oral doses of barium cause vomiting and diarrhea, followed by decreased heart rate and elevated blood pressure. Higher doses result in cardiac irregularities, weakness, tremors, anxiety, and dyspnea. A drop in serum potassium may account for some of the symptoms. Death can occur from cardiac and respiratory failure. Acute doses around 800 milligrams can be fatal to humans.

Subchronic and chronic oral or inhalation exposure primarily affects the cardiovascular system resulting in elevated blood pressure. A lowest-observed-adverse-effect level (LOAEL) of 0.51 mg barium/kg/day based on increased blood pressure was observed in chronic oral rat studies (Perry *et al.*, 1983), whereas human studies identified a no-observed-adverse-effect level (NOAEL) of 0.21 mg barium/kg/day (Wones *et al.*, 1990, Brenniman and Levy 1984). In the Wones *et al.* study, human volunteers were given barium up to 10 mg/L in drinking water for 10 weeks. No clinically significant effects were observed. An epidemiological study was conducted by Brenniman and Levy in which human populations ingesting 2 to 10 mg/L of barium in drinking water were compared to a population ingesting 0 to 0.2 mg/L. No significant individual differences were seen; however, a significantly higher mortality rate from all combined cardiovascular diseases was observed with the higher barium level in the 65+ age group. The average barium concentration was 7.3 mg/L, which corresponds to a dose of 0.20 mg/kg/day.

Subchronic and chronic inhalation exposure of human populations to barium-containing dust can result in a benign pneumoconiosis called “baritosis.” This condition is often accompanied by an elevated blood pressure but does not result in a change in pulmonary function. Exposure to an air concentration of 5.2 mg barium carbonate/m^3 for 4 hours/day for 6 months has been reported to result in elevated blood pressure and decreased body weight gain in rats (Tarasenko *et al*., 1977). Reproduction and developmental effects were also observed. Increased fetal mortality was seen

after untreated females were mated with males exposed to 5.2 mg/m^3 of barium carbonate. Similar results were obtained with female rats treated with 13.4 mg barium carbonate/m^3.

Barium has not been evaluated by the USEPA for evidence of human carcinogenic potential

Brenniman, G. R. and P. S. Levy. 1984. High barium levels in public drinking water and its association with elevated blood pressure. In: *Advances in Modern Toxicology IX*, E. J. Calabrese, Ed. Princeton Scientific Publications, Princeton, NJ. pp. 231–249.

Perry, H. M., S. J. Kopp, M. W. Erlanger, and E. F. Perry. 1983. Cardiovascular effects of chronic barium ingestion. In: *Trace Substances in Environmental Health*, XVII, D. D. Hemphill, ed. Proc. Univ. Missouri's 17th Ann. Conf. on Trace Substances in Environmental Health. University of Missouri Press, Columbia, MO. pp. 155–164.

Tarasenko, M, O. Promin, and A. Silayev. 1977. Barium compounds as industrial poisons (an experimental study). *J. Hyg. Epidem. Microbiol. Immunol*. 21:361–373.

Wones, R. G., B. L. Stadler, and L. A. Frohman. 1990. Lack of effect of drinking water barium on cardiovascular risk factor. *Environ. Health Perspect*. 85:1–13.

Cadmium

Gastrointestinal absorption of cadmium in humans ranges from 5 to 6% (USEPA, 1985a). Based on a comprehensive model for inhaled cadmium, the deposition rate of particulate airborne cadmium is 5–50% (i.e., 5% of particles greater than 10 microns and up to 50% of particles less than 0.1 microns), and 50–100% of the cadmium deposited was absorbed (Nordberg *et al*., 1985). Cadmium bioaccumulates in humans, particularly in the kidney and liver (USEPA, 1985a,b). Acute oral exposure to cadmium in laboratory animals resulted in systemic, immunological, neurological, developmental, and reproductive effects at doses of 2–138 mg/kg-day (ATSDR, 2002). Chronic oral or inhalation exposure of humans to cadmium has been associated with renal dysfunction, itai-itai disease (bone damage), hypertension, anemia, endocrine alterations, and immunosuppression. Renal toxicity occurs in humans chronically exposed to cadmium in food at LOAEL of 0.0075 mg/kg-day. In laboratory animals (i.e., rat, mouse) chronic oral exposure to cadmium results in increased blood pressure, hematological, and renal effects at LOAELs ranging from 0.014 to 57 mg/kg-day (ATSDR, 2002). Teratogenic and reproductive effects (i.e., deceased fetal and birth weight, delayed ossification, behavioral impairment, and reduced fertility) were reported in laboratory animals (i.e., rat, mice, dogs) subchronically exposed to cadmium in drinking water at LOAELs ranging from 0.04 to 40 mg/kg-day (ATSDR, 2002). Epidemiological studies have demonstrated a strong association between inhalation exposure to cadmium and cancers of the lung, kidney, and prostate (USEPA, 1985b; Thun *et al*., 1985). In experimental animals, cadmium induces injection-site sarcomas and testicular tumors. When administered by inhalation, cadmium chloride is a potent pulmonary carcinogen in rats. Cadmium is a well-documented animal teratogen (USEPA, 1985b).

