APPENDIX D
POST-REMEDIATION HUMAN HEALTH RISK ASSESSMENT FOR AOC 3 AT THE FORMER SADVA

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ACRONYMS AND ABBREVIATIONS

AOC	Area of concern
COPC	Chemical of potential concern
CSM	Conceptual site model
DERP-FUDS	Defense Environmental Restoration Program for Formerly Used Defense Sites
DOA	Department of the Army
DoD	Department of Defense
EIS	Environmental Impact Statement
EPC	Exposure point concentration
FFS	Focused Feasibility Study
GSA	General Services Administration
GURA	Guilderland Urban Renewal Agency
HHRA	Human health risk assessment
J&E	Johnson and Ettinger
MCL	Maximum contaminant level
MSSL	Medium-specific screening level
NEIP	Northeast Industrial Park
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
RAGS	Risk Assessment Guidance for Superfund
RI	Remedial Investigation
SADVA	Schenectady Army Depot, Voorheesville Area
SQL	Sample quantitation limit
SVOC	Semivolatile organic compound
UCL	Upper confidence limit (95% UCL)
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound

SECTION D.1

INTRODUCTION

D.1.1 PROJECT BACKGROUND

D.1.1.1 This post-remediation quantitative human health risk assessment (HHRA) has been prepared by Parsons as part of the Remedial Investigation (RI) for Area of Concern (AOC) 3, located near the northern end of the former Schenectady Army Depot, Voorheesville Area (SADVA). AOC 3 is the former Burn Pit Area. The site has been remediated in accordance with the Focused Feasibility Study (FFS) (Parsons, 2002a) and an Interim Action Plan (Parsons, 2002b). Based on conclusions identified in the FFS and Interim Action Plan, it was recommended that Remedial Alternative 3 (Containment, Soil Removal, and Offsite Disposal) be implemented to remediate this AOC.

D.1.1.2 The specific objective of this HHRA is to provide a quantitative post-remediation risk evaluation of the soil and groundwater at the site. The HHRA will determine if there is potential risk to human health associated with exposure to these environmental media based on post-remediation sampling data, and whether the remedial alternative addressed the potential risk.

D.1.1.3 The SADVA site is being addressed under the authority of the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS). The SADVA site is DERP-FUDS site number C02NY0002. This HHRA has been prepared to satisfy the U.S. Army Corps of Engineers (USACE) requirements for RI projects.

D.1.1.4 Although the HHRA for AOC 3 has not been required by the State of New York or by the U.S. Environmental Protection Agency (USEPA), there are numerous guidelines and criteria from the State and the USEPA that are relevant to this HHRA. As described further in this HHRA, the assessment will use applicable guidelines including those provided by the New York State Department of Environmental Conservation (NYSDEC), the New York State Department of Health (NYSDOH), and the USEPA.

D.1.1.5 This HHRA refers to information provided in other sections of the SADVA RI report, including figures and tables relevant to the HHRA. Sections 2 and 3 of the SADVA RI Report contains specific information related to the site history and regulatory status, land use, environmental setting (*e.g.*, surface features, hydrogeology, geology, and soils), and nature and extent of contamination. This HHRA refers to the RI for more detailed information as needed. All of the new figures and tables developed for this HHRA, site photographs taken during a site visit performed by the project risk assessment team in July 2006, as well as a few of the figures from the RI report are provided in Section 7 of this HHRA.

D.1.2 FACILITY AND SITE DESCRIPTION

D.1.2.1 SADVA is located 0.25 miles southeast of the Village of Guilderland Center, New York (Figure D.1). The former SADVA site plan is provided on Figure D.2. The Department of Defense (DoD) held ownership of the SADVA property from 1941 through 1969. The site was originally constructed as a regulating station and a holding and reconsignment point, and later became a general Army depot. The principal mission of the installation was the receipt, storage, maintenance, and distribution of supply items for the U.S. Department of the Army (DOA).

D.1.2.2 SADVA was closed in 1969 and most of the SADVA property was sold to the Town of Guilderland Urban Renewal Agency (GURA). GURA leased the property to Galesi Group, Inc., which established the Northeast Industrial Park (NEIP). The NEIP has been in operation as an industrial park since this time. Various open spaces and buildings on the property are leased to tenants. The leased area has been used for manufacturing, maintenance and repair operations, and storage of goods.

D.1.2.3 AOC 3 is the former Burn Pit Area. The site is less than 10 acres in size and is situated between two warehouses at the northern end of the former SADVA property (Figure D.2). The site is also adjacent to the west and northwest fence lines of SADVA. Off site and adjacent to the fence lines are the Guilderland Central School grounds and the recently constructed bus maintenance garage for the Guilderland School District. Figure D.3 shows the historical site layout and surrounding land uses. Figure D.4 shows the site plan and the soil and groundwater sampling locations. Historical aerial photographs and former employee interviews indicate AOC 3 was used for waste burning and/or disposal. Historical records for SADVA tend to confirm the presence of a disposal area where materials were burned or otherwise disposed. The historical records and photographs suggest the AOC has been the site of numerous dump areas and pits, and scarred areas that are thought to have been locations where wastes were burned.

D.1.2.4 The general features of AOC 3 are shown in Photos D.1 and D.2 (see Section 7). Photo D.1 shows the two warehouses and the typical vegetation at AOC 3. Photo D.2 shows the northwestern SADVA fence line and the adjacent school property. These photos were taken during the site visit by the Parsons risk assessment team in July 2006.

D.1.3 RISK ASSESSMENT PROCESS

Summary of Available Data for AOC 3

D.1.3.1 An interim removal action was completed at AOC 3 between the Fall of 2002 and the Spring of 2003. This removal action consisted of excavating and disposing of waste materials and impacted soils, followed by backfilling and reseeding the area. The excavation activities at the AOC 3 site were concentrated in three areas defined in the FFS (Parsons, 2002a) and the Interim Action Plan (Parsons, 2002b). The removal action, performed under the direction of USACE by Shaw Environmental, Inc. (Shaw, 2004), resulted in the excavation and off-site disposal of approximately 4,000 cubic yards of waste and impacted soils.

D.1.3.2 During the remedial action at AOC 3, adjacent property belonging to the Guilderland School District was also investigated. The purpose of investigating this area was to remove any debris found to have a military origin, and to investigate the remaining portion of the property to ensure that other disposal areas were not present. The Guilderland Central School (Guilderland Junior/Senior High School) is partially in an area formerly owned by the DoD at the north end of the SADVA property. Subsequent to NEIP acquisition of the property, the School District leased and then exercised an option to purchase the property from NEIP. The School District built a new bus maintenance garage for the Guilderland School District near the land that was formerly owned by the DoD.

D.1.3.3 The area of investigation for AOC 3 included approximately 3.5 acres at the school grounds. Approximately 1.5 acres consisted of a portion of the property surrounding the new bus maintenance garage and approximately 2 acres were at a new baseball field. The bus maintenance garage was under construction at the time of the investigation. Test pits were excavated in areas previously undisturbed by the construction contractors. Buried debris, consistent with materials formerly stored by the DoD at SADVA, was found in two different areas at the site. The material was excavated from the two areas (three excavation pits) and removed from the site. A geophysical survey was used to investigate the baseball field. Based on the geophysical survey, it was determined that the presence of additional buried debris in the area was unlikely.

D.1.3.4 The confirmatory soil samples from the excavation pits at AOC 3 and the new bus maintenance garage area were included in this HHRA. A total of 37 confirmatory soil samples were collected from the pits. Confirmatory or endpoint samples are those collected from the bottom or sidewalls of excavations to ensure that all impacts soil has been removed and that the area is “clean”. Samples designated EX1, EX2 and EX3 were the endpoint samples collected from excavation pits near the bus maintenance garage. Samples designated PES-1, PES-2, and PES-3 were the endpoint samples collected from excavation areas at the AOC 3 site. Soil samples were analyzed for various constituents including volatile organic compounds (VOCs), semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCBs), and metals. The analytical suites varied based on the nature of debris in the excavation areas and supporting data collected during the excavation activities (*e.g.*, chemical data obtained from representative environmental samples).

D.1.3.5 A 2-year groundwater monitoring program was also started at the completion of the interim removal action for the site. Data were collected from five monitoring wells (MW-1, MW-2, MW-3, MW-4-2, and MW-5) and the former irrigation supply well (Supply Well) present within the Guilderland School District Maintenance Garage (the Supply Well and the maintenance garage are not shown on the site figures, including Figure D.4, because they are outside the view of the figures). MW-2 and MW-5 are adjacent to the school grounds along the former SADVA fenceline. Thus, MW-2, MW-5 and the former Supply Well represent downgradient, off-site groundwater monitoring locations. The 2-year monitoring program began in September/December 2003 and was completed in June/July 2005. A Final Groundwater Sampling Report for the 2-year monitoring effort was prepared and submitted to the NYSDEC (Shaw, 2006). The report included a technical justification for closure of AOC 3. Following this

report, two additional rounds of sampling were performed at the request of NYSDEC. The first round of sampling was completed in August 2006 and the second round of sampling was completed in November 2006. An additional monitoring well (MW-9) was also included in the two rounds of sampling in 2006.

D.1.3.6 In summary, a total of 62 groundwater samples have been collected since remediation was completed at AOC 3. This included sampling at the six wells (MW-1, MW-2, MW-3, MW-4-2, MW-5, and Supply Well) on a quarterly basis beginning in September/December 2003. Dates of sample collection were September 2003, December 2003, March 2004, June 2004, September 2004, January 2005, March 2005, and June/July 2005, plus the additional rounds of sampling in August 2006 and November 2006. Thus, ten samples have been collected at each of these six wells since remediation. The additional two samples were collected at MW-9 during 2006 as indicated above. Groundwater samples were analyzed for VOCs, PCBs, naphthalene, and lead. Results from these samples are used in this HHRA.

D.1.3.7 This HHRA used the results of the groundwater and confirmatory/endpoint soil samples as described above. Additionally, a site visit was performed at AOC 3 on July 11, 2006, by the Parsons team that is performing the HHRA for the site. The site visit verified site characteristics and potential exposure pathways for AOC 3.

D.1.3.8 The post-remediation sampling results are provided in data summary tables in Section 7. Table D.1 provides results for chemicals detected in soil (*i.e.*, excavation endpoint samples) and Table D.2 provides results for chemicals detected in groundwater.

General HHRA Approach and Guidance Documents

D.1.3.9 Techniques and methodology developed or recognized by the USACE and the USEPA were used for this HHRA. This quantitative HHRA is intended to satisfy USACE requirements for RI projects. As recommended by USACE, the quantitative HHRA uses a risk ratio approach to quantify potential risk. USEPA Region 6 risk-based human health screening values, as well as other screening values as listed below, were used for the risk ratio analyses. NYSDEC human health criteria were qualitatively used in the risk ratio approach, but were not used to calculate the final risk ratio results. The NYSDEC criteria are not specifically derived for cancer or non-cancer risk evaluations and thus these criteria were used for comparison only.

D.1.3.10 The primary resources for conducting this quantitative risk ratio HHRA are listed and described below.

- *Standard Scopes of Work for HTRW Risk Assessments* (USACE, 2001).
- USEPA Region 6 *Human Health Medium-Specific Screening Levels* (USEPA, 2006a). These medium-specific screening levels (MSSL) are available for soil and groundwater.
- Technical and Administrative Guidance Memorandum #4046, *Determination of Soil Cleanup Objectives and Cleanup Levels* (NYSDEC, 1994).

- *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations* (NYSDEC, 1999).
- To evaluate vapor intrusion of shallow groundwater contaminants into indoor air, the primary resource included the USEPA (2002) *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* This document contains target groundwater concentrations that are calculated to correspond to target indoor air concentrations that are protective of human health if vapor intrusion occurs. The target groundwater concentrations are derived to ensure protection of a residential receptor, and thus provide a conservative evaluation for a potential indoor worker at the site (*i.e.*, workers at the two warehouses) or nearby receptors (*e.g.*, students and workers at the Guilderland Central School). Based on future land use plans at SADVA, as described in the Northeastern Industrial Park Generic Environmental Impact Statement (NEIP EIS) (Clough, Harbour & Associates LLP, June 2005), future land use at the site will remain commercial. The Master Plan discussed in the NEIP EIS indicates land use will remain as currently exists. No other buildings are proposed for the site. The former SADVA fence line lies just west of AOC 3. Beyond the fence line boundary (downgradient), land use includes the Guilderland High School and the new Guilderland School Bus Garage. Residential property is located further to the west and north of this area. Because groundwater is shallow and flows in a northwesterly direction, there may be potential for VOCs to volatilize from shallow groundwater into enclosed buildings (*e.g.*, warehouses, school buildings, homes).
- The use of the target groundwater concentrations is to provide an initial screening for potential unacceptable risks. If this evaluation shows potential risk, further work may be necessary at the site. Additional work would follow the *U.S. Army's Interim Vapor Intrusion Policy* (USACE, 2006) and the *USEPA User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* (USEPA, 2004a). The USEPA methodology uses the Johnson and Ettinger (J&E) model to evaluate vapor intrusion into buildings from groundwater. The New York State guidance documents, *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH, 2006) and DER-13 / *Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York* (NYSDEC, 2006) would also be considered and used. Based on the guidance documents from the State of New York, all J&E results must be supported by actual sampling results, such as soil vapor samples, sub-slab vapor samples, crawl space samples, indoor air samples, and outdoor air samples. These types of samples would be required to satisfy New York State guidelines.
- The USEPA provides the basic background and approach for performing standard HHRAs (*e.g.*, data evaluation, exposure assessments, *etc*.). General procedures identified in the USEPA's *Risk Assessment Guidance for Superfund* (RAGS) (USEPA, 1989), were also followed for this HHRA in terms of data evaluation,

the exposure assessment, and the toxicity assessment. Supplemental USEPA guidelines were also used in conjunction with RAGS.

D.1.4 ORGANIZATION OF HHRA REPORT

The overall risk assessment process consists of four key steps: data evaluation, exposure assessment, toxicity assessment, and risk characterization. These four steps of risk assessment provide the general outline of a quantitative risk assessment report. Because this HHRA uses the risk ratio approach, the outline and overall format is slightly modified from the traditional HHRA. This HHRA is still consistent with USEPA guidelines as presented in *Risk Assessment Guidance for Superfund* (RAGS) (USEPA, 1989) and supporting supplemental guidance including the *Standard Scopes of Work for HTRW Risk Assessments* (USACE, 2001). This HHRA uses the risk ratio approach organized into seven sections, as outlined below.

D.1 Introduction,

D.2 Data Evaluation and Identification of Chemicals of Potential Concern,

D.3 Exposure Assessment,

D.4 Risk Ratio and Screening Criteria Assessment,

D.5 Risk Assessment Results and Uncertainties,

D.6 References, and

D.7 Figures, Site Photographs, and Tables (Data and Risk Calculation Tables).

SECTION D.2
DATA EVALUATION AND IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

D.2.1 INTRODUCTION

D.2.1.1 Chemicals of potential concern (COPC) at AOC 3 are those chemicals detected in soil and groundwater samples collected after the site was remediated. The post-remediation samples were collected from the AOC 3 site and from the adjacent school grounds. Sampling results for the chemicals detected in soil and groundwater are summarized in Tables D.1 and D.2 in Section 7. The dates of sample collection are shown in the tables. Depths of soil samples are also shown for the excavations located near the Guilderland School Bus Garage; these sampling depths ranged from 8 to 20 feet. Samples labeled PES-1, PES-2, and PES-3 were the endpoint samples collected at the AOC 3 site; the depths of these excavations were 6 inches, 16 feet, and 20 feet, respectively.

D.2.1.2 Samples were analyzed for various constituents including VOCs, SVOCs, pesticides, PCBs, and metals. The analytical suites varied based on the nature of debris in the excavation areas and supporting data collected during the excavation activities (*e.g.*, chemical data obtained from representative environmental samples). Post-remediation data and quality control data are included in several reports for the various sampling events. These reports include the following:

- Guilderland High School Emergency Response (Shaw 2003);
- Interim Remedial Measure, Area of Concern No. 3 (Shaw 2004);
- Final Report, Groundwater Sampling for Area of Concern No. 3 (Shaw, 2006); and
- Groundwater Sampling Report, November 2006, Area of Concern No. 3 (Shaw 2007).

D.2.1.3 It is assumed that USEPA Level III data validation, or equivalent, was performed on all of the data used in this HHRA. This level of validation is appropriate for evaluating the useability of analytical data in a quantitative risk assessment.