USEPA classified cadmium as Group B1 - Probable Human Carcinogen by inhalation. This classification applies to agents for which there is limited evidence of carcinogenicity in humans from epidemiologic studies.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for cadmium.* April 2002.

Friberg, L., M. Piscator, G.F. Nordberg and T. Kjellstrom. 1974. *Cadmium in the environment*, 2nd ed. Boca Raton, FL: CRC Press, Inc.

Nordberg, G.F., T. Kjellstrom and M. Nordberg. 1985. Kinetics and metabolism. In: *Cadmium and health: A toxicological and epidemiological appraisal. Vol I. Exposure, dose, and metabolism*, eds. L. Friberg, C.G. Elinder, T. Kjellstrom, et al. Boca Raton, FL: CRC Press. pp. 103-178.

Thun, M.J., T.M. Schnorr, A.B. Smith, W.E. Halperin and B.A. Lemen. 1985. Mortality among a cohort of U.S. cadmium production workers—an update. *J. Natl. Cancer Inst.* 74:325-333.

U.S. Environmental Protection Agency (USEPA). 1985a. *Drinking water criteria document for cadmium. Final draft.* Office of Drinking Water. PB86-117934. April 1985.

U.S. Environmental Protection Agency (USEPA). 1985b. *Updated mutagenicity and carcinogenicity assessment of cadmium. Addendum to the health assessment document for cadmium (May 1981; EPA/600/8-81/023).* Office of Health and Environmental Assessment. EPA 600/8-83-025F. June 1985.

Chromium

Chromium exists in two states, as chromium (III) and as chromium (VI). Following oral exposure, absorption of chromium (III) has been reported to be 0.4% while absorption of chromium (VI) has been observed to be as high as 10% (ATSDR, 2002). However, chromium (VI) is rapidly reduced to chromium (III) after penetration of biological membranes and in the gastric environment (ATSDR, 2002). Chromium is an essential micronutrient and is not toxic in trace quantities (USEPA, 1980).

Alterations in liver enzyme activities were noted in rats administered an oral dose of 13.5 mg/kg-day chromium (VI) for 20 days (Kumar *et al*., 1985). Rats subchronically administered higher concentrations of chromium VI (98 mg/kg-day) have exhibited adverse effects on renal function (Diaz-Mayans *et al*., 1986). No significant changes, however, were detected in the livers or kidneys of rats exposed to 2.7 mg/kg-day or 3.5 mg/kg-day chromium (III) or chromium (VI), respectively, in the drinking water for 1 year (MacKenzie *et al*., 1958; ATSDR, 2002). CNS effects including hypoactivity have been reported in rats when exposed to subchronic levels of 98 mg/kg-day chromium VI in drinking water (Diaz-Mayans *et al*., 1986).

Workers exposed to 2 µg/m^3 chromic acid vapors (mean duration of 2.5 years), a soluble chromium (VI) compound, exhibited atrophy and ulceration of the nasal mucosa and transient decrease in lung function (Lindberg and Hedenstierna, 1983). There is, however, insufficient scientific evidence that chromium (III) compounds by themselves elicit atrophy of the nasal mucosa or adverse respiratory effects in humans (ATSDR, 2002). Furthermore, epidemiological studies of worker populations have clearly established that inhaled chromium (VI) is a human carcinogen; the respiratory passages and the lungs are the target organs (Mancuso, 1975; USEPA, 1984).

Inhalation of chromium (III) or ingestion of chromium (VI) or (III) has not been associated with carcinogenicity in humans or experimental animals (USEPA, 1984). Oral exposure of pregnant mice (gestational days, 1 to 19) to 57 mg/kg-day chromium (VI) resulted in embryolethal effects (e.g., increased resorptions and postimplantation loss), reduced ossification and gross anomalies (Trivedi *et al.*, 1989). Chromium (III) does not appear to cause fetotoxic or teratogenic effects in rats (ATSDR, 2002). Reproductive effects in the form of decreased sperm count were noted in mice administered oral doses of 4.6 mg/kg-day chromium (VI) (225 ppm) and 3.5 mg/kg-day chromium (III) (172 ppm) for 7 weeks (Zahid *et al*., 1990).

USEPA classified inhaled chromium (VI) in Group A—Human Carcinogen by the inhalation route. Inhaled chromium (III) and ingested chromium (III) and (VI) have not been classified with respect to carcinogenicity. Because carcinogenicity by the oral route of exposure can not be determined, chromium is classified as Group D for the oral exposure route.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for chromium.* April 2002.

Diaz-Mayans, J., R. Laborda and A. Nunez. 1986. Hexavalent chromium effects on motor activity and some metabolic aspects of Wistar albino rats. *Comp. Biochem. Physiol.* 83:191-195.

Ivankovic, S. and R. Preussman. 1975. Absence of toxic and carcinogenic effects after administration of high doses of chromic oxide pigment in subacute and long-term feeding experiments in rats. *Food Cosmet. Toxicol.* 13:347-351.

Kumar, A., S.V.S. Rana and R. Prakash. 1985. Dysenzymuria induced by hexavalent chromium. *Int. J. Tissue React.* 47:333-338.

Lindberg, E. and G. Hedenstierna. 1983. Chrome plating: Symptoms, findings in the upper airways, and effects on lung function. *Arch. Environ. Health* 38:367-374.

Mancuso, T.F. 1975. *International conference on heavy metals in the environment.* Toronto, Canada.

MacKenzie, R.D., R.V. Byerrum, C.F. Decker, C.A. Hoppert and F.L. Longham. 1958. Chronic toxicity studies II. Hexavalent and trivalent chromium administered in drinking water to rats.

Arch. Ind. Health 18:232-234.

Trivedi, B., D.K. Saxena and R.C. Murphy. 1989. Embryotoxicity and fetotoxicity of orally administered hexavalent chromium in mice. *Reprod. Toxicol.* 3:275-278.

U.S. Environmental Protection Agency (USEPA). 1980. *Ambient water quality criteria for chromium.* Office of Water Regulations and Standards. EPA 440/5-80-035.

U.S. Environmental Protection Agency (USEPA). 1984. *Health assessment document for chromium.* Environmental Criteria and Assessment Office. EPA 600/8-83-014F.

Zahid, Z.R., Z.A. Al-Hakkak and A.H.H. Kadhim. 1990. Comparative effects of trivalent and hexavalent chromium on spermatogenesis of the mouse. *Toxicol. Environ. Chem.* 25:131-136.

Cobalt

Cobalt is a naturally-occurring element that has properties similar to those of iron and nickel. There is only one stable isotope of cobalt, which has an atomic weight of 59. Small amounts of cobalt are naturally found in rocks, soil, water, plants, and animals. Elemental cobalt is a hard, silvery grey metal, which is usually found combined with other elements in the environment. A biochemically important cobalt compound is vitamin B12 which is essential for good health in animals and humans (ATSDR, 2002). Cobalt compounds are used as colorants in glass, ceramics and paints, as catalysts, and as paint driers. Cobalt colorants have a characteristic blue color. Cobalt was also added to beer to stabilize the foam.

Cobalt can enter the body by inhaling cobalt-containing dusts, drinking and eating cobalt-containing foods, or when the skin touches materials that contain cobalt. Once cobalt enters the body, it partitions primarily to the liver, kidney, and bones. Absorbed cobalt leaves the body slowly, primarily in the urine.

Even though cobalt is used to treat anemia caused by a vitamin B12 deficiency, harmful effects can occur if too much cobalt is taken into the body. Workers exposed to dusts containing cobalt developed asthma, wheezing, and pneumonia. Workers who developed respiratory allergies to cobalt dust also developed skin rashes (ATSDR, 2002).

People who drank too much cobalt-containing beer experienced serious effects on the heart. Vomiting and nausea occurred before the cardiac effects were noticed. Short-term exposure to rats to high levels of cobalt in the air resulted in death and lung damage. Longer-term inhalation exposure to lower levels in rodents resulted in lung damage and in increased red blood cell counts. Oral exposures have resulted in effects on the blood, liver, kidneys, and heart in rodents. Longer-term exposures also resulted in effects to the testes. Cobalt has not been found to be carcinogenic or to produce birth defects (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for*

cobalt. April 2002.

Lead

Lead is used extensively in the manufacture of storage batteries and was used in gasoline and paint. Lead is also a natural constituent of many soils, for which concentrations normally range from 10 to 30 mg lead per kilogram of soil (USEPA, 1980).

Lead can be absorbed by the oral, inhalation or dermal exposure routes (see section on Relative Absorption Factors). Gastrointestinal absorption of lead varies considerably depending upon chemical form, dietary intake, and age (Forbes and Reina, 1974; Barltrop and Meek, 1975). The deposition and absorption of inhaled lead depends upon particle size, chemical form and the rate and depth of breathing (Randall *et al*., 1975; Nozaki, 1966; Chamberlain *et al*., 1975). Once absorbed, lead is distributed to the various organs of the body, with most distribution occurring into mineralized tissues (ATSDR, 2002). Placental transfer to the developing fetus is possible (Bellinger *et al*., 1987). Inorganic lead is not known to be biotransformed within the body. Absorbed lead is excreted via the urinary or fecal routes (ATSDR, 2002)

Cases of acute lead poisoning in humans are not common and have not been studied in experimental animals as thoroughly as chronic lead poisoning. Symptoms of acute lead poisoning from deliberate ingestion by humans may include vomiting, abdominal pain, hemolysis, liver damage, and reversible tubular necrosis (USEPA, 1984). Subacute exposures in humans reportedly may produce a variety of neurological effects including dullness, restlessness, irritability, poor attention span, headaches, muscular tremor, hallucinations, and loss of memory. Nortier *et al*., (1980) report encephalopathy and renal damage to be the most serious complications of chronic toxicity in man and the hematopoietic system to be the most sensitive. For this reason, most data on the effects of lead exposure in humans are based upon blood lead levels. The effects of lead on the formation of hemoglobin and other hemoproteins, causing decreased levels, are reportedly detectable at lower levels of lead exposure than in any other organ system (Betts *et al*., 1973). Peripheral nerve dysfunction is observed in adults at levels of 30 to 50 mg/dL-blood. Children's nervous systems are reported to be affected at levels of 15 mg/dL-blood and higher (Benignus *et al*., 1981). In high doses, lead compounds may potentially cause abortions, premature delivery, and early membrane rupture (Rom, 1976).