D.2.1.4 The Parsons RI (including this HHRA) and the reports listed above identify NYSDEC criteria for each of the chemicals detected in soil and groundwater. Background soil and groundwater samples were also collected as part of the Parsons RI and were used in conjunction with the NYSDEC criteria to evaluate the nature and extent of contamination during the RI, leading to the identification of soil and groundwater impacts that required remediation.

D.2.2 RISK RATIO APPROACH

D.2.2.1 This quantitative HHRA uses a risk ratio approach to quantify potential cancer risk and non-cancer hazard for each COPC in each contaminated media (soil and groundwater). A risk ratio method considers risk averaged across an entire exposure area (*e.g.*, endpoint soil samples from all excavation pits) and follows a tiered approach.

D.2.2.2 For soils, the maximum detected chemical concentrations were initially used as the exposure point concentrations (EPC) to calculate risk. Use of maximum concentrations provides a conservative (*i.e.*, most health-protective) estimate of exposure to that chemical. If unacceptable risk was calculated based on maximum detected concentrations, then the 95 percent upper confidence limit (95% UCL) was calculated and used in the risk ratio approach. The 95% UCLs were calculated using the percentile bootstrap method assuming a non-parametric distribution for the particular chemical. This method was performed using USEPA's ProUCL Version 3.0 (USEPA, 2004b). A minimum of 10 samples is needed for purposes of calculating the 95% UCL. Using UCLs provides a more representative assessment of the overall risk posed by the media of concern (soil or groundwater) because it uses the entire data set, not just the single maximum concentration detected.

D.2.2.3 For groundwater, maximum detected chemical concentrations were initially used as the EPC. If unacceptable risk was calculated based on maximum detected concentrations, then the analytical results for each chemical that was a significant contributor to the risk was plotted against the sampling date, for each well. This graph was used to conduct a qualitative trend analysis. For chemicals where there was an obvious downward (or upward) trend, the latest detected concentration was used as the EPC. For chemicals where there was only one detection or where there was no obvious trend the mean concentration was calculated. For each sample that was undetected, half of the detection limit was used in calculating the mean concentration. For chemicals that did not contribute significantly to the cumulative risk, the maximum detected concentration was used as the EPC. Since remediation, a total of 62 groundwater samples have been collected from seven monitoring wells at and near AOC 3. This included sampling at six monitoring wells (MW-1, MW-2, MW-3, MW-4-2, MW-5, and Supply Well) on a quarterly basis beginning in September/December 2003. Dates of sample collection were September 2003, December 2003, March 2004, June 2004, September 2004, January 2005, March 2005, and June/July 2005, plus an additional two rounds of sampling in August and November 2006. One additional monitoring well, MW-9, was also sampled in August and November 2006. Samples collected between September 2003 and June/July 2005 were analyzed for VOCs, PCBs, and lead. Samples collected in 2006 were analyzed for VOCs and lead.

D.2.2.4 In the risk ratio procedure for soils, the ratio of the EPC (either the maximum concentration or the 95% UCL) was divided by the appropriate screening level for soil. In the risk ratio procedure for groundwater, the ratio of the EPC (either the maximum concentration, the latest detected concentration, or the mean concentration, as described above) was divided by the appropriate screening level for the groundwater. As discussed above, the criteria for the risk ratio analysis are the USEPA Region 6 MSSLs for soil and groundwater. NYSDEC soil and groundwater criteria were only qualitatively used in the risk ratio approach but were not used to

calculate the final risk ratio results. The NYSDEC criteria are not specifically derived for cancer and non-cancer risk evaluations and thus were used for comparison only. However, these NYSDEC criteria were used in developing cleanup criteria for the site.

D.2.2.5 After calculating the risk ratios for individual chemicals using the USEPA MSSLs, the ratios for the individual chemicals were summed to determine the cumulative risk. In the first tier, all carcinogenic chemicals were evaluated together, as were all non-carcinogenic chemicals. Carcinogenic risk ratios greater than the upper bound of the CERCLA acceptable risk range, 1.0×10^{-4}, indicate a potentially unacceptable carcinogenic risk. Non-carcinogenic risk ratios greater than 1 (one) indicate a potential unacceptable risk. Should the non-carcinogenic chemicals have indicated an unacceptable risk, they would have been evaluated using specific target organs or organ groupings. To estimate the risk associated with multiple non-carcinogenic chemicals, the risks were considered cumulative if the chemicals affect the same target organ. Therefore, if necessary, the target organs would have been identified for all non-carcinogenic chemicals. Although there were some non-carcinogenic risks identified in this HHRA, the use of target organ groupings was not necessary in this assessment. The primary chemicals driving the non-cancer risk are discussed in Section D.5 (Risk Assessment Results and Uncertainties).

D.2.2.6 Based on USEPA RAGS guidance (USEPA, 1989) and supplemental guidance for data evaluation, the COPC list can be refined during initial screening. One of the steps is to screen essential nutrients from the HHRA. Thus, analytical results for any essential nutrients (*e.g.*, calcium, magnesium, potassium, iron, sodium) were removed from the COPC list and not considered further in this HHRA.

D.2.2.7 Another chemical that was not quantified using the risk ratio approach was lead. According to USEPA guidance, lead should be evaluated based on blood lead levels and not the potential for cancer or non-cancer risks. In the absence of blood lead data, lead concentrations detected at the site were directly compared to the screening criteria. For groundwater, the maximum contaminant level (MCL) for lead was used as the screening value. For soil, both the commercial/industrial and the residential screening values for lead were used. A detailed discussion of the development of the soil lead values is discussed in the USEPA Region 6 *Human Health Medium-Specific Screening Levels* User's Guide (USEPA, 2006a). If lead concentrations at the site exceed the criteria, then unacceptable risk may occur. If lead concentrations are lower than the criteria, then there is no unacceptable risk.

D.2.2.8 USEPA guidance also allows elimination of COPCs if they are detected in fewer than 5 percent of the samples in a particular medium. This would require a sample set of at least 20 samples. However, detection frequency was only qualitatively reviewed on a case by case basis in this HHRA and only following the risk ratio analysis (*e.g.*, chemicals driving an unacceptable risk are identified and then detection frequency was reviewed). Thus, chemicals were not screened from the HHRA based on detection frequency.

D.2.3 SCREENING CRITERIA OVERVIEW

D.2.3.1 In addition to Tables D.1 and D.2 of this HHRA, more detail on the identification and use of NYSDEC and background criteria is discussed in the SADVA RI Report (Section 3).

D.2.3.2 USEPA Region 6 risk-based MSSLs for soil and groundwater contaminants were used for the risk ratio analysis. Detected compounds were also compared to applicable and available NYSDEC criteria and background criteria. NYSDEC criteria were qualitatively used in the risk ratio approach but were not used as the final risk ratio calculations. The NYSDEC criteria are not specifically derived for cancer and non-cancer risk evaluations and thus these criteria were used for comparison only. However, these criteria were used in developing cleanup criteria for the site. For chemicals that have NYSDEC criteria as well as background values (*e.g.*, pesticides, polynuclear aromatic hydrocarbons [PAH], metals), the final value selected for the risk ratio approach was the higher of the values.

D.2.3.3 The screening levels used in the risk ratio analysis are further discussed in following sections of this HHRA. Soil sample EPCs have been screened against site background concentrations in Table D.3. Soil EPCs are screened against NYSDEC soil quality criteria and USEPA Region 6 risk-based screening levels in Table D.4.

D.2.4 ENDPOINT SOIL SAMPLES

D.2.4.1 Soil samples evaluated for this HHRA were the endpoint soil samples collected from six excavation areas during the remedial action (three areas at AOC 3 and three areas at the new Guilderland School Bus Garage). The endpoint samples were generally collected between 8 and 20 feet below ground surface, although one excavation area at the AOC 3 site was only 6 inches deep. The depths of excavation endpoint samples collected near the Guilderland School Bus Garage are shown in Table D.1; these samples are designated EX1, EX2, and EX3. Samples designated PES-1, PES-2 and PES-3 were the endpoint samples collected at the AOC 3 site; the depths of these excavations were 6 inches, 16 feet, and 20 feet, respectively.

D.2.4.2 Because this is a post-remediation risk assessment, the concentrations of chemicals remaining in place at the site (*i.e.*, excavation endpoint samples) were used to quantify potential risk. All endpoint sampling results were combined for purposes of this HHRA and represent exposure pathways involving mixed soils. The primary pathway for mixed soils includes a current outdoor worker that infrequently visits the site (such as a property maintenance worker or a person accessing the site during site investigation work). Future land development involving excavation and construction activities may also represent an outdoor worker exposure pathway. However, based on the NEIP Master Plan for SADVA, there are no plans for future development/construction at the AOC 3 site. Additionally, no future construction plans are known for the Guilderland Central School grounds. If any construction were to take place in the area, this risk assessment also provides a conservative evaluation of potential risk to a construction/excavation worker.

D.2.5 GROUNDWATER SAMPLES

D.2.5.1 Subsequent to remediation of the contaminated soils, a total of 62 groundwater samples were collected from seven monitoring wells at and near AOC 3. This included sampling at six monitoring wells (MW-1, MW-2, MW-3, MW-4-2, MW-5, and Supply Well) on a quarterly basis beginning in September/December 2003. Dates of sample collection were September 2003, December 2003, March 2004, June 2004, September 2004, January 2005, March 2005, and June/July 2005, plus an additional two rounds of sampling in August and November 2006. One additional monitoring well was also sampled in August and November 2006. Samples collected between September 2003 and June/July 2005 were analyzed for VOCs, PCBs, and lead. Samples collected in 2006 were analyzed for VOCs and lead.

D.2.5.2 Groundwater flow in the AOC 3 area is generally to the northwest. In this area of SADVA, the depth to groundwater in the upper zone/unconfined layer is approximately 24 feet. There is no known use of groundwater in this area. The former SADVA is supplied by the Town of Guilderland Water Department, as are most residents north and west of SADVA. The Guilderland Central School previously used groundwater from the Guilderland School supply well, located downgradient of AOC 3, for irrigation of school grounds and athletic fields; however, the school has not utilized this well for several years. Although groundwater is not known or expected to be used in the area, there may still be a few homes or businesses near SADVA that use private wells for drinking water or other purposes. Because of this, a conservative evaluation of residential use of groundwater was included in the HHRA (*i.e.*, the USEPA residential "tap water" screening level is used in the risk ratio analysis). The routes of exposure include ingestion of groundwater as drinking water and inhalation of volatiles from use of groundwater in the home (*e.g.*, showering, laundering, and dish washing). The residential pathway is protective of worker exposure scenarios

D.2.5.3 Section 3 of the SADVA RI Report summarizes the RI sample locations and the contaminants that exceeded NYSDEC Class GA groundwater standards and the upgradient well contaminant concentrations prior to the remedial action. Class GA groundwater standards provide protection for groundwater designated as a potable water supply for drinking water and all other uses. For the HHRA groundwater analyses, the well sample results were assessed separately to provide an estimate of well-by-well contamination, if present. Tables D.5 through D.11 further summarize the screening of groundwater data against NYSDEC Class GA and USEPA risk-based screening levels.

SECTION D.3

EXPOSURE ASSESSMENT

D.3.1 INTRODUCTION

D.3.1.1 The objective of the exposure assessment is to estimate the type and magnitude of potential exposures to COPCs at the site. The exposure assessment includes identification of potential exposure pathways, receptors, and exposure scenarios, and quantification of exposure. Characterization of the exposure setting and identification of all potentially exposed receptors and exposure pathways are discussed in this section. A conceptual site model (CSM) showing results of the exposure assessment is shown on Figure D.5 in Section 7. Quantification of exposure involves quantifying the magnitude, frequency, and duration of exposure for the receptors and exposure pathways of concern.

D.3.1.2 Soil and groundwater are evaluated as the environmental media of concern at AOC 3. The exposure pathways relevant to the site are described in this exposure assessment of the HHRA and shown in the CSM.

D.3.2 CONCEPTUAL SITE MODEL

D.3.2.1 A CSM is an effective tool for defining site dynamics, streamlining risk assessments, establishing exposure hypotheses, and developing appropriate corrective actions. The CSM for AOC 3 is provided on Figure D.5. CSMs are useful for identifying completed exposure pathways between the contaminated media and potential receptors. The purpose of the CSM is to aid in understanding and describing a site and presents the assumptions regarding:

- Suspected sources and types of contaminants present;
- Contaminant release and transport mechanisms;
- Affected media;
- Potential receptors that could come in contact with site-related contaminants in affected media under current and future land use scenarios; and
- Potential routes of exposure.

D.3.2.2 An overall description of contaminant sources, release mechanisms, and affected media was provided Sections D.1 and D.2. The potential receptors and completed exposure pathways are discussed in the following subsections. Further description of site characterization information is described in the Parsons reports (SADVA RI Report, AOC 3 FFS and Interim Action Plan), as well as the sampling reports by Shaw Environmental, Inc. (as listed at the beginning of Section D.2).

D.3.3 POTENTIAL RECEPTORS AND EXPOSURE PATHWAYS

D.3.3.1 Potential human receptors are defined as individuals who may be exposed to site-related contaminants in environmental media. Consistent with USEPA (1989) guidance, current and reasonably anticipated land uses were considered in the receptor selection process.

D.3.3.2 USEPA (1989) defines an exposure pathway as: "The course a chemical or physical agent takes from a source to an exposed organism. An exposure pathway describes a unique mechanism by which an individual or population is exposed to chemicals or physical agents at or originating from a site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, a transport/exposure medium (*e.g.*, air) or media (in cases of intermedia transfer) is also included."

D.3.3.3 A review of potential exposure pathways links the sources, locations, and types of environmental releases with receptor locations and activity patterns to determine the significant pathways of concern.

D.3.3.4 Based on the previous investigations and the site visit by the project team performing the risk assessment for the site, the observations and reasonable assumptions for the potential human receptors and exposure pathways for AOC 3 are listed below.

Mixed Soil Exposure Pathways

D.3.3.5 Contaminants detected in excavation endpoint samples from the six excavation areas (three at the AOC 3 site and three at the new school bus garage) were used to evaluate potential risk. As previously discussed, the endpoint samples were generally collected between 8 and 20 feet below grade, although one excavation area was only 6 inches deep. All endpoint samples were combined for purposes of this HHRA and represent the mixed soil exposure interval.

D.3.3.6 The receptors and pathways evaluated for mixed soil are listed below.

- Incidental ingestion of mixed soil, inhalation of volatiles from mixed soil, and dermal contact with mixed soil by a current outdoor worker. This calculation assumes an exposure frequency of 225 days per year and an exposure duration of 25 years. Thus, it provides a conservative evaluation (*i.e.*, most health protective evaluation) for potential current and/or future outdoor workers who would have much less exposure. It is also very protective of current and/or future indoor workers because indoor worker exposure to mixed soil would be much less.

- Although the site is not residential and is not planned to be converted to residential use (based on the Master Plan), a residential pathway was shown for comparative purposes. Thus, incidental ingestion of mixed soil, inhalation of volatiles from mixed soil, and dermal contact with mixed soil by a future resident were

calculated. This provides the most conservative risk evaluation of any other types of receptors.

Groundwater Exposure Pathways

D.3.3.8 AOC 3 is located near the north and west boundaries of the former SADVA where groundwater flow is to the northwest. Residential property is located further to the north and west of this area. In the AOC 3 area, the depth to groundwater in the upper zone/unconfined layer is approximately 24 feet. There is no known use of groundwater in this area. The former SADVA is supplied by the Town of Guilderland Water Department, as are most residents north and west of SADVA. This water is obtained from the Watervliet Reservoir and three town wells, and is processed at the Guilderland Water Treatment Plant. Additional treated water is obtained from the City of Albany. The Guilderland Central School previously used groundwater from the Guilderland School supply well, located downgradient of AOC 3, for irrigation of school grounds and athletic fields; however, the school has not utilized this well for several years. The school district currently draws its irrigation water from a well field located across Black Creek from AOC 3. Although groundwater is not known or expected to be used in the area, it is uncertain whether all homes in this area have converted to the public drinking water supply. There may still be a few homes or businesses in this area that use private wells for drinking water or other purposes. Because of this, a conservative evaluation of residential use of groundwater was included in the HHRA. The residential pathway is the most protective scenario and thus is protective of worker exposure scenarios.

D.3.3.9 Groundwater beneath the site is also very shallow and there may be potential for vapor intrusion of contaminants into indoor air (*e.g.*, vapor intrusion into warehouses on site, adjacent school buildings, and/or nearby homes). To evaluate the potential for VOCs to volatilize from shallow groundwater into a building, the maximum detected groundwater concentrations were directly compared to USEPA target groundwater concentrations. The target groundwater concentrations are calculated to correspond to target indoor air concentrations assuming that VOCs in groundwater may be intruding into indoor air.