Acute oral lethal doses of lead in animals depend upon chemical form, but generally range from 500 to 30,000 mg/kg. Several reproduction studies on the effects of subchronic oral exposure to lead in rats have been conducted (Kimmel *et al*., 1976; Grant *et al*., 1980; Fowler *et al*., 1980). These studies report that lead acetate administered in drinking water at various concentrations caused depressed body weights at 50 and 250 mg-Pb/L water, histological changes in the kidneys of offspring, cytokaryomegaly of the tubular epithelial cells of the inner cortex at concentrations greater than or equal to 25 mg/L and postnatal developmental delays at 50 to 250 mg/L. Higher oral doses of lead may result in decreased fertility and fetotoxic effects in a variety of species (Hilderbrand *et al*., 1973). A reduction in the number of offspring of rats and mice exposed to 25 mg Pb/L drinking water with a chromium deficient diet was reported by Schroeder *et al*. (1970).

Chronic oral exposure of female Long-Evans rats to lead (5 mg/PB/L-water) reportedly resulted in slight effects on tissue excitability, systolic blood pressure, and cardiac ATP concentrations (Kopp *et al*., 1980a,b).

Results of *in vitro* studies with human lymphocyte cultures using lead acetate were nearly equally positive and negative. Results of in vivo tests are also contradictory but suggest that lead may have an effect on chromosomes (sister chromatid exchange). Results for gene mutations, DNA modification, and recombinations in various microorganisms using lead acetate, lead nitrate and lead chloride were consistently negative with or without metabolic activation. Lead chloride has been reported to inhibit both DNA and RNA synthesis. In *in vitro* mammalian test systems, lead acetate gave conflicting results.

No epidemiological data regarding the oral carcinogenic potential of lead could be located in the available literature. Chronic inhalation may result in a statistically significant increase in deaths due to tumors in the digestive organs and respiratory systems in lead smelter workers and battery plant workers (Kang *et al*., 1980). Several studies have reported tumor formation in experimental animals orally administered specific lead salts, not normally ingested by humans (Zawirska and Medras, 1972; Boyland *et al*., 1962; Ito, 1973). The carcinogenicity of inhaled lead in experimental animals could not be located in the available literature. The USEPA has classified lead and lead compounds as Group B2 - Probable Human Carcinogens. Because the carcinogenic potential of lead appears to be weak, USEPA bases risk management decisions for this compound on neurodevelopmental effects rather than carcinogenicity.

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for lead.* U.S. Public Health Service.

Barltrop, D. and Meek, F. (1975) *Absorption of different lead compounds.* Postgrad. Med. J. 51:805-809.

Bellinger, D.C., Leviton, A., Waternaux, C., Needleman, H. and Rabinowitz, M. (1987) *Longitudinal analyses of prenatal and postnatal lead exposure and early cognitive development*. N. Engl. J. Med. 316:1037-1043.

Benignus, V.A., Otto, D.A., Muller, K.E. and Seiple, K.J. (1981) *Effects of age and body lead burden on CNS function in young children. II: EEG spectra*. Electroencephalograph. Clin. Neurophysiol. 52:240-248.

Betts, P.R., Astley, R. and Raine, R.N. (1973) *Lead intoxication in children in Birmingham.* Br. Med. J. 1:402-406.

Boyland, E., Dukes, C.E., Grover, P.L. and Mitchley, B.C.V. (1962) *The induction of renal tumors by feeding lead acetate to rats.* Br. J. Cancer 16:283-288.

Chamberlain, D. *et al*. (1975) *Uptake of lead by inhalation of motor exhaust*. Proc. Roy. Soc. London B. 192:77-110.

Forbes, G.B. and Reina, J.C. (1974) *Effect of age on gastrointestinal absorption (Fe, Sr, Pb) in the rat*. J. Nutr. 102:647-652.

Fowler, B.A. *et al*. (1980) *Chronic low level lead toxicity in the rat: III. An integrated assessment of long-term toxicity with special reference to the kidney*. Toxicol. Appl. Pharmacol. 56:59-77.

Grant, L.D. *et al*. (1980) *Chronic low-level lead toxicity in the rat: II. Effects on postnatal physical and behavioral development*. Toxicol. Appl. Pharmacol. 56:42-58.

Hilderbrand, D.C. *et al*. (1973) *Effect of lead acetate on reproduction*. Am. J. Obstet. Gynecol. 115:1058-1065.

Ito, N. (1973) *Experimental studies on tumors on the urinary system of rats induced by chemical carcinogens*. Acta. Pathol. (Jap.) 23:87-109.

Kang, H.D. *et al*. (1980) *Occupational lead exposure and cancer: Letter to the Editor*. Science 207:935.

Kopp, L. *et al*. (1980a) *Altered metabolism and function of rat heart following chronic low level cadmium/lead feeding*. J. Mol. Cell. Cardiol. 12:1407-1425.

Kopp, L. *et al*. (1980b) *Cardiac physiological-metabolic changes after chronic low-level heavy metal feeding*. Am. J. Physiol. 239:H22-H30.