D.3.3.10 Based on these potential exposure scenarios, the groundwater at the site was evaluated for the receptors listed below.

- Ingestion of groundwater as drinking water and inhalation of volatiles from use of groundwater in the home (*e.g.*, showering, laundering, and dish washing) by a current residential receptor. Residential receptors and exposure pathways are considered to provide a conservative estimate of risk for other potential receptors. Thus, ingestion of groundwater by a resident will produce a higher level of risk than ingestion of groundwater by a current and/or future indoor and/or outdoor worker. The worker scenarios may be complete exposure pathways if groundwater were to be used as drinking water; however, these pathways are not included separately in the risk ratio analysis because they are assumed to be conservatively evaluated under the residential scenario.

- Inhalation of volatiles (from vapor intrusion of groundwater VOCs into indoor air) by a current indoor worker. The target groundwater concentrations are designed to ensure protection of the public in a residential setting, and thus provide a conservative evaluation for a current and/or future indoor worker at the warehouse, or a student at the Guilderland Central School. These exposure pathways are considered to be potentially complete because groundwater beneath the site is very shallow and VOCs in groundwater could possibly intrude into indoor air.

SECTION D.4

RISK RATIO AND SCREENING CRITERIA ASSESSMENT

D.4.1 RISK RATIO ASSESSMENT

D.4.1.1 The risk ratio method considers risk averaged across an entire exposure area (*e.g.*, endpoint soil samples from all excavation pits) and follows a tiered approach. For the risk ratio assessment for soil, the initial EPCs used to calculate risk were the maximum detected chemical concentrations. Use of maximum concentrations provides the most health-protective estimate of exposure to a particular chemical. If unacceptable risk was calculated based on the maximum detected concentration, then the 95% UCL was calculated and used in the risk ratio approach. The 95% UCLs were calculated using the percentile bootstrap method, assuming a non-parametric distribution of the particular chemical. This method was performed using USEPA's ProUCL Version 3.0 (USEPA, 2004b). A minimum of 10 samples is needed for the purposes of calculating the 95% UCL. When calculating the 95% UCL, the chemical needs to be detected in at least one sample and one-half the sample quantitation limit (SQL) was used when the chemical was not detected in any of the other samples.

D.4.1.2 An exception to using 95% UCLs was used for the groundwater results. A total of 62 groundwater samples have been collected at AOC 3 since remediation. As the concentrations of contaminants in groundwater are not homogeneous, and users of groundwater would theoretically obtain groundwater from discrete locations (*i.e.*, a single well), it is not appropriate to evaluate groundwater risk across the entire site. Therefore, risk associated with direct contact with groundwater was calculated for each individual well. Therefore, the results represent the risk associated with the use of groundwater from each well. This approach allows the risk manager to focus on those areas of the site that pose a risk, rather than addressing the entire site uniformly.

D.4.1.3 In the risk ratio analysis, the ratio of the EPC was divided by the appropriate screening level for the environmental medium. The soil EPC is either the maximum detected concentration or the 95% UCL. For groundwater, the EPC was chosen from either the maximum detected concentration, or the latest detected concentration (of obvious downward or upward trend), or the mean concentration (if no obvious trend). For chemicals where there was only one detection, or where there was no obvious trend, the mean concentration was calculated. For each sample that was undetected, half of the detection limit was used in calculating the mean concentration. The initial screening criteria for soil are the background concentrations. If the EPC is below the upper end of the background range for a particular chemical, the risk ratio was not calculated for that chemical. Background concentrations were available for PAHs, pesticides, metals, and other miscellaneous volatile or semivolatile chemicals that are sometimes found in the environment from regional anthropogenic sources (*e.g.*, acetone). Background concentrations were not available for groundwater.

D.4.1.4 Following initial screening to background concentrations, the risk ratio screening criteria (*i.e.*, the USEPA Region 6 MSSLs for soil and groundwater) were used to calculate potential health risk. NYSDEC human health criteria were qualitatively evaluated but were not used in the final risk ratio calculations. The NYSDEC criteria are not specifically derived for cancer and non-cancer risk evaluations, and thus these criteria were used for comparison only.

D.4.1.5 Following calculation of the risk ratios for individual chemicals, the ratios were then summed to determine the cumulative risk. Carcinogenic risk ratios greater than the upper bound of the CERCLA acceptable risk range, 1.0×10^{-4}, indicate a potentially unacceptable carcinogenic risk. Non-carcinogenic risk ratios greater than 1 (one) indicate a potential unacceptable risk. In the first tier, all carcinogenic chemicals will be evaluated together, as will all non-carcinogenic chemicals. Should the non-carcinogenic chemicals have indicated an unacceptable risk, they would have been evaluated using specific target organs or organ groupings. To estimate the risk associated with multiple non-carcinogenic chemicals, the risks are considered cumulative if the chemicals affect the same target organ. Therefore, if necessary, the target organs would have been identified for all non-carcinogenic chemicals. Although there were some non-carcinogenic risks identified in this HHRA, the use of target organ groupings was not necessary in this assessment. The primary chemicals driving the non-cancer risk are discussed in Section D.5 (Risk Assessment Results and Uncertainties).

D.4.2 RISK RATIO EQUATIONS

D.4.2.1 Cancer risks were estimated using the following equation.

$$\text{Cumulative Risk} = \sum (TR)\frac{(EPC_i)}{MSSL_{c-i}}$$

where:

Cumulative Risk = Cumulative risk for carcinogenic COPCs one through "i" (unitless), where $(TR)\frac{(EPC_i)}{MSSL_{c-i}}$ is the chemical-specific cancer risk for chemical "i";

TR = Target lifetime excess cancer risk of 1E-06 (unitless);

EPC_i = Exposure point concentration for chemical "i" (mg/kg for soil or µg/L for groundwater); and

$MSSL_{c-i}$ = USEPA Region 6 (2006a) residential cancer-based medium-specific screening level (MSSL) (mg/kg for soil or µg/L for groundwater) for chemical "i."

D.4.2.2 Non-cancer risks were estimated using the following equation.

$$HI = \sum (THQ) \frac{(EPC_i)}{MSSL_{nc-i}}$$

where:

HI	=	Cumulative hazard index for non-cancer COPCs one through "i" (unitless), where $(THQ)\frac{(EPC_i)}{MSSL_{nc-i}}$ is the chemical-specific non-cancer hazard quotient (HQ) for chemical "i";
THQ	=	Target hazard quotient of one (unitless);
EPC_i	=	Exposure point concentration for chemical "i" (mg/kg for soil or µg/L for groundwater); and
$MSSL_{nc-i}$	=	USEPA Region 6 (2006a) residential non-cancer based medium-specific screening level (MSSL) (mg/kg for soil or µg/L for groundwater) for chemical "i."

D.4.3 SCREENING CRITERIA

Soil Screening Criteria

D.4.3.1 The soil results were compared to NYSDEC soil criteria, background concentrations, and USEPA soil screening levels (*i.e.*, USEPA soil MSSLs). Tables D.3 and D.4 provide the results of those screenings. The NYSDEC recommended cleanup criteria for metals include provisions for using site-specific background concentrations, as well as reference concentrations for eastern U.S. soils. The background metals concentrations were integrated into the NYSDEC soil criteria using the guidance provided by NYSDEC (1994). Thus, the criteria for metals were derived by integrating the NYSDEC criteria with the background concentrations and using the higher concentration as the criteria (NYSDEC, 1994). The higher of the reference eastern U.S. soil concentrations and the site-specific background concentration for each metal was accepted as the "RI background concentration" for comparison purposes in the RI.

D.4.3.2 Based on the exposure assessment for current and future land use, the soil risk-based levels from USEPA Region 6 (*i.e.*, the soil MSSLs) are those listed below.

- Current outdoor industrial (commercial) worker – the risk ratio screening levels are the cancer (Target Risk = 1E-06) and non-cancer (HQ=1) values calculated for incidental ingestion of soil, inhalation of volatiles from soil, and dermal contact with soil. These values are very conservative for a current scenario because they

are based on an exposure frequency of 225 days and an exposure duration of 25 years. As previously discussed these values are protective of potential future outdoor and/or indoor workers.

- Although the site is not residential and is not expected to be converted to residential use, a residential pathway was shown for comparative purposes. Thus, incidental ingestion of soil, inhalation of volatiles from soil, and dermal contact with soil by a future resident were calculated. This provides the most conservative risk evaluation (*i.e.*, most health protective evaluation) than for other types of receptors.

D.4.3.3 One screening value is derived for the combined exposure routes. Thus, incidental ingestion of soil, inhalation of volatiles from soil, and dermal contact with soil are included as the combined exposure route.

Groundwater Screening Criteria

D.4.3.4 Groundwater results are compared to NYSDEC Class GA groundwater standards (NYSDEC, 1998) in Tables D.5 through D.11. Class GA groundwater standards provide protection for groundwater designated as a source of drinking water and all other uses.

D.4.3.5 Based on the exposure assessment for current and future land use, the groundwater risk-based levels from USEPA Region 6 (*i.e.*, the groundwater MSSLs) are those listed below.

- Current residential receptor – the risk ratio screening levels are the cancer (1E-06) and non-cancer (HQ=1) "tap water" values calculated for ingestion of groundwater as drinking water and inhalation of volatiles from use of groundwater in the home (*e.g.*, showering, laundering, and dish washing). Residential receptors and exposure pathways are considered to provide a conservative estimate of risk for other potential receptors. As previously discussed, these values are protective of potential future outdoor and/or indoor workers.
- Screening criteria to evaluate vapor intrusion of shallow groundwater VOCs into buildings were based on USEPA (2002) target groundwater concentrations. The target groundwater concentrations are calculated to correspond to target indoor air concentrations that are protective of human health if vapor intrusion occurs. As previously discussed, the target groundwater concentrations are derived to ensure protection of a residential receptor, and thus provide a conservative evaluation for a potential current and/or future indoor worker. Based on future land use plans as described in the NEIP EIS Master Plan (Clough, Harbour & Associates LLP, June 2005), future land use of the AOC 3 site will remain the same. The site will not be converted to residential use based on the Master Plan.

SECTION D.5

RISK ASSESSMENT RESULTS AND UNCERTAINTIES

D.5.1 INTRODUCTION

The primary objective of this HHRA was to quantitatively characterize the human health risk associated with current and reasonably expected future exposure to contaminated media at AOC 3. As discussed in Section D.3, all potentially complete exposure pathways for the site were evaluated or were assumed to be evaluated based on more protective exposure scenarios (*e.g.*, the residential scenarios provide very conservative estimates for standard worker scenarios). The exposure pathways were outlined in Section D.3 and were also shown on the CSM (Figure D.5). The results of the risk ratio quantification are presented in this section.

D.5.2 ESTIMATED RISKS FOR MIXED SOIL

D.5.2.1 Table D.3 presents the comparison of site concentrations in soil to background. Only those analytes that exceed the upper end of the background range (or if no background concentrations were available) were retained for the risk ratio calculations. As can be seen in the table, the PAHs chrysene, phenanthrene, and pyrene were detected within the range of background concentrations. Also, the metals arsenic and manganese were within the range of background. Therefore, these analytes were not included in the risk ratio calculations. Table D.4 compares the site concentrations to NYSDEC and USEPA screening criteria. Finally, the risk ratios are provided in Table D.12 (Risk Ratio Calculations for Potential Exposure to Mixed Soil by a Current/Future Outdoor Worker and a Hypothetical Future Resident).

D.5.2.2 No unacceptable risks were calculated for the carcinogenic chemicals detected in mixed soils. The cumulative carcinogenic risk ratio results were 6.48×10^{-7} and 2.28×10^{-7} for the residential and industrial receptors, respectively. These results are below the USEPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}.

D.5.2.3 For the non-carcinogenic chemicals detected in mixed soils, there was no unacceptable risk for potential industrial receptors. The cumulative non-carcinogenic risk ratio result for the industrial receptor was 0.003. For the potential residential receptor, the cumulative non-carcinogenic risk ratio was 0.01. These values are both below the acceptable non-carcinogenic risk ratio of 1.0.

D.5.2.4 Additionally, the maximum detected concentrations of most of the chemicals driving the unacceptable non-carcinogenic risk were from one endpoint sample (EX1-Post-F2). The main chemicals driving the non-carcinogenic residential risk were metals (aluminum, antimony, cadmium, chromium, thallium, and vanadium). The maximum detected concentrations of aluminum, cadmium, chromium, and vanadium were from EX1-Post-F2. This sample was collected from excavation 1 near the new bus maintenance garage. The sample was collected from the bottom of the excavation at a depth of 18 to 20 feet. The depth of this sample

was close to, if not at, the water table; thus, further excavation would have been impractical below the water table (Shaw, 2003). Because this sample was so deep, a direct soil exposure pathway is not likely.

D.5.3 ESTIMATED RISKS FOR GROUNDWATER USED AS DRINKING WATER

D.5.3.1 The calculated risks for groundwater were evaluated for each individual well. There were no background concentrations available for groundwater, so results are only compared to NYSDEC Class GA criteria prior to the risk ratio calculations, as shown in Tables D.5 through D.11. No analytes were eliminated from consideration in the SLRA.

Monitoring Well MW– 1

D.5.3.2 Table D.13 presents the results of the risk ratio calculations for MW-1. Figures D.6 and D.7 present the trends analysis for volatile chemicals and metals, respectively. There were no unacceptable carcinogenic risks associated with contaminants identified in MW-1. The carcinogenic risk of 2.9×10^{-6} is less than the upper end of USEPA's acceptable risk range of 1.0×10^{-4}. The cumulative risk for non-carcinogenic chemicals is 0.0039, which is significantly less than one, indicating that there is no unacceptable non-carcinogenic risk. Based on the qualitative trend analysis, which showed a decreasing trend of lead in MW-1 (Figure D.7), the EPC selected was the latest detected concentration of lead. That concentration is less than the USEPA screening value, indicating no unacceptable risks associated with lead in groundwater at MW-1.

Monitoring Well MW– 2

D.5.3.3 Table D.14 presents the results of the risk ratio calculations for MW-2. Figures D.8 and D.9 present the trends analysis for volatile chemicals and metals, respectively. The carcinogenic risk ratio was 2.0×10^{-4} which is greater than the upper end of USEPA's acceptable risk range. Therefore, there may be an unacceptable carcinogenic risk. This carcinogenic risk is driven by the risk associated with 1,2,3-trichloropropane, which was detected during one sampling event in September 2004, at an estimated concentration (flagged "J" by the laboratory) far below the NYSDEC Class GA criterion, and has not been detected during the five sampling events since that one detection. The carcinogenic risk for MW-2 when 1,2,3-trichloropropane is not included in the cumulative risk is 7.0×10^{-5}, which is within the USEPA's acceptable range of carcinogenic risk (data not shown). Because the risk without this chemical is within USEPA's risk range, and because the laboratory detection limits are far greater than the screening value, it is not clear if there is a carcinogenic risk at MW-2. The non-carcinogenic risk ratio is 0.1 which indicates no unacceptable non-carcinogenic risk. Based on the qualitative trend analysis, which showed a decreasing trend of lead in MW-2 (Figure D.9), the EPC selected was the latest detected concentration of lead. That concentration is less than the USEPA screening value, indicating no unacceptable risks associated with lead in groundwater at MW-2.

Monitoring Well MW– 3

D.5.3.4 Table D.15 presents the results of the risk ratio calculations for MW-3. There were no unacceptable carcinogenic risks associated with contaminants identified at MW-3. The carcinogenic risk of 1.5×10^{-7} is less than the upper range of the USEPA's acceptable risk of 1.0×10^{-4}. The cumulative risk ratio for non-carcinogenic chemicals is 0.0028, significantly less than one, indicating no unacceptable non-carcinogenic risk from groundwater in MW-3. No qualitative trend analysis was done for this well, because there were no risks determined.

Monitoring Well MW-4-2

D.5.3.5 Table D.16 presents the results of the risk ratio calculations for MW-4-2. Figures D.10 and D.11 present the trends analysis for volatile chemicals and metals, respectively. There were no unacceptable carcinogenic risks associated with contaminants identified at MW-4-2. The carcinogenic risk of 8.0×10^{-6} is less than the upper range of the USEPA's acceptable risk of 1.0×10^{-4}. The cumulative risk ratio for non-carcinogenic chemicals is 0.09, less than one, indicating no unacceptable non-carcinogenic risk associated with groundwater in MW-4-2. Based on the qualitative trend analysis, which showed a decreasing trend of lead in MW-4-2 (Figure D.11), the EPC selected was the latest detected concentration of lead. That concentration is less than the USEPA screening value, indicating no unacceptable risks associated with lead in groundwater at MW-4-2.