Nortier, J.W., Sangster, B. and Van Kestern, R.G. (1980) *Acute lead poisoning with hemolysis and liver toxicity after ingestion of red lead*. Vet. Hum. Toxicol. 22:145-147.

Nozaki, K. (1966) *Method for studies on inhaled particles in human respiratory system and retention of lead fume*. Ind. Health (Jap.) 4:118-128.

Randall, K. *et al*. (1975) *The effect of particle size on absorption of inhaled lead*. J. Am. Ind. Hyg. Assoc. 36:207-213.

Rom, W.N. (1976) *Effects of lead on female reproduction: A review*. Mt. Sinai J. Med. 43:542-552.

Schroeder, P. *et al*. (1970) *Zirconium, niobium, tin, vanadium, and lead in rats: Lifeterm studies*. J. Nutr. 100:59-68.

U.S. Environmental Protection Agency (USEPA) (1980) *Ambient water quality criteria*

document for lead. Office of Regulations and Standards.

U.S. Environmental Protection Agency (USEPA) (1984) *Drinking water criteria document on lead* (Quantification of toxicological effects section) Office of Drinking Water.

Zawirska, B. and Medras, K. (1972) *The role of the kidneys in disorders of porphyrin metabolism during carcinogenesis induced with lead acetate*. Arch. Immunol. Ther. Exp. 20:257-272.

Manganese

Manganese is considered to be among the least toxic of the trace metals and, in fact, is considered to be an essential element (NRC, 1989). The oral absorption of dietary manganese ranges from 3 to 10%. However, manganese is absorbed to a greater extent following inhalation exposures. The National Research Council has established a provisional recommended dietary allowance for adults of 2 to 5 mg/day (NRC, 1989).

The effects following acute exposure to manganese are unknown. Chronic occupational exposure to manganese dust (0.02–2.6 mg/m^3) has been associated with respiratory symptoms and pneumonitis (Chandra *et al*., 1981) and higher levels have been associated with a condition known as manganism, a progressive neurological disease characterized by speech disturbances, tremors, and difficulties in walking. For example, male workers exposed to manganese dioxide, tetroxide and various salts (TWA of total airborne manganese dust ranged from 0.07 to 8.61 mg/m^3) experienced an increased incidence of psychomotor disturbances (e.g., reaction time, hand-eye coordination and hand steadiness) (Roels *et al*., 1987). Other effects observed in humans occupationally exposed to manganese dust include hematological (Chandra *et al*., 1981; Flinn *et al*., 1941; Kesic and Hausler, 1954), cardiovascular (Saric and Hrustic, 1975) and reproductive effects (Cook *et al*., 1974; Emara *et al*., 1971; Lauwerys *et al*., 1985; Rodier, 1955).
In adults, a safe intake of manganese from dietary sources ranges from 2 to 10 mg/day (10 mg/day = 0.14 mg/kg-day) (WHO, 1973; NRC, 1989; Schroeder *et al*., 1966). Individuals who chronically ingested drinking water from natural wells containing manganese concentrations of 1,600–2,300 µg/L (0.06 mg/kg-day), showed a statistically significant increase in minor neurologic effects (neurologic exam scores) (Kondakis *et al*., 1989). The dietary intake of manganese was unaccounted for in this study, and therefore, USEPA withdrew its previous assessment that used this study to determine a quantitative dose-response relationship for manganese in drinking water. Higher concentrations in drinking water (0.8 mg/kg-day) have resulted in symptoms including lethargy, increased muscle tonus, tremor and mental disturbances (Kawamura *et al*., 1941).

Chronic oral exposure of rats to manganese chloride can also result in CNS dysfunction (Leung *et al*., 1981; Lai *et al*., 1982). Chronic inhalation exposure of experimental animals (monkeys, rats, mice, hamsters) has resulted in respiratory effects; however, other studies have demonstrated that these effects may be immunological in origin (ATSDR, 2002). Manganese has not been reported to be teratogenic; however, this metal has been observed to cause depressed reproductive

performance and reduced fertility in humans and experimental animals (USEPA, 1984a).

Certain manganese compounds have been shown to be mutagenic in a variety of bacterial tests. Manganese chloride and potassium permanganate can cause chromosomal aberrations in mouse mammary carcinoma cells. Manganese was moderately effective in enhancing viral transformation of Syrian hamster embryo cells (USEPA, 1984a,b). USEPA established a weight-of-evidence classification for manganese of D (not classifiable as to human carcinogenicity).

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for manganese.* July 2002.

Chandra, S.V., G.S. Shukla, R.S. Striavastava, H. Singh and V.P. Gupta. 1981. An exploratory study of manganese exposure to welders. *Clin. Toxicol.* 18:407-416.

Cook, D.G., S. Fahn and K.A. Brait. 1974. Chronic manganese intoxication. *Arch. Neurol.* 30:59-64.

Emara, A.M., S.H. El-Ghawabi, O.I. Madkour and G.H. El-Sarma. 1971. Chronic manganese poisoning in the dry battery industry. *Br. J. Ind. Med.* 28:78-82.

Flinn, R.H., P.A. Neal and W.B. Fulton. 1941. Industrial manganese poisoning. *J. Ind. Hyg. Toxicol.* 23:374-387.

Kawamura, R., H. Ikuta and S. Fukuzumi. 1941. Intoxication by manganese in well water. *Kitasato Arch. Exp. Med.* 18:145-149.

Kesic, B. and V. Hausler. 1954. Hematological investigation on workers exposed to manganese dust. *Arch. Ind. Hyg. Occup. Med.* 10:336-343.

Kondakis, X.G., M. Makris and M. Leotsinidis. 1989. Possible health effects of high manganese concentration in drinking water. *Arch. Environ. Health* 44:175-178.

Lai, J.C.K., T.K.C. Leung and L. Lim. 1982. Activities of the mitochondrial NAD-linked isocitric dehydrogenase in different regions of the rat brain. Changes in aging and the effect of chronic manganese chloride administration. *Gerontology* 28:81-85

Lauwerys, R., H. Roels and P. Genet. 1985. Fertility of male workers exposed to mercury vapor or to manganese dust: A questionnaire study. *Am. J. Ind. Med.* 7:171-176.

Leung, T.K.C., J.C.K. Lai and L. Lim. 1981. The regional distribution of monoamine oxidase activities towards different substrates: Effects in rat brain of chronic administration of manganese chloride and of aging. *J. Neurochem.* 36:2037-2043.

National Research Council (NRC). 1989. *Recommended dietary allowances*, 10th ed. Food and Nutrition Board, National Research Council. Washington, D.C.: National Academy Press. pp. 230-235.

Rodier, J. 1955. Manganese poisoning in Moroccan miners. *Br. J. Ind. Med.* 12:21-35.

Roels, H., R. Lauwerys and J-P. Buchet. 1987. Epidemiological survey among workers exposed to manganese: Effects on lung, central nervous system, and some biological indices. *Am. J. Ind. Med.* 11:307-327.

Saric, M. and O. Hrustic. 1975. Exposure to airborne manganese and arterial blood pressure. *Environ. Res.* 10:314-318.

Schroeder, H.A., D.D. Balassa and I.H. Tipton. 1966. Essential trace metals in man: Manganese, a study in homeostasis. *J. Chron. Dis.* 19:545-571.

U.S. Environmental Protection Agency (USEPA). 1984a. *Health assessment document for manganese. Final report*. Environmental Criteria and Assessment Office. EPA 600/8-83-013F. August 1984.

U.S. Environmental Protection Agency (USEPA). 1984b. *Health effects assessment for manganese (and compounds).* Environmental Criteria and Assessment Office. EPA 540/1-86-057.

World Health Organization (WHO). 1973. *Trace elements in human nutrition: Manganese. Report of a WHO Expert Committee*. Technical Report Service, 532. Geneva, Switzerland: WHO. pp. 34-36.

Nickel

Nickel in the ambient atmosphere typically exists as a constituent of suspended particulate matter (U.S. EPA, 1985). The greatest volume of nickel emitted into the atmosphere is the result of fossil fuel combustion. Other sources of nickel emissions are primary production, incinerators, metallurgy, chemical manufacturing, cement manufacturing, coke ovens, nickel recovery, asbestos mining/milling and cooling towers.

Studies of nickel absorption have shown that it is absorbed by all routes of exposure to varying degrees, primarily dependent on the chemical form (see section on Relative Absorption Factors). Absorbed nickel is bound to serum components and distributed to body organs, reaching highest concentrations in kidney and lung tissue (Whanger, 1973). Nickel is not known to be biotransformed. Excretion of absorbed nickel is primarily through urine, with minor excretory routes through hair and sweat (ATSDR, 2002).

Nickel carbonyl $Ni(CO)_4$ is a particularly toxic form of nickel upon inhalation and causes chest

pain, dry coughing, hyperpnea, cyanosis, occasional gastrointestinal symptoms, sweating, visual disturbances and severe weakness. This is often followed by pulmonary hemorrhage, edema and cellular derangement. Survivors may be left with pulmonary fibrosis. In the workplace, nickel dermatitis may result at high nickel concentrations. At lower concentrations some susceptible individuals develop eczema-like lesions. The threshold for these health effects is much greater than exposures which occur in the ambient environment. The major adverse effects of nickel in man are dermatitis, chemical pneumonitis, and lung and nasal cancers.

Deaths occurred in rats and mice at concentrations greater than 3.3 and 1.7 mg/m^3 nickel, respectively, upon extended inhalation exposure to $NiSO_4$ (Dunnick *et al*., 1987). Mice exposed to Ni_3S_2 died due to necrotizing pneumonia at 7.3 mg/m^3 nickel (Benson *et al*., 1987). Prolonged exposure of hamsters to nickel oxide at 41.7 mg/m^3 resulted in decreased survival due to emphysema (Wehner *et al*., 1975). Oral LD_{50}s in rats vary depending upon the nickel-containing compound to which the rats were exposed. These range from 355 mg compound/kg (118 mg Ni/kg) for nickel acetate (Haro, 1968) to greater than 5000 mg compound/kg for nickel oxide, nickel sulfide, and nickel subsulfide (Mastromatteo, 1986). Rats fed diets containing nickel sulfate hexahydrate at 0, 250, 500 and 1000 ppm nickel showed no adverse effects over three generations in fertility, gestation, viability or lactation.