Monitoring Well MW-5

D.5.3.6 Table D.17 presents the results of the risk ratio calculations for MW-5. Figures D.12 and D.13 presents the trend analysis for volatile chemicals and metals, respectively. There were no unacceptable carcinogenic risks associated with contaminants at MW-5. The carcinogenic risk of 8.1×10^{-5} is less than the upper range of the USEPA's acceptable risk of 1.0×10^{-4}. The cumulative risk ratio for non-carcinogenic chemicals is 0.027, less than one, indicating no unacceptable non-carcinogenic risk associated with groundwater in MW-5. Based on the qualitative trend analysis, which showed a decreasing trend of lead in MW-5 (Figure D.12), the EPC selected was the latest detected concentration of lead. That concentration is less than the USEPA screening value, indicating no unacceptable risks associated with lead in groundwater at MW-5.

Supply Well

D.5.3.7 Table D.18 presents the results of the risk ratio calculations for Supply Well. Figures D.14 and D.15 present the trends analysis for volatile chemicals and metals, respectively. There were no unacceptable carcinogenic risks associated with contaminants at the Supply Well. The carcinogenic risk of 7.9×10^{-5} is less than the upper range of the USEPA's acceptable risk of 1.0×10^{-4}. Based on the trend analysis for trichloroethene (TCE), there were detections that exceeded the NYSDEC Class GA Groundwater and USEPA values. However, there was a detection followed by no detections, followed by a detection. Because there is no obvious overall trend, the mean value was used as the EPC for this chemical. The cumulative risk ratio

for non-carcinogenic chemicals is 0.059, less than one, indicating no unacceptable non-carcinogenic risk associated with groundwater in the Supply Well. Based on the qualitative trend analysis, which showed a decreasing trend of lead in the Supply well (Figure D.15), the EPC selected was the latest detected concentration of lead. That concentration is less than the USEPA screening value, indicating no unacceptable risks associated with lead in groundwater at the Supply Well.

Monitoring Well MW- 9

D.5.3.8 Table D.19 presents the results of the risk ratio calculations for MW-9. There were no unacceptable non-carcinogenic risks associated with this well. Based on the two samples collected in 2006, there may be a carcinogenic risk at this well based on the cumulative risk of 2.4×10^{-4}, which is greater than the USEPA's acceptable range of risk of 1.0×10^{-4}. Because only two samples were collected at this well, trends analysis was not completed, and a mean concentration was not calculated (but would have also resulted in an unacceptable risk).

D.5.4 ESTIMATED RISKS FOR VAPOR INTRUSION OF GROUNDWATER INTO INDOOR AIR

D.5.4.1 Groundwater beneath the site is very shallow and there may be potential for vapor intrusion of contaminants into indoor air. Thus, the existing warehouses on site or possible school buildings and homes/businesses located near the site may be susceptible to vapor intrusion.

D.5.4.2 Screening criteria to evaluate vapor intrusion of shallow groundwater VOCs into buildings were based on USEPA (2002) target groundwater concentrations. The target groundwater concentrations are calculated to correspond to target indoor air concentrations that are protective of human health if vapor intrusion occurs. The calculated risks of vapor intrusion were evaluated for each individual well.

Monitoring Well MW– 1

Table D.20 shows the results of the vapor intrusion analysis for MW-1. There are no EPCs that exceed USEPA screening values at MW-1.

Monitoring Well MW– 2

Table D.21 shows the results of the vapor intrusion analysis for MW-2. There are no EPCs that exceed USEPA screening values at MW-2.

Monitoring Well MW– 3

Table D.22 shows the results of the vapor intrusion analysis for MW-3. There are no EPCs that exceed USEPA screening values at MW-3.

Monitoring Well MW-4-2

Table D.23 shows the results of the vapor intrusion analysis for MW-4-2. There are no EPCs that exceed USEPA screening values at MW-4-2.

Monitoring Well MW-5

Table D.24 shows the results of the vapor intrusion analysis for MW-5. There are no EPCs that exceed USEPA screening values at MW-5.

Supply Well

Table D.25 shows the results of the vapor intrusion analysis for the Supply Well. There are no EPCs that exceed USEPA screening values at the Supply Well.

Monitoring Well – 9

Table D.26 shows the results of the vapor intrusion analysis for MW-9. The EPC of one chemical, trichloroethene (TCE), exceeds the USEPA screening value at MW-9. MW-9 is in an open area located about 600 feet downgradient of the NEIP warehouse at AOC 3, and about 300 feet from the old Guilderland School District bus garage where the Supply Well is located. Concentrations at the Supply Well did not exceed the USEPA indoor air screening values, so there are no buildings in the immediate vicinity of MW-9 that would appear to be at risk from vapor intrusion. USACE will conduct five additional annual rounds of groundwater sampling and analysis for VOCs at MW-9 to further assess the trend of TCE concentrations in this well.

D.5.4.3 There are several levels of uncertainty associated with this exposure pathway analysis. The target screening values are a first-step approach to evaluating chemicals which may pose a risk due to the vapor intrusion pathway. The State of New York guidance documents, *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH, 2006) and DER-13 / *Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York* (NYSDEC, 2006) would need to be followed to satisfy New York guidelines. As discussed in previous sections of this HHRA, the guidance documents from the State of New York require all sites with groundwater contamination to perform actual sampling for the vapor intrusion pathway. Therefore, any results from a target screening approach (used in this HHRA) or from modeling approaches (such as the J&E model) must be supported by actual sampling results. Such sampling may include soil vapor samples, sub-slab vapor samples, crawl space samples, indoor air samples, and outdoor air samples. Again, these types of samples would be required to satisfy New York guidelines. Another level of uncertainty in the assessment presented is that the target screening concentrations are derived to ensure protection of a residential receptor, and thus provide an overly conservative evaluation for the current and/or future worker exposure scenarios expected for the site.

D.5.4.4 Based on the foregoing assessment of groundwater data for AOC 3, there appears to be no unacceptable risk for vapor intrusion of VOCs into the existing buildings at AOC 3.

USACE will continue to sample well MW-9 annually for a period of five years, and will continue to monitor the results for this well as new data are collected.

SECTION D.6

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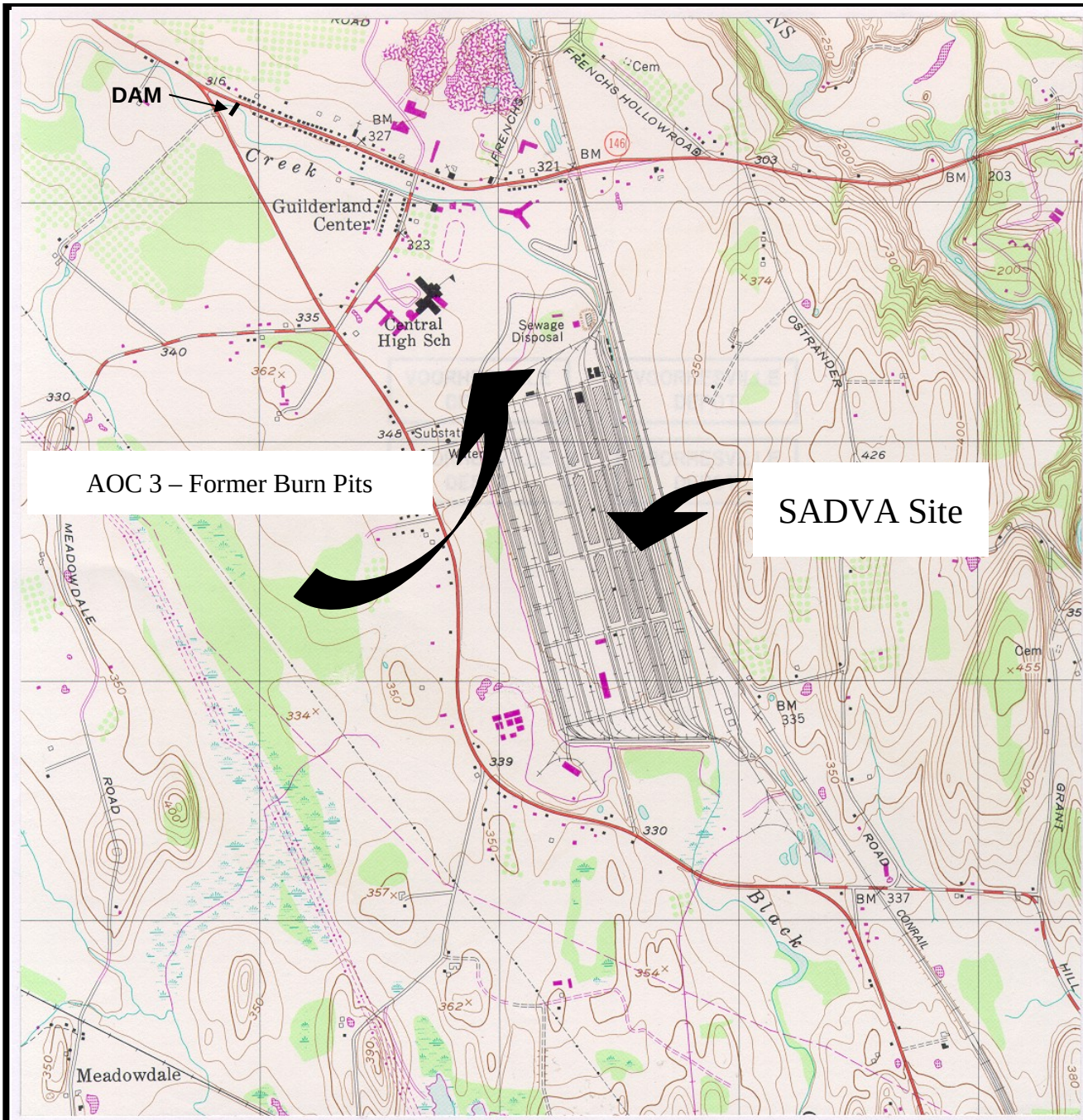
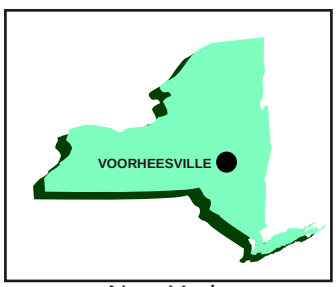
SECTION D.7

FIGURES AND TABLES





New York Quadrangle

N

LATITUDE: N42° 15' 20"
LONGITUDE: W75° 14' 38"

2000 1000 0

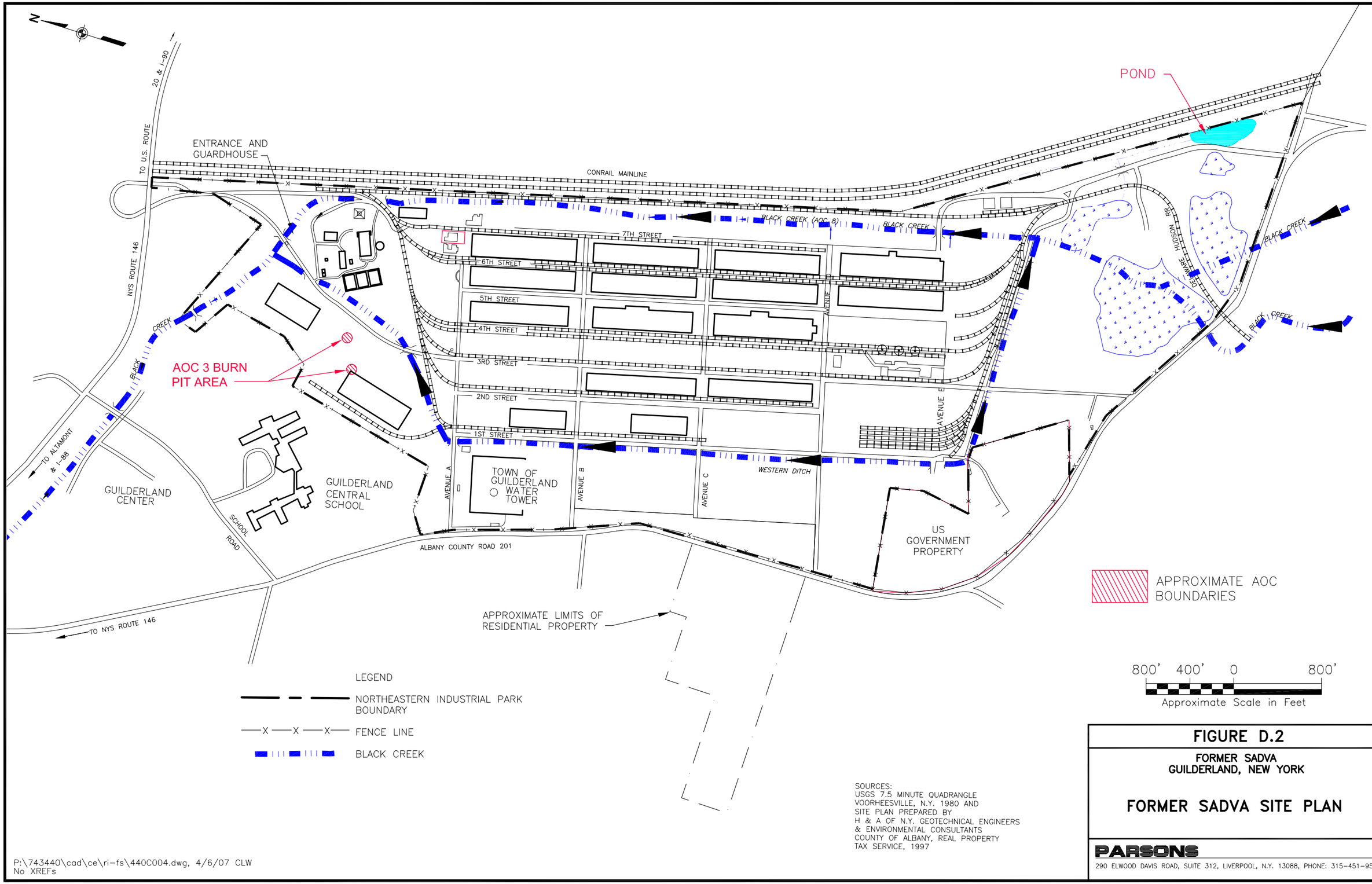
Approximate Scale in Feet

FIGURE D.1

SADVA
GUILDERLAND, NEW YORK

SITE VICINITY

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, NY 13088 PHONE: (315) 451-9560



SOURCES:
USGS 7.5 MINUTE QUADRANGLE
VOORHEESVILLE, N.Y. 1980 AND
SITE PLAN PREPARED BY
H & A OF N.Y. GEOTECHNICAL ENGINEERS
& ENVIRONMENTAL CONSULTANTS
COUNTY OF ALBANY, REAL PROPERTY
TAX SERVICE, 1997