Weak evidence exists for the mutagenicity of nickel in bacterial and mammalian cells. Nickel appears to induce chromosomal aberrations in cultured mammalian cells (Larramendy *et al*., 1981), but not in vivo (Waksvik and Boysen, 1982). Occupational studies of human exposure indicate that certain nickel compounds appear to be carcinogenic via inhalation. However, there is no evidence of carcinogenicity in mammals through ingestion or dermal exposure (U.S. EPA, 1985). Nickel subsulfide has been found to be carcinogenic via the inhalation route in rats (Ottolenghi *et al*., 1974). Studies on nickel exposure via the oral route are inadequate to reach conclusions on carcinogenicity (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for nickel.* U.S. Public Health Service.

Ambrose, A.M., Larson, P.S., Borzelleca, J.R. and Henningan, G.R. (1976) *Long-term toxicologic assessment of nickel in rats and dogs*. J. Food Sci. Technol. 13:181-187.

Benson, J.M., Burt, D.G. and Carpenter, R.L. (1987) *Comparative inhalation toxicity of nickel sulfate to F344/N rats and B6C3F1 mice exposed for twelve days*. Fund. Appl. Toxicol. 10:164-178.

Dunnick, J.K., Hobbs, C.H. and Benson, J.M. (1987) *Comparative toxicity of nickel oxide, nickel sulfate, and nickel subsulfide in the F344/N rat and B6C3F1 mouse*. Toxicology 7:789.

Haro, R.T., Furst, A. and Falk, H. (1968) *Studies on the acute toxicity of nickelocene*. Proc. West Pharmacol. Soc. 11:39-42.

Larramendy, M.L., Popescu, N.C. and DiPaolo, J.A. (1981) *Induction by inorganic metal salts of sister chromatid exchanges and chromosome aberrations in human and Syrian hamster cell strands*. Environ. Mutagen. 3:597-606.

Mastromatteo, D. (1986) *Lant Memorial Lecture: Nickel*. Am. Ind. Hyg. Assoc. J. 47:589-601.

Ottolenghi, A.D., Haseman, J.K., Payne, W.W., Falk, H.L. and MacFarland, H.N. (1974) *Inhalation studies of nickel sulfide in pulmonary carcinogenesis of rats*. J. Natl. Cancer Inst. 54:1165-1172.

U.S. Environmental Protection Agency (U.S. EPA) (1985) *Health effect assessment document for nickel*. Office of Research and Development. Office of Emergency and Remedial Response.

Waksvik, H. and Boysen, V. (1982) *Cytogenic analysis of lymphocytes from workers in a nickel refinery*. Mutat. Res. 103:185-190.

Wehner, A.P., Busch, R.H., Olson, R.J. and Craig, D.K. (1975) *Chronic inhalation of nickel oxide and cigarette smoke by hamsters*. Am. Ind. Hyg. Assoc. J. 36:801-809.

Whanger, P.D. (1973) *Effects of dietary nickel on enzyme activities and mineral content in rats*. Toxicol. Appl. Pharmacol. 25:323-331.

Silver

Silver in various forms is absorbed to a limited extent following oral and inhalation exposures (U.S. EPA 1985). The acute toxic effects in humans following oral exposure to silver include corrosive damage to the gastrointestinal tract leading to shock, convulsions, and death. In animals, acute exposure has been shown to affect the CNS and to cause respiratory paralysis (Hill and Pillsbury 1939). The primary effect of silver in humans following chronic exposures is argyria, a permanent bluish-metallic discoloration of the skin and mucous membranes, which can be either localized or generalized. Silver also accumulates in the blood vessels and connective tissue (U.S. EPA 1985).

Blumberg, H. and Carey, T.N. 1934. Argyremia: Detection of unsuspected and obscure argyria by the spectrographic demonstration of high blood silver. *J. Am. Med. Assoc.* 103:1521-1524.

East, B.W.; Boddy, K.; Williams, E.D.; Macintyre, D.; and McLay, A.L.C. 1980. Silver retention, total body silver and tissue silver concentrations in argyria associated with exposure to an anti-smoking remedy containing silver acetate. *Clin. Exp. Dermatol.* 5:305-311.

Gaul, L.E., and Staud, A.H. 1935. Clinical spectroscopy. Seventy cases of generalized argyrosis following organic and colloidal silver medication. *J. Am. Med. Assoc.* 104:1387-1390.

Hill, W.R., and Pillsbury, D.M. 1939. *Argyria, the pharmacology of silver.* Baltimore, MD: Williams and Wilkins Co.

U.S. Environmental Protection Agency (U.S. EPA). 1985. *Drinking water criteria document for silver.* Cincinnati: Environmental Criteria and Assessment Office. PB 86-118288.

U.S. Environmental Protection Agency (U.S. EPA). 1996. Integrated Risk Information System (IRIS). Cincinnati: Environmental Criteria and Assessment Office.