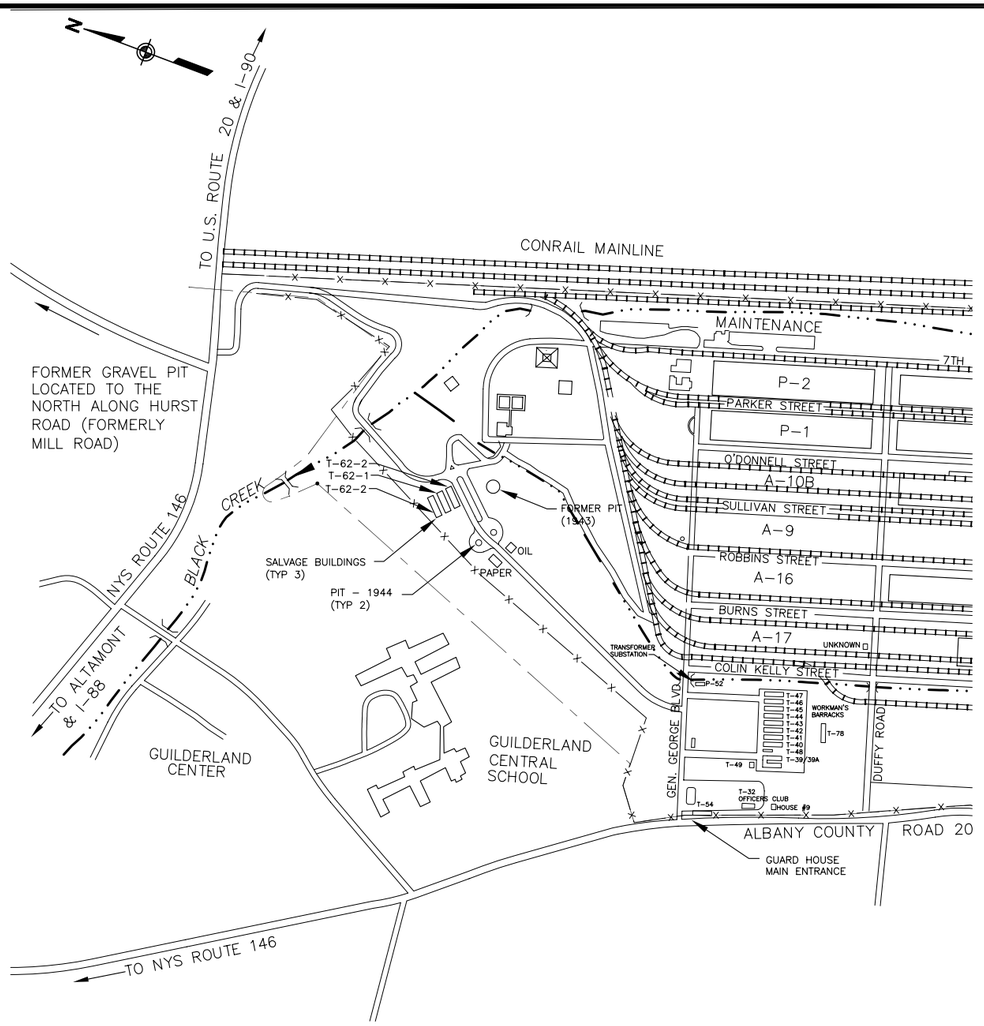
P:\743440\cad\ce\ri-fs\440C004.dwg, 4/6/07 CLW
No XREFs

FIGURE D.2

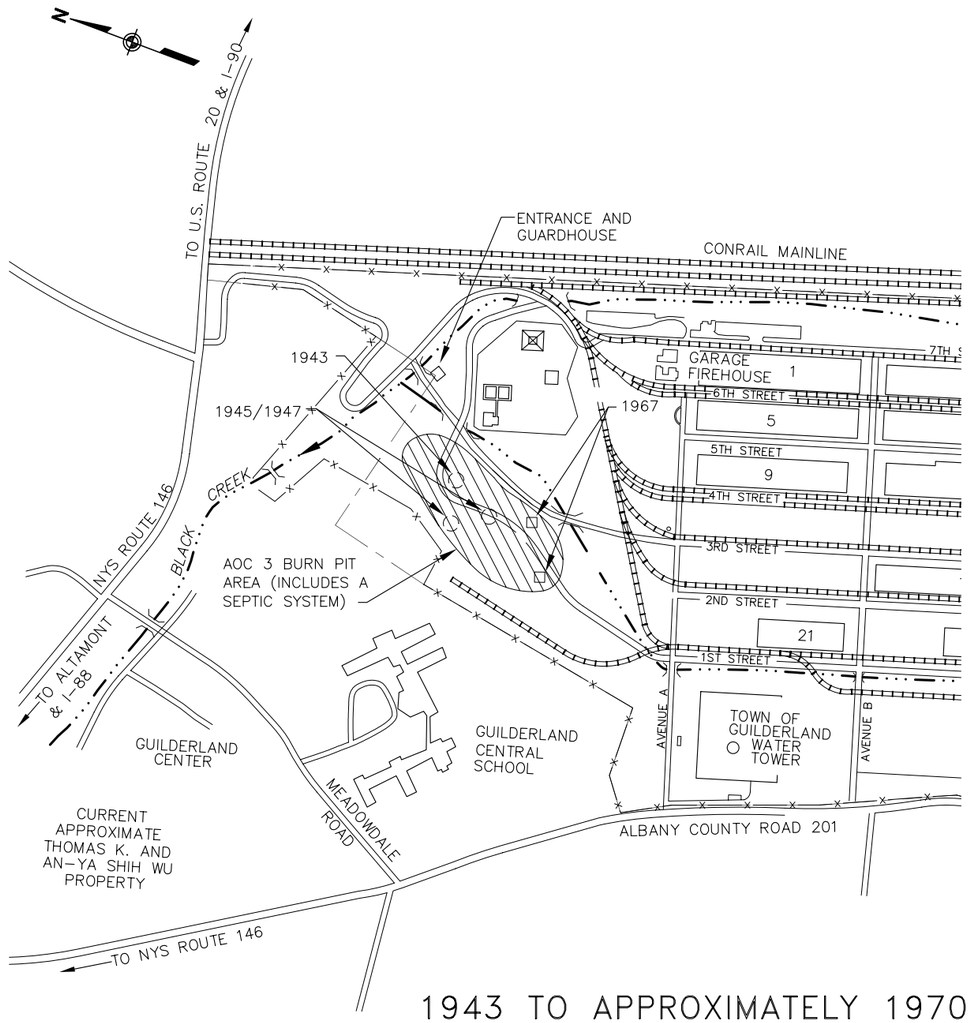
FORMER SADVA
GUILDERLAND, NEW YORK

FORMER SADVA SITE PLAN

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560



1943-1945



1943 TO APPROXIMATELY 1970

LEGEND:

- SITE BOUNDARY
- CREEKS/ DRAINAGE DITCH
- T-82 TEMPORARY BUILDING/ STRUCTURE
- P-4 PERMANENT BUILDING/ STRUCTURE
- A-11 OPEN STORAGE AREA
- RAILROAD TRACKS
- FENCING

900 450 0 900 1800

SCALE: 1"=900'

LEGEND:

- APPROXIMATE AOC BOUNDARIES
- CREEKS/ DRAINAGE DITCH
- NORTHEASTERN INDUSTRIAL PARK BOUNDARY
- PART OF THE FORMER SCHENECTADY ARMY DEPOT, VOORHEESVILLE AREA
- 2 BUILDING NUMBER
- A-11 OPEN STORAGE AREA
- RAILROAD TRACKS
- FENCING

900 450 0 900 1800

Approximate Scale in Feet

FIGURE D.3

SADVA
GUILDERLAND, NEW YORK

AOC 3 HISTORICAL SITE LAYOUT

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

P:\743440 (sadva)\cad\ce\ri-fs\aoc3-c010.dwg 4/6/07
No XREFs

STAFF GAUGE 1
GMW5-AOC3
GMW3-AOC3
GMW6-AOC3
GMW4-AOC3
STAFF GAUGE 2
MW-9
BLACK CREEK
GUILDERLAND HIGH SCHOOL
MW-6
MW-5
MW-4-2
STAFF GAUGE 3
GUARD SHACK
MW-8
SB18
SB17
HP-03
HP-02
SB20
SB21
SB19
SB01
NEW WAREHOUSE
SB11
SB22
SB23
SB24
SB25
SB04
SB05
MW-7
MW-2
SB02
SB03
SB10
SB06
SB31
SB15
SB12
SB30
SB32
SB26
SB06
SB13
SB27
SB14
SB16
SB28
SB29
MW-3
HP-04
WASTEWATER TREATMENT PLANT
SB07
SB08
MW-1
SB09
WAREHOUSE
HP-01

N

LEGEND

- FORMER ROAD LOCATION
- SB04 SOIL BORING
- HP-03 HYDROPUNCH GROUNDWATER SAMPLE
- STAFF GAUGE 3 STAFF GAUGE LOCATION
- MW-9 MONITORING WELL
- GMW3-AOC3 GUILDERLAND SCHOOL BUS GARAGE MONITORING WELL
- CREEKS/ DRAINAGE DITCH
- RAILROAD TRACKS
- FENCING

200 100 0 200 400

Approximate Scale in Feet

SOURCE: USACE, 1999.

FIGURE D.4

SADVA
GUILDERLAND, NEW YORK

AOC 3
SITE PLAN

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

P:\743440(sadva)\cad\ce\ri-fs\aoc3-c011.dwg 4/6/07
XREFs: none

Figure D.5 Human Health Conceptual Site Model

Potential Medium of Concern	Potential Route of Exposure	Potentially Exposed Population	Pathway Completeness and Assumptions
Soil (Surface and/or Mixed Soil)	• Incidental ingestion of surface/mixed soil • Inhalation of volatiles from surface/mixed soil • Dermal contact with surface/mixed soil	• Current outdoor worker • Future outdoor worker • Current indoor worker • Future indoor worker • Future resident	• Current and future outdoor workers are complete exposure pathways. There are workers present on site. An exposure frequency of 225 days per year and an exposure duration of 25 years are assumed for this scenario. Thus, it is a very conservative evaluation for a potential current outdoor worker who would have much less exposure (*e.g.*, current worker that visits the site to perform outdoor activities such as landscaping). • Current and future indoor workers are complete exposure pathways. There are currently two buildings on site. An exposure frequency of 225 days per year and an exposure duration of 25 years are assumed for this scenario. This pathway is not included in the risk ratio analysis because it is assumed to be conservatively evaluated under the current outdoor worker scenario (future indoor workers would have much less exposure to surface and/or mixed soils). • Although the site is not residential and will not be converted to residential use (based on the Master Plan), a residential pathway was shown for comparative purposes. This provides the most conservative risk evaluation (*i.e.*, most health protective evaluation) than for other types of receptors.

Figure D.5 continued

Groundwater	• Ingestion of groundwater as drinking water • Inhalation of groundwater from use of groundwater in the home (*e.g.*, showering, laundering, and dish washing) • Inhalation of volatiles due to vapor intrusion of VOCs from shallow groundwater into indoor air	• Current outdoor worker • Future outdoor worker • Current indoor worker • Future indoor worker • Future resident	• The area surrounding the boundaries of the former SADVA, close to AOC 3, is composed of a school and bus maintenance facility. Some residences are also present in the area. It is uncertain whether all homes in the area have converted to the Town of Guilderland public drinking water supply. Thus, there may be some homes and businesses that still use private wells for drinking water or other purposes. • Residential receptors and exposure pathways are considered to provide a conservative estimate of risk for other potential receptors. Thus, ingestion of groundwater by a resident will produce a higher level of risk than ingestion of groundwater by a current and/or future indoor and/or outdoor worker. The worker scenarios may be complete exposure pathways if groundwater were to be used as drinking water; however, these pathways are not included in the risk ratio analysis because they are assumed to be conservatively evaluated under the residential scenario. • Inhalation of volatiles (from vapor intrusion of VOCs from shallow groundwater into indoor air) by a current/future resident and a current/future industrial/commercial worker. These exposure pathways are considered to be potentially complete because groundwater beneath the site is very shallow and VOCs in groundwater could possibly intrude into indoor air (*e.g.*, vapor intrusion into buildings that may be constructed on site or possible homes/businesses located near the site).

Figure D.6
Monitoring Well 1 Trend Analysis
Volatile Chemicals
Former SADVA

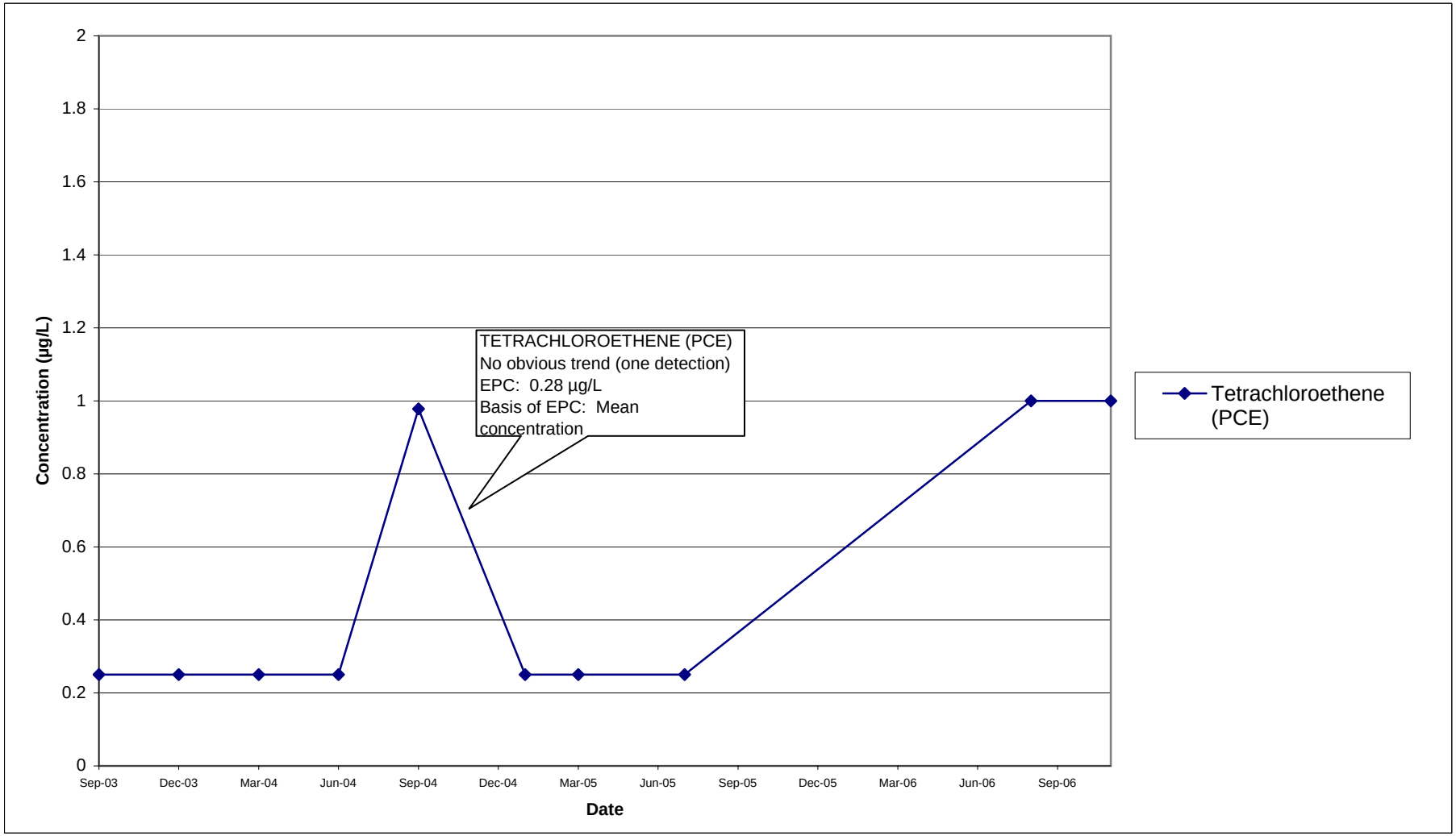


Figure D.7
Monitoring Well 1 Trend Analysis
Metals
Former SADVA

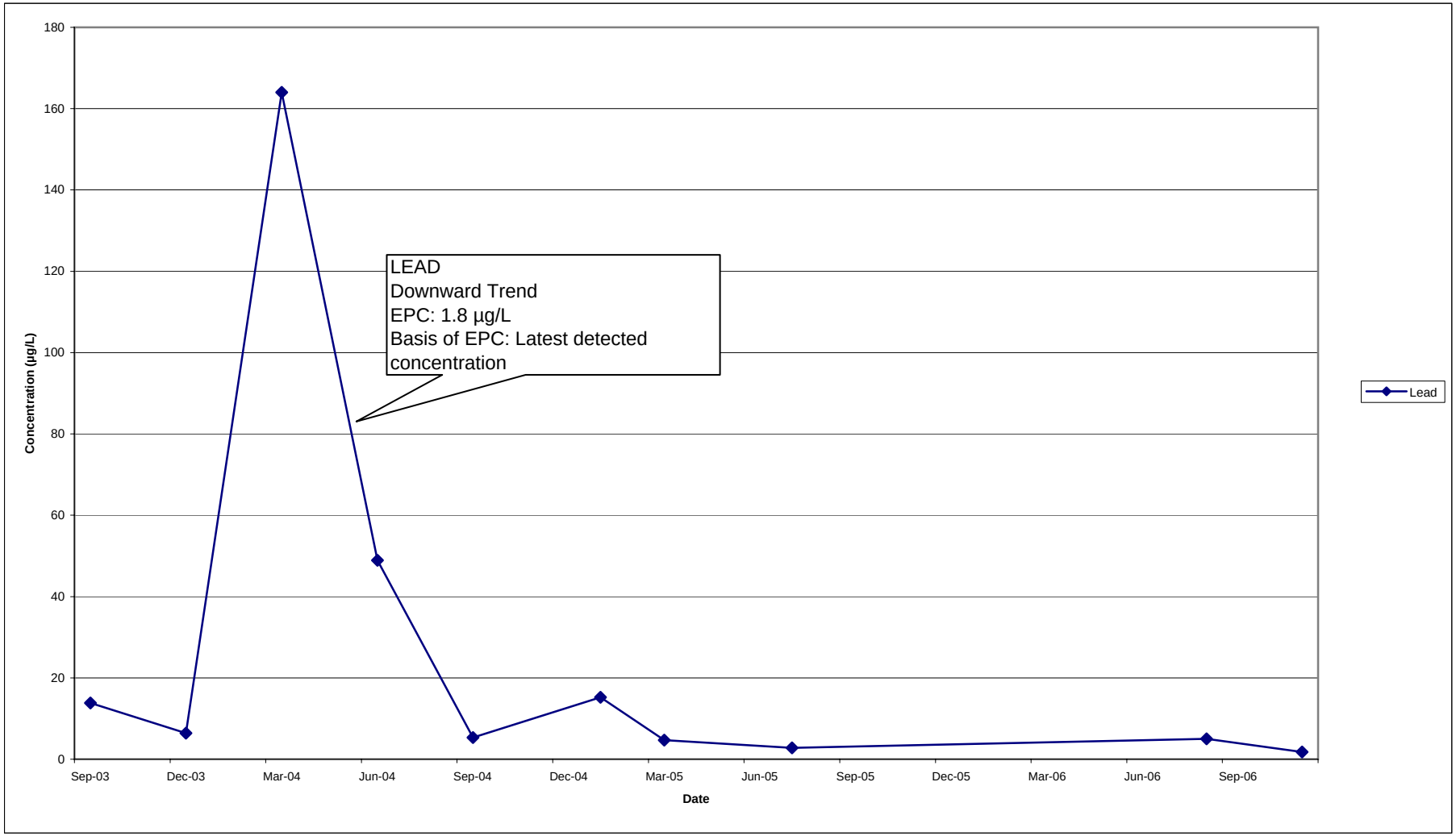


Figure D.8
Monitoring Well 2 Trend Analysis
Volatile and Semivolatile Chemicals
Former SADVA

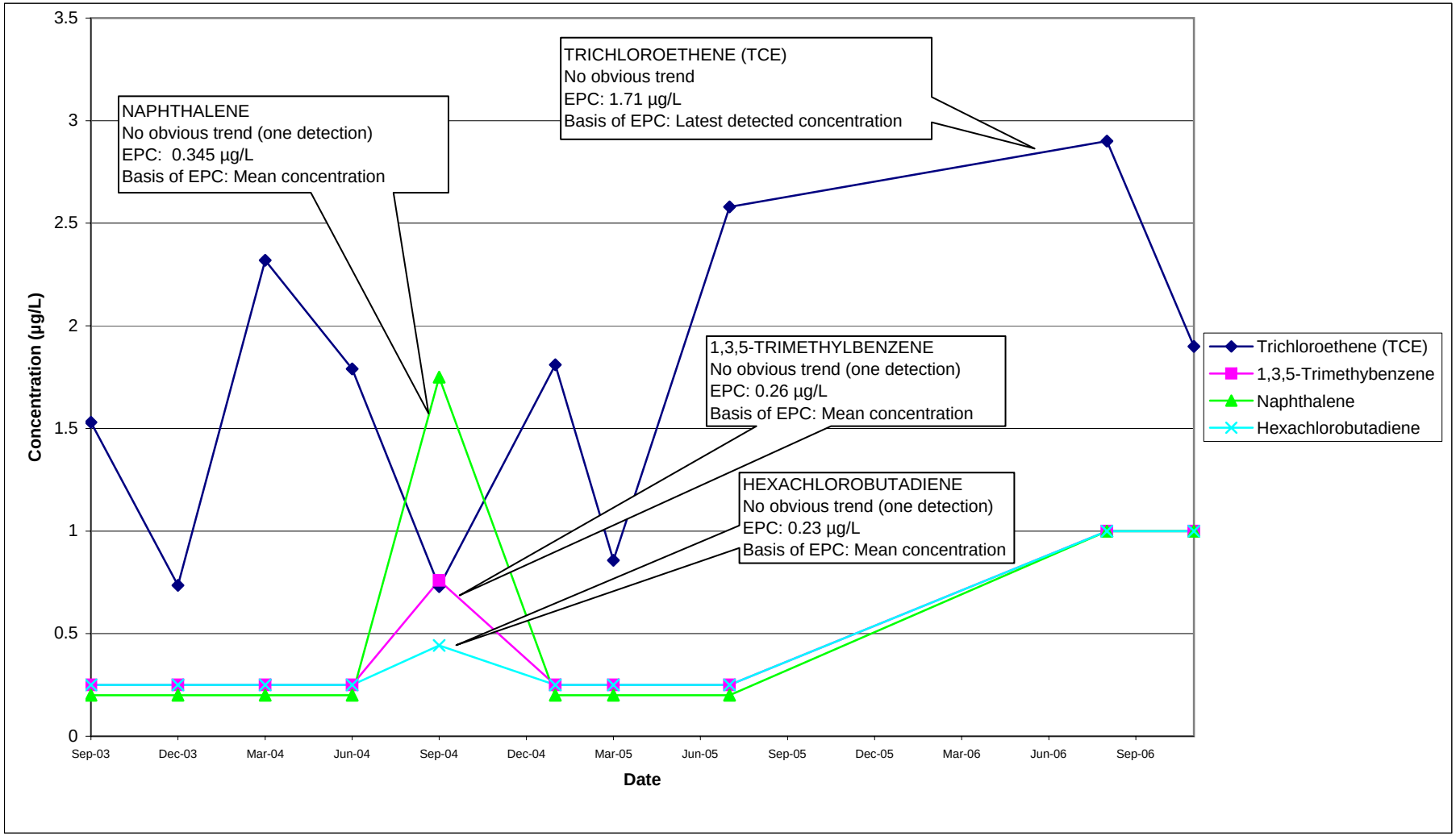


Figure D.9
Monitoring Well 2 Trend Analysis
Metals
Former SADVA

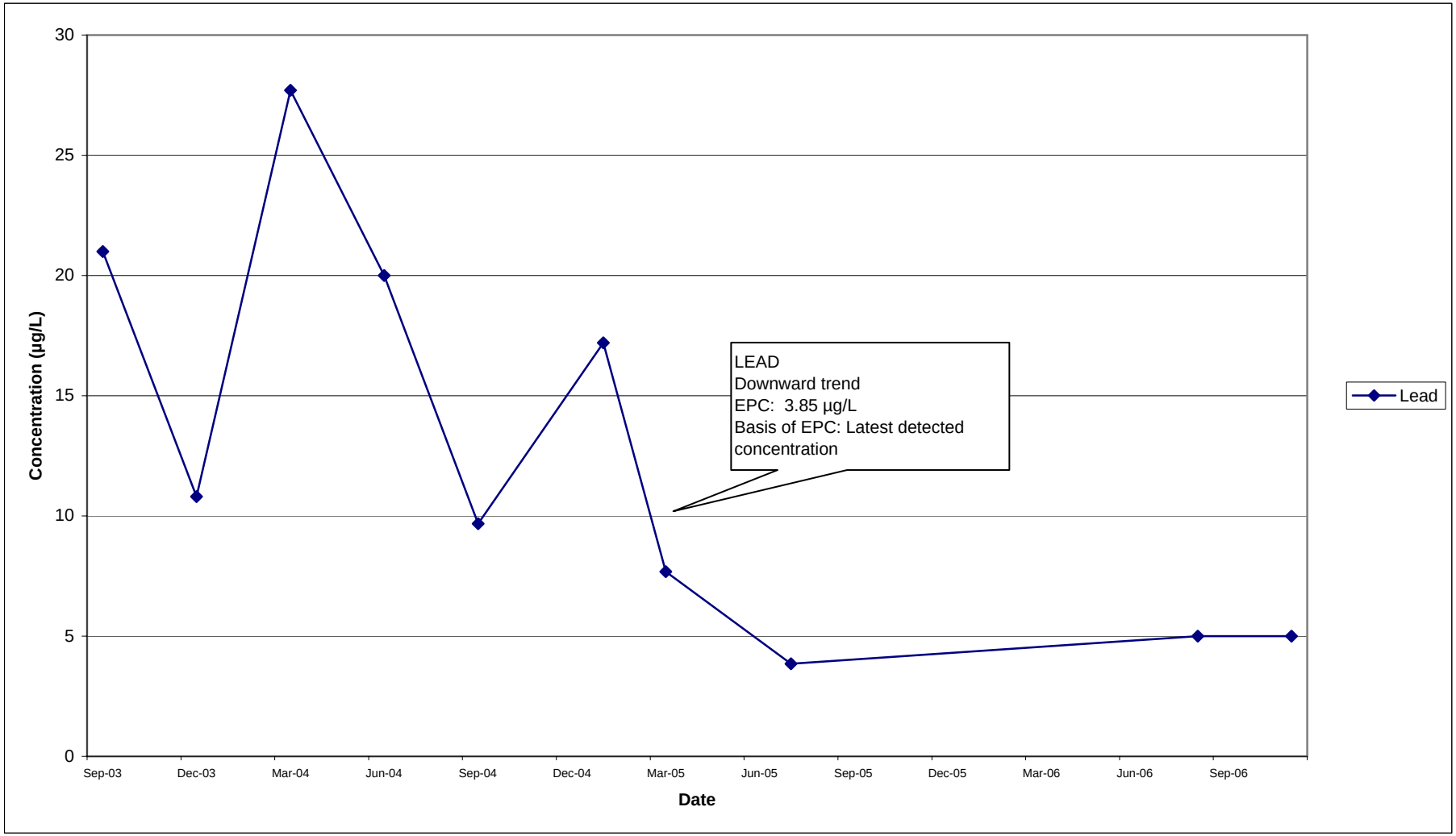


Figure D.10
Monitoring Well 4-2 Trend Analysis
Volatile Chemicals
Former SADVA

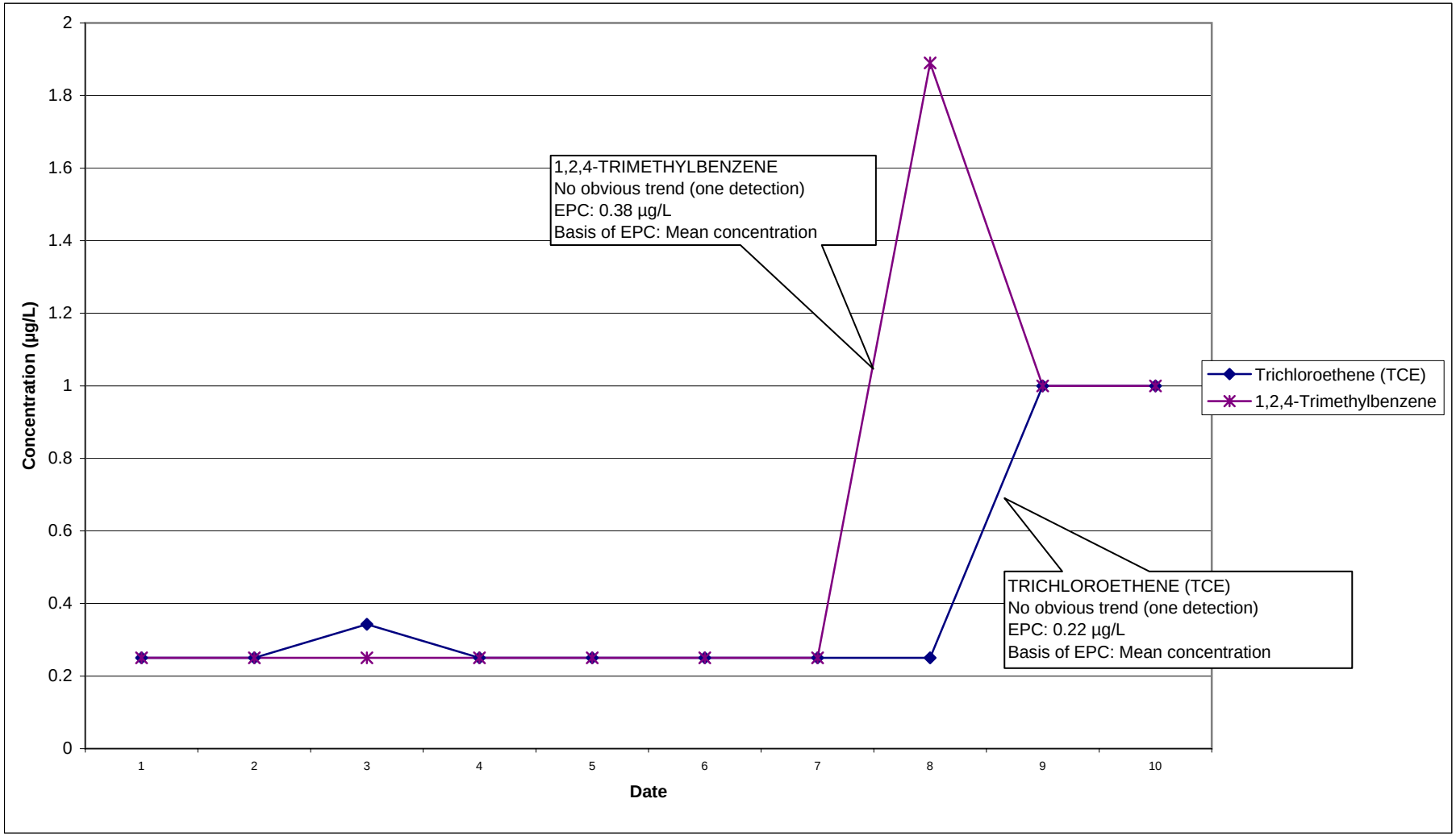


Figure D.11
Monitoring Well 4-2 Trend Analysis
Metals
Former SADVA

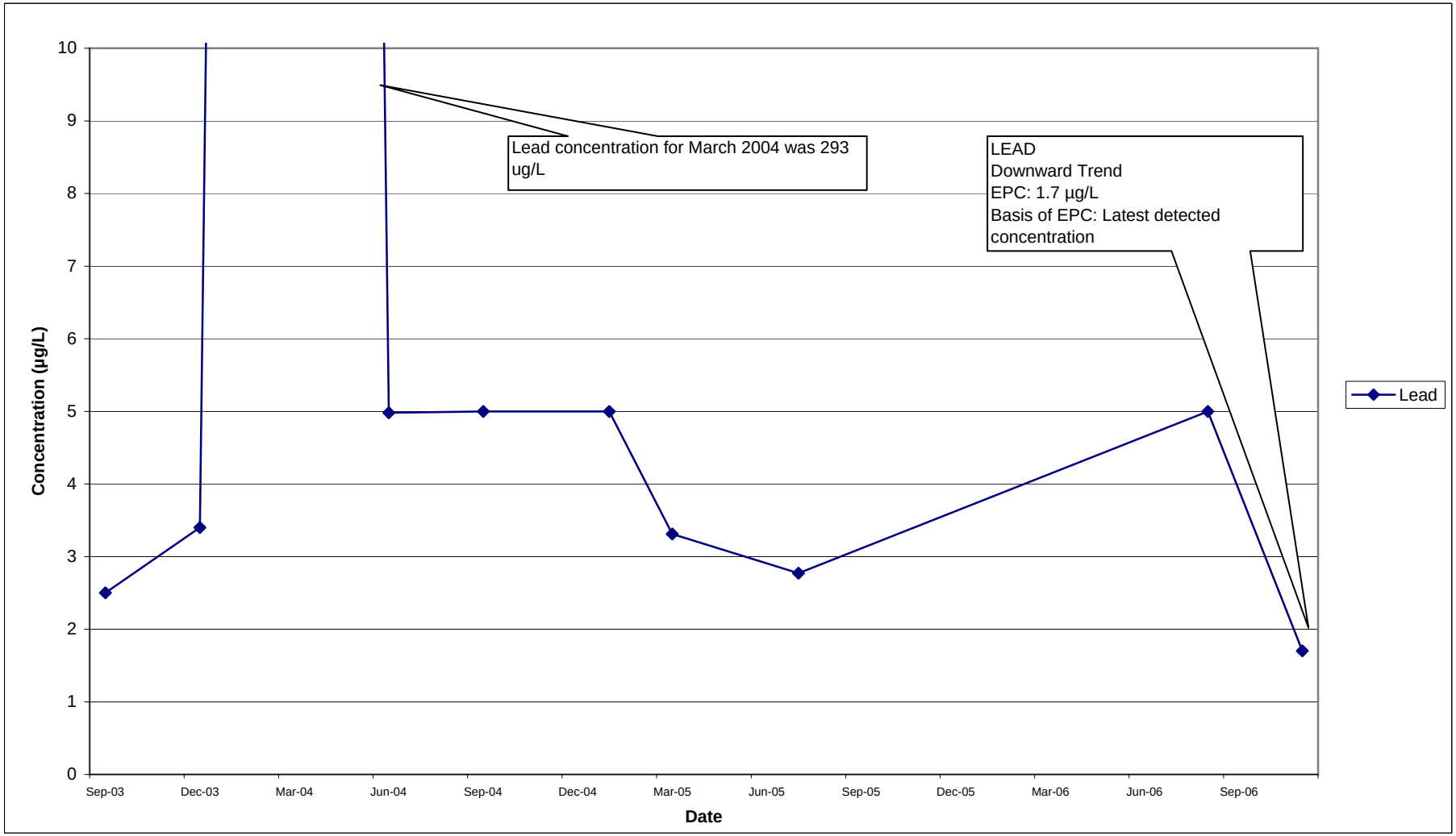


Figure D.12
Monitoring Well 5 Trend Analysis
Volatile Chemicals
Former SADVA