Vanadium

The absorption of vanadium through the gastrointestinal tract of animals is low (2.6% for vanadium pentoxide in rats) (Conklin *et al*., 1982). Soluble vanadium compounds that are inhaled and deposited are readily absorbed (50–100%) (ATSDR, 2002). Because vanadium has low solubility, its absorption through skin is thought to be quite low, although no specific studies were located regarding dermal absorption (ATSDR, 2002).

Pentavalent vanadium compounds are generally considered to be more toxic than other valence states. Many incidents of short-term and long-term occupational exposures to vanadium, mainly vanadium pentoxide dust, have been reported. Inhalation causes respiratory tract irritation, coughing, wheezing, labored breathing, bronchitis, chest pains, eye and skin irritation and discoloration of the tongue (NIOSH, 1977; NAS, 1974). Humans subchronically exposed to vanadium pentoxide (0.1 mg/m^3) via inhalation experienced respiratory irritation (Zenz and Berg, 1967). Experimental animals (i.e., rats, monkeys) subchronically exposed to vanadium compounds (vanadium pentoxide, bismuth orthovanadate) manifested alveolar proteinosis and increased pulmonary resistance at concentrations of 2.5–4.7 mg/m^3 (Lee and Gillies, 1986; Knecht *et al*., 1985). Effects seen in experimental animals following chronic inhalation exposure include fatty degeneration of the liver and kidneys, hemorrhage, and bone marrow changes (Browning, 1969).

Humans subchronically exposed to ammonium vanadyl tartrate (1.3 mg/kg-day) via capsules did not manifest any adverse effects (Dimond *et al*., 1963). However, experimental animals (i.e., rats, mice) orally exposed to vanadium compounds (sodium metavanadate, sodium orthovanadate, ammonium metavanadate) exhibited mild systemic effects (decreased weight gain, vascular infiltration, spleen hypertrophy and increased ventricular pressure) at doses as low as 0.57 mg/kg-day (ATSDR, 2002). Rats chronically administered 0.77 mg/kg-day (5 ppm) vanadium in their drinking water showed no adverse effects (Schroeder *et al*., 1970). Pre- and postnatally exposed rat pups have exhibited reduced pup weight and length and facial hemorrhage (ATSDR, 2002). Vanadium has not been demonstrated to be carcinogenic in humans or experimental animals.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for vanadium.* July 2002.

Browning, E. 1969. *Toxicity of industrial metals.* 2nd ed. New York: Appleton-Century-Crofts.

Conklin, A.W., C.S. Skinner and T.L. Felten. 1982. Clearance and distribution of intratracheally instilled vanadium — 48 compounds in the rat. *Toxicol. Lett.* 11:199-203.

Dimond, E.G., J. Caravaca and A. Benchimol. 1963. Vanadium: excretion, toxicity, lipid effect in man. *Am. J. Clin. Nutr.* 12:49-53.

Knecht, E.A., W.J. Moorman and J.C. Clark. 1985. Pulmonary effects of acute vanadium pentoxide inhalation in monkeys. *Am. Rev. Respir. Dis.* 132:1181-1185.

Lee, K.P. and P.J. Gillies. 1086. Pulmonary response and intrapulmonary lipids in rats exposed to bismuth orthovanadate dust by inhalation. *Environ. Res.* 40:115-135.

National Academy of Sciences (NAS). 1974. *Vanadium.* Washington, D.C.: Committee on Biological Effects of Atmospheric Pollutants, Division of Medical Sciences, National Research Council.

National Institute of Occupational Safety and Health (NIOSH). 1977. *Criteria for a recommended standard—occupational exposure to vanadium.* DHEW (NIOSH) Publication No. 77-222.

Schroeder, J.A., M. Mitchner and A.P. Nason. 1970. Zirconium, niobium, antium, antimony, vanadium and lead in rats: Life term studies. *J. Nutr.* 100:59-68.

U.S. Environmental Protection Agency (USEPA). 1997. *Health effects assessment summary tables.* FY-1997. Washington, D.C.: Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response.

Zenz, C. and B.A. Berg. 1967. Human responses to controlled vanadium pentoxide exposure. *Arch. Environ. Health* 14:709-712.

TABLE 1. ABSOLUTE ORAL BIOAVAILABILITY FACTORS

Chemical	Absolute Oral Bioavailability Factor	Reference
Aluminum	0.01	ATSDR, 2002
Antimony	0.15	USEPA, 2004a

Chemical	Absolute Oral Bioavailability Factor	Reference
Barium	0.07	USEPA, 2004a
Cadmium - diet	0.025	USEPA, 2004a
Cadmium - water	0.05	USEPA, 2004a
Chromium	0.025	USEPA, 2004a
Manganese	0.04	USEPA, 2004a
Nickel	0.04	USEPA, 2004a
Silver	0.04	USEPA, 2004a
Vanadium	0.026	USEPA, 2004a

REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for aluminum.* U.S. Department of Health and Human Services. Public Health Service. December 2002.

U.S. Environmental Protection Agency (USEPA). 2004a. *Risk assessment guidance for Superfund Volume I: Human health evaluation manual (Part E, Supplemental guidance for dermal risk assessment)*. Office of Superfund Remediation and Technology Innovation. July 2004.