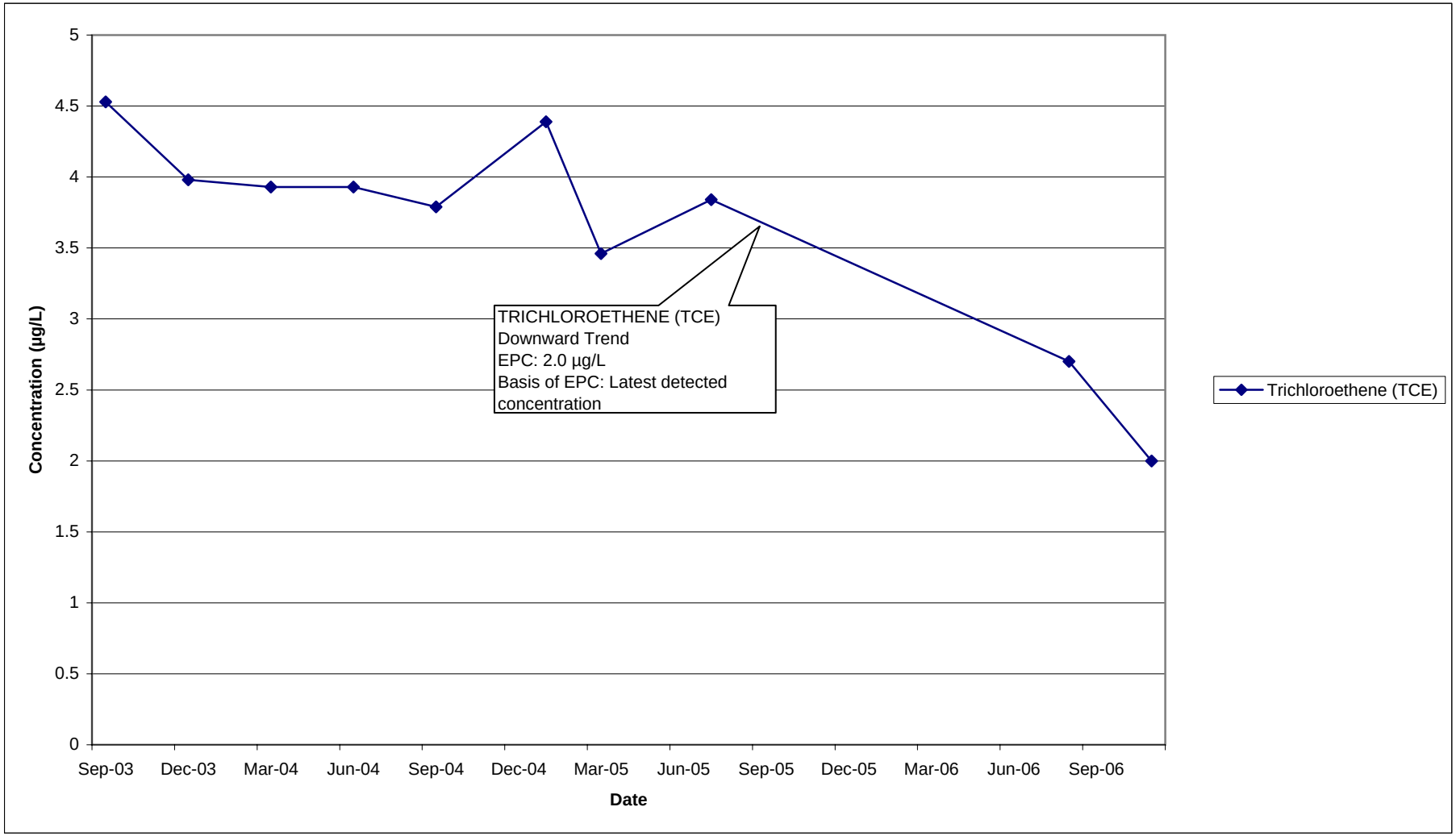


Figure D.13
Monitoring Well 5 Trend Analysis
Metals
Former SADVA

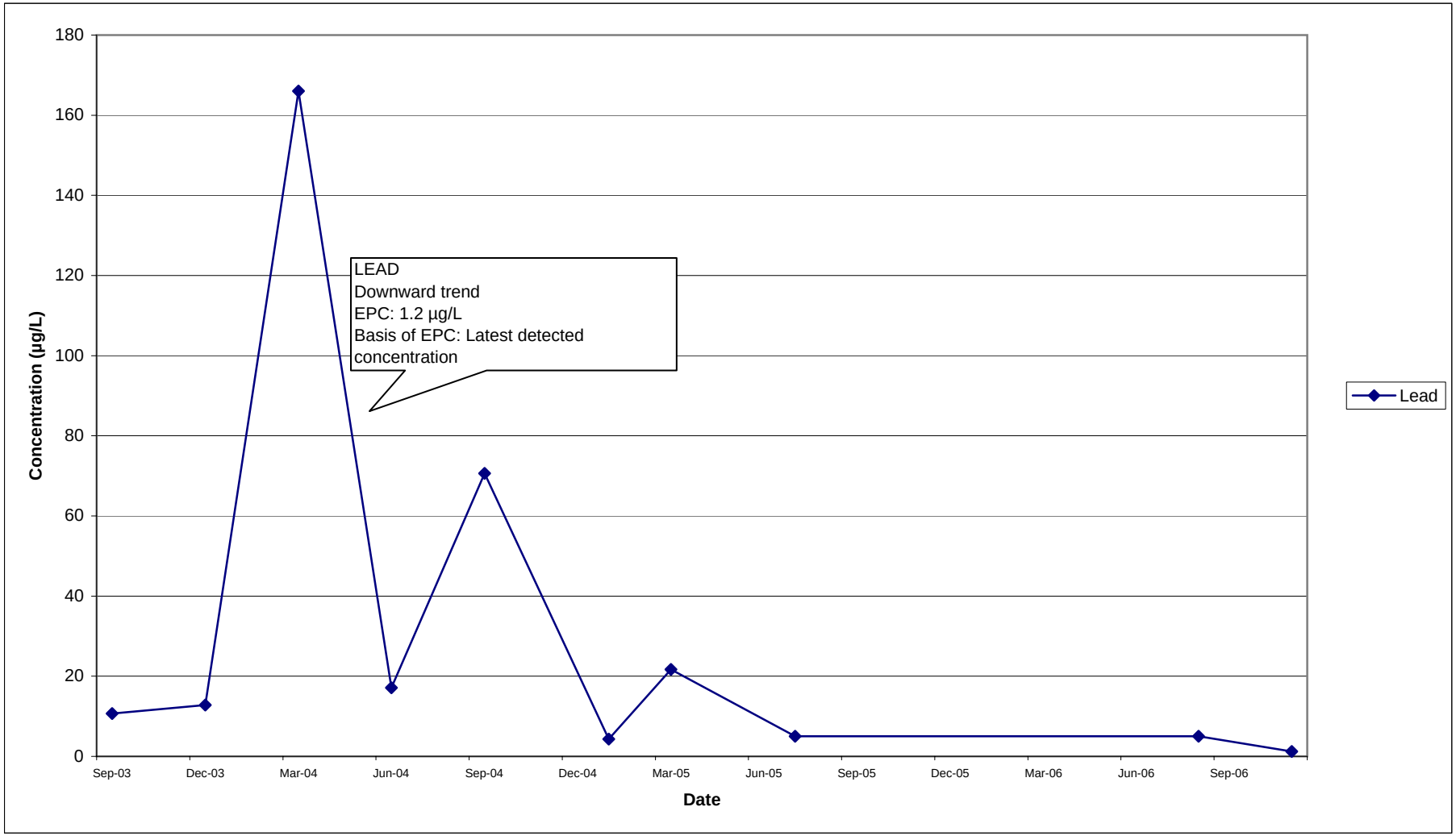


Figure D.14
Supply Well Trend Analysis
Volatile Chemicals
Former SADVA

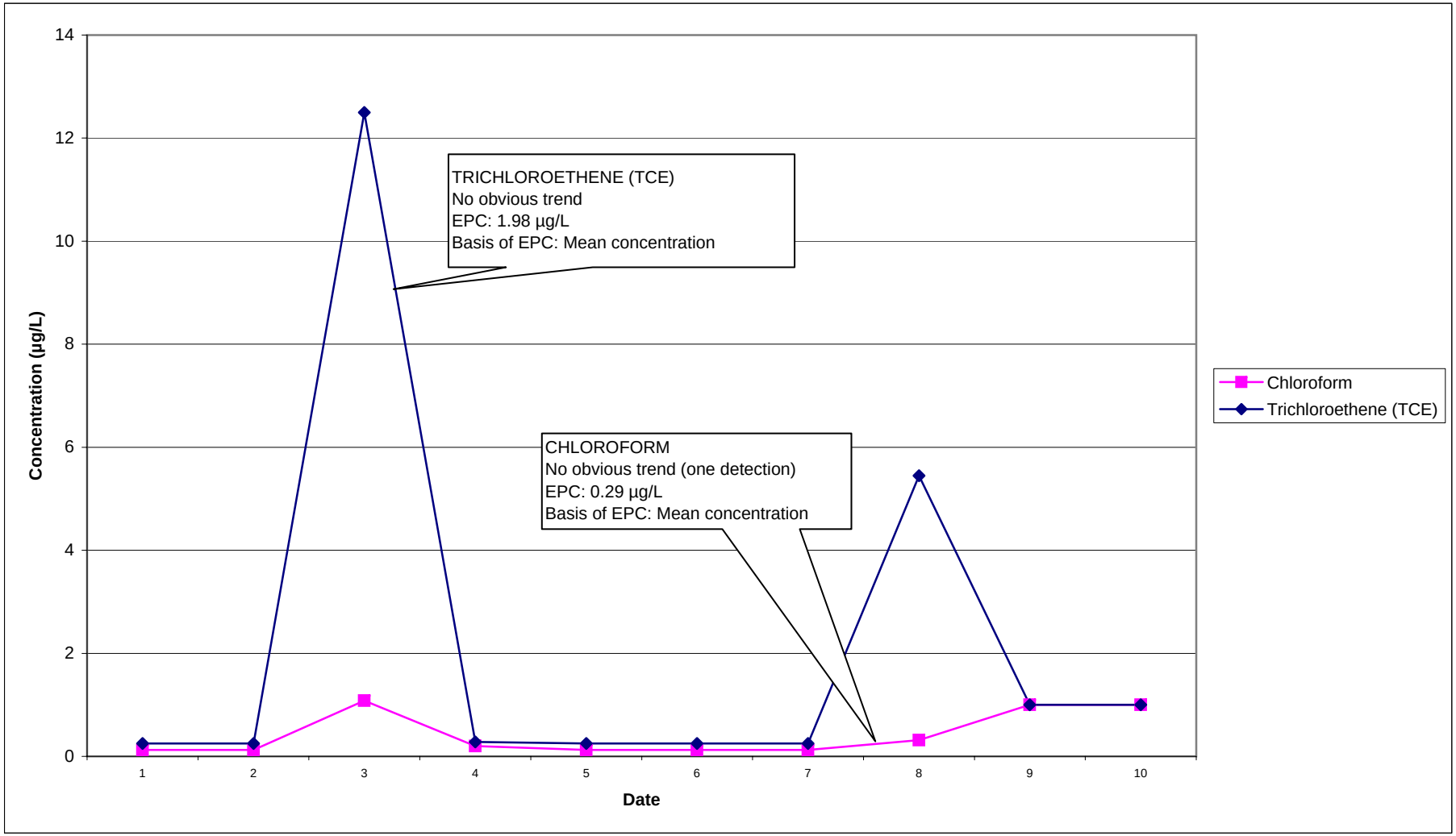


Figure D.15
Supply Well Trend Analysis
Metals
Former SADVA

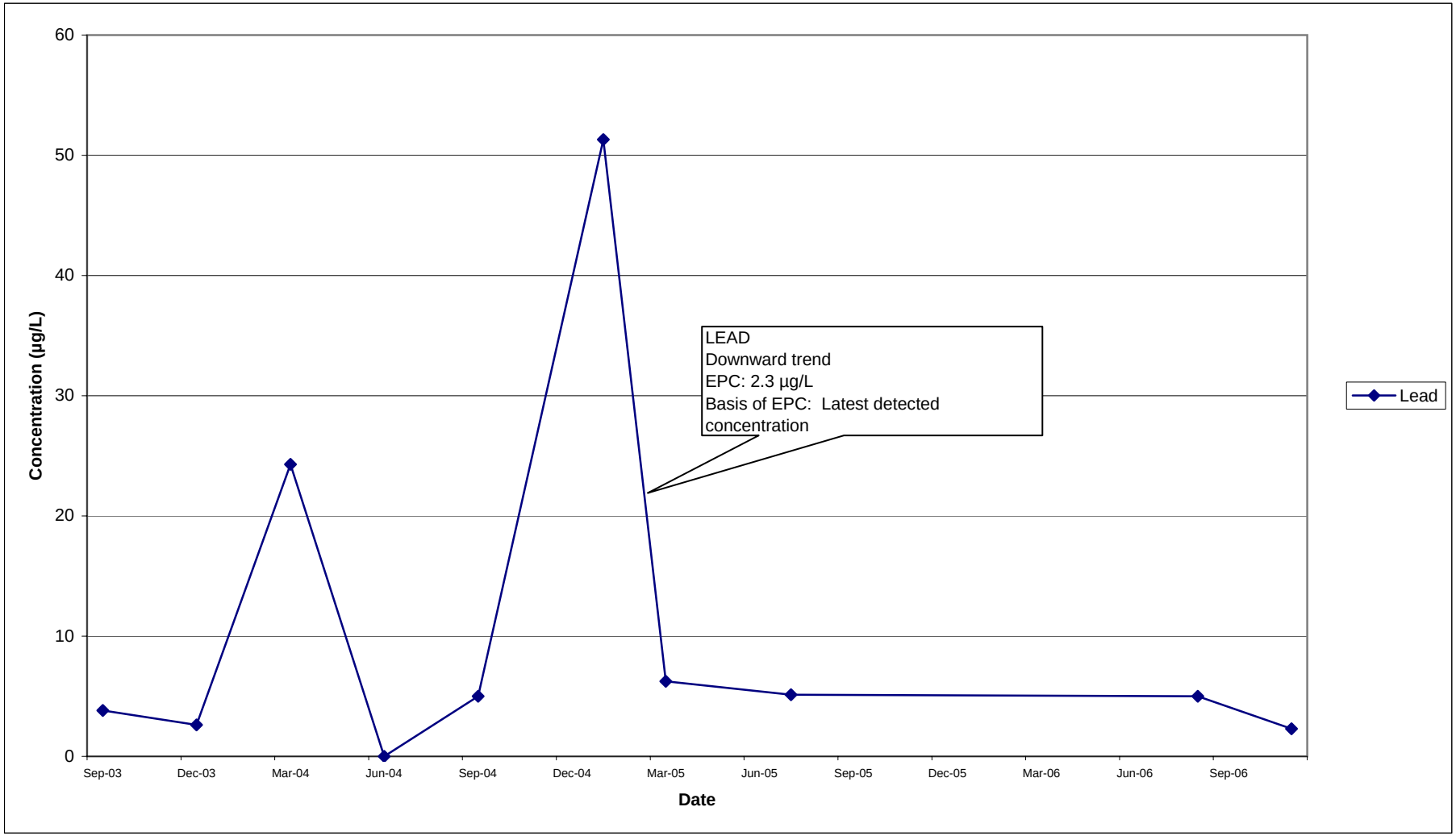


Table D.1
Chemicals Detected in Mixed Soil
(Endpoint Excavation Soil Samples)
AOC 3 Former SADVA

Sample ID			EX1-Post-N1	EX1-Post-E1	EX1-Post-E2	EX1-Post-E3	EX1-Post-W1	EX1-Post-S1	EX1-Post-F1	EX1-Post-F2	EX1-Post-F3	EX2-Post-E2	EX2-Post-N1	EX2-Post-W2	EX2-Post-S2	EX2-POST-F3	EX2-POST-F3	POSTEX3-N1	POSTEX3-S1	POSTEX3-F1
Collection Date			9/19/2002	9/19/2002	9/24/2002	9/24/2002	9/24/2002	9/24/2002	9/19/2002	9/24/2002	9/24/2002	9/24/2002	9/20/2002	9/24/2002	9/24/2002	10/2/2002	10/3/2002	10/10/2002	10/10/2002	10/10/2002
Depth			8 feet	8 feet	8 feet	8 feet	8 feet	8 feet	18 to 20 feet	18 to 20 feet	18 to 20 feet	8 feet	8 feet	8 feet	8 feet	8 to 10 feet	8 to 10 feet	8 feet	8 feet	18 feet
Sample Source			Excavation 1	Excavation 1	Excavation 1	Excavation 1	Excavation 1	Excavation 1	Excavation 1	Excavation 1	Excavation 1	Excavation 2	Excavation 2	Excavation 2	Excavation 2	Excavation 2	Excavation 2	Excavation 3	Excavation 3	Excavation 3
			Endpoint	Endpoint	Endpoint	Endpoint	Endpoint	Endpoint	Endpoint	Endpoint Sample	Endpoint Sample	Endpoint	Endpoint	Endpoint	Endpoint	Endpoint	Endpoint	Endpoint Sample	Endpoint Sample	Endpoint Sample
Parameter	**units**	**Maximum Detected Concentration**																		
VOCs																				
Acetone	µg/kg	41								116 U	112 U							10.8 U	11.1 U	11.4 U
Chlorobenzene	µg/kg	96								5.8 U	5.58 U							5.39 U	5.53 U	5.7 U
1,2-dichloroethene (total)	µg/kg	5								11.6 U	5.58 U							5.39 U	5.53 U	5.7 U
Ethylbenzene	µg/kg	66								5.8 U	5.58 U							5.39 U	5.53 U	5.7 U
Methylene chloride	µg/kg	43								5.8 U	5.58 U							5.39 U	5.53 U	5.7 U
Tetrachloroethene	µg/kg	8								5.8 U	5.58 U							5.39 U	5.53 U	5.7 U
Toluene	µg/kg	6								5.8 U	5.58 U							5.39 U	5.53 U	5.7 U
trans-1,2-Dichloroethene	µg/kg	1.2																		
Trichloroethene	µg/kg	43								5.8 U	5.58 U							5.39 U	5.53 U	5.7 U
Xylenes (total)	µg/kg	110								5.8 U	5.58 U							5.39 U	5.53 U	5.7 U
SVOCs																				
2-methylnaphthalene	µg/kg	250								191 U	164 J									
Acenaphthene	µg/kg	83								191 U	184 U									
Anthracene	µg/kg	66								191 U	184 U									
Benzoic acid	µg/kg	389								389	920 U									
bis(2-ethylhexyl)phthalate	µg/kg	162								162 J	184 U									
Chrysene	µg/kg	46								191 U	184 U									
Dibenzofuran	µg/kg	37								191 U	184 U									
Flourene	µg/kg	140								191 U	184 U									
Naphthalene	µg/kg	140								191 U	184 U									
Pentachlorophenol	µg/kg	569								569 J	920 U									
Phenanthrene	µg/kg	420								191 U	184 U									
Pyrene	µg/kg	67								191 U	184 U									
Pesticides / PCBs																				
4,4'-DDD	µg/kg	2.59																		
4,4'-DDE	µg/kg	23.8																		
4,4'-DDT	µg/kg	95.1																		
Metals																				
Aluminum	mg/kg	29,700.00	14,600	17,200	20,300	18,100	21,900	15,400	15,600	29,700	18,800	18,700	11,750	15,300	16,200	--	--	19,200	18,600	17,900
Antimony	mg/kg	3.39	--	--	--	--	--	--	--	--	--	--	3 U	--	0.161 J	--	--	--	--	--
Arsenic	mg/kg	11.50	7.85	3.83	2.7	6.7	7.91	5.57	6.61	6.39	4.85	4.1	0.25 U	4.75	5.14	--	--	3.45	5.15	2.45
Barium	mg/kg	123.00	69.7	84.1	89.8	83.9	101	78.3	61.2	123	74.8	75.6	40.5	54.9	62.7	--	--	72.3	75.2	77.8
Beryllium	mg/kg	1.53	0.742	1.17	1.06 J	0.911	1.12	0.762	0.768	1.53	0.997 J	0.91	0.78	0.718	0.813	--	--	0.874	0.827	0.842
Cadmium	mg/kg	54.40	0.307 J	3.57	0.943 J	44.2	6.12	0.441 J	1.38	54.4	11	0.261 J	0.25 U	0.211 J	0.261 J	--	--	0.586	0.549	0.624
Calcium	mg/kg	4,230.00	1540	2430	2200	2190	2790	2350	1980	4230	33.6	1700	1640	881	1320	--	--	1910	2410	2490
Chromium	mg/kg	40.2	20	24.9	28.4	25	29.7	19.8	20.9	40.2	28	22.4	20.4	17.4	20	--	--	23.4	23.1	23.5
Cobalt	mg/kg	26.50	12.6	12.4	18.4	14.4	18.5	13.9	13.8	26.5	16.5	12.9	10.8	10.1	12.6	--	--	11.7	8.3	10.7
Copper	mg/kg	68.60	38.5	48	43.2	39.2	29.7	32	33.5	68.6	43.3	29.4	25.3	26.4	29.4	--	--	31.9	38.3	40
Iron	mg/kg	48,700.00	26,900	32,600	36,700	30,300	38,200	25,900	27,300	48,700	36,300	27,000	9,820	22,800	25,900	--	--	31,900	31,800	40,500
Lead	mg/kg	316.9	19.1	7.05	12.9	30.7	316.9	15	17.3	31.8	12.4	9.16	162	9.2	262	2.93	156	11.3	13.2	7.41
Magnesium	mg/kg	11,300.00	6,140	4,860	7,720	6,930	7,830	5,960	6,220	11,300	8220	5,500	4,750	4,400	5,190	--	--	6,060	7,170	7,240
Manganese	mg/kg	832.00	497	519	780	753	684	446	587	832	684	430	625	515	473	--	--	549	335	514
Mercury	mg/kg	0.17	0.0397 J	0.0467 J	0.0479 J	0.0361 J	0.0557 J	0.0617 J	0.0279 J	0.168 J	0.027 J	0.0257 J	0.02	0.0265 J	0.0673 J	--	--	0.0251 J	--	0.0278 J
Nickel	mg/kg	195.00	27.9	32.4	40.1	28.7	38.7	29.1	31.7	195	37	25.8	20.5	21.6	25.3	--	--	30.7	30.8	32
Potassium	mg/kg	3,990.00	1760	2570	2780	2610	3140	2350	1680	3990	2400	2220	720	1410	1970	--	--	2270	2360	2310
Selenium	mg/kg	7.71	0.681	0.369	0.338	0.522	0.447	0.335	0.539	0.325	0.325	0.394	0.25 U	0.302	0.321	--	--	0.369	0.444	0.318
Silver	mg/kg	3.97	1.67 J	2.71	2.78 J	2.59	3.97	2.93	1.91 J	3.84	2.63 J	2.97	1 U	2.95	2.53	--	--	1.21 J	1.54 J	1.57 J
Sodium	mg/kg	832.00	47.2	69.6	68.7	76.3	82.3	65	55.5	832	92.9	61	149	46.1	50.7	--	--	49.8	70.4	68.1
Thallium	mg/kg	11.70	0.14	0.107 J	0.0888 J J	0.156	0.157	0.116	0.142	0.122	0.143	0.104	0.5 U	0.0868 J	0.0893	--	--	0.0832 J	0.099 J	0.0585 J
Vanadium	mg/kg	44.30	22.1	30.8	31.8	28.7	36.6	25.4	23.7	44.3	28.3	31.6	14.2	25.1	26.5	--	--	31.1	28.7	29.6
Zinc	mg/kg	192.00	96	109	110	122	123	92.3	87.4	192	124	68.8	81	56.2	72.8	--	--	93	100	103

Notes:
U - Analyte Undetected
J - Estimated Value

Table D.1
Chemicals Detected in Mixed Soil
(Endpoint Excavation Soil Samples)
AOC 3 Former SADVA

Sample ID																					
Collection Date		IV Composite	PES-1-NEB	PES-1-NWB	PES-1-SEB	PES-1-SWB	PES-1-NEB-R	PES-2-NSWC	PES-2-WSWC	PES-2-ESWC	PES-2-SSWC	PES-3-W-1-SWS	PES-3-W-2-SWS	PES-3-W-3-SWS	PES-3-S-1-SWS	PES-3-E-1-SWS	PES-3-E-2-SWS	PES-3-N-1-SWS	PES-3-N-2-SWS	PES-3-W-1-SWS-2	PES-3-N-2-SWS-2
Depth		7/22/2003	5/20/2003	5/20/2003	5/20/2003	5/20/2003	6/27/2003	5/16/2003	5/16/2003	5/16/2003	5/16/2003	5/19/2003	5/19/2003	5/19/2003	5/19/2003	5/19/2003	5/19/2003	5/19/2003	5/19/2003	5/22/2003	5/22/2003
Sample Source		soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Parameter	**units**																				
VOCs																					
Acetone	µg/kg	113 U						113 U	112 U	10.3 J	111 U	12 U	11 U	10 U	11 U	13	12 U	10 U	41 J		
Chlorobenzene	µg/kg	5.67 U						5.64 U	5.59 U	5.46 U	5.54 U	12 U	11 U	10 U	11 U	12 U	12 U	10 U	96		
1,2-dichloroethene (total)	µg/kg	5.67 U						5.64 U	5.59 U	5.46 U	5.54 U	5 J	4 J	10 U	11 U	12 U	12 U	10 U	53 U		
Ethylbenzene	µg/kg	5.67 U						5.64 U	5.59 U	5.46 U	5.54 U	12 U	11 U	10 U	11 U	12 U	12 U	10 U	66		
Methylene chloride	µg/kg	5.67 U						5.64 U	5.59 U	5.46 U	5.54 U	12	6 J	28 B	11 J	19	18	5 J	43 J		
Tetrachloroethene	µg/kg	5.67 U						1 J	1.4 J	0.854 J	2.36 J	2 J	8 J	10 U	11 U	12 U	12 U	10 U	53 U		
Toluene	µg/kg	5.67 U						5.64 U	5.59 U	5.46 U	5.54 U	12 U	11 U	10 U	11 U	12 U	12 U	10 U	6 J		
trans-1,2-Dichloroethene	µg/kg							5.64 U	5.59 U	5.46 U	1.2 J										
Trichloroethene	µg/kg	5.67 U						7.38	6.03	4.55 J	8.71	17	32	17	5 J	19	3 J	2 J	43 J		
Xylenes (total)	µg/kg	5.67 U						5.64 U	5.59 U	5.46 U	5.54 U	12 U	11 U	10 U	11 U	12 U	12 U	10 U	110		
SVOCs																					
2-methylnaphthalene	µg/kg	191 U										73 J	210 J	360 U	78 J	380 U	85 J	88 J	250 J		
Acenaphthene	µg/kg	191 U						186 U	184 U	180 U	183 U	740 U	710 U	360 U	740 U	380 U	720 U	700 U	83 J		
Anthracene	µg/kg	191 U						186 U	184 U	180 U	183 U	740 U	710 U	360 U	740 U	380 U	720 U	700 U	66 J		
Benzoic acid	µg/kg	955 U																			
bis(2-ethylhexyl)phthalate	µg/kg	191 U																			
Chrysene	µg/kg	191 U						186 U	184 U	180 U	183 U	740 U	710 U	360 U	740 U	380 U	720 U	700 U	46 J		
Dibenzofuran	µg/kg	191 U										740 U	37 J	360 U	740 U	380 U	720 U	700 U	780 U		
Flourene	µg/kg	191 U						186 U	184 U	180 U	183 U	740 U	710 U	360 U	740 U	380 U	720 U	700 U	140 J		
Naphthalene	µg/kg	191 U						186 U	184 U	180 U	183 U	740 U	63 J	360 U	740 U	380 U	720 U	700 U	140 J		
Pentachlorophenol	µg/kg	955 U																			
Phenanthrene	µg/kg	191 U						186 U	184 U	180 U	183 U	740 U	150 J	360 U	38 J	380 U	720 U	54 J	420 J		
Pyrene	µg/kg	191 U						186 U	184 U	180 U	183 U	740 U	710 U	360 U	740 U	380 U	720 U	700 U	67 J		
Pesticides / PCBs																					
4,4'-DDD	µg/kg		2.59 J	3.52 U	3.56 U	3.42 U															
4,4'-DDE	µg/kg		23.8	3.52 U	3.56 U	3.42 U															
4,4'-DDT	µg/kg		95.1 I	3.52 U	9.24	1.01 J															
Metals																					
Aluminum	mg/kg	18,900																			
Antimony	mg/kg	3.39																			
Arsenic	mg/kg	11.5																			
Barium	mg/kg	75.3 J																			
Beryllium	mg/kg	0.856																			
Cadmium	mg/kg	0.374 J																			
Calcium	mg/kg	2,090																			
Chromium	mg/kg	23.4																			
Cobalt	mg/kg	13.4																			
Copper	mg/kg	36.3																			
Iron	mg/kg	39,600																			
Lead	mg/kg	14.2		22.3	22.2	21.1	33.3						16.9	8.2	27.4	15.3	14.2	25.1		23.6	17.9
Magnesium	mg/kg	6,390																			
Manganese	mg/kg	457																			
Mercury	mg/kg	0.0326																			
Nickel	mg/kg	30.7 J																			
Potassium	mg/kg	2,200																			
Selenium	mg/kg	7.71																			
Silver	mg/kg	1.13																			
Sodium	mg/kg	54.4																			
Thallium	mg/kg	11.7																			
Vanadium	mg/kg	29.7 J																			
Zinc	mg/kg	89.4																			

Notes:
U - Analyte
J - Estimate

Table D.2
Chemicals Detected in Groundwater
AOC 3 Former SADVA

		SAMPLE ID:		INDOOR AIR	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
		SAMPLED:		SCREENING	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04	Jan-05	Mar-05	Jul-05	Aug-06	Nov-06	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04	Jan-05	Mar-05	Jul-05	Aug-06	Nov-06
		DEPTH ZONE:		VALUE	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
PARAMETER	**CAS NUMBER**	UNITS:	MAX VALUE	(Risk = 1x10^{-6})	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																								
2-Butanone	78-93-3	µg/L	17.7	4.40E+05	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	17.7	2.5 U	2.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4.46 J	2.5 U	5 U	5 U
Carbon Tetrachloride	56-23-5	µg/L	1.09	5.00E+00	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U
Chloroform	67-66-3	µg/L	1.08	8.00E+01	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U
1,2-Dichloroethene (total)	107-06-2	µg/L	3.57	5.00E+00	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U
Hexachlorobutadiene	87-68-3	µg/L	0.442	3.30E-01	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.442 J	0.25 U	0.25 U	0.25 U	1 U	1 U
Isopropylbenzene	98-82-8	µg/L	0.825	8.40E+00	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.825 J	0.25 U	0.25 U	0.25 U	1 U	1 U
Methyene chloride	75-09-2	µg/L	0.87	5.80E+01	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 J	1 U
n-Propylbenzene	103-65-1	µg/L	0.957	3.20E+02	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	0.957 J	0.125 U	0.125 U	0.125 U	1 U	1 U
Tetrachloroethene (PCE)	127-18-4	µg/L	0.978	5.00E+00	0.25 U	0.25 U	0.25 U	0.25 U	0.978 J	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U
Toluene	108-88-3	µg/L	3.13	1.50E+03	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5	2.5	0.25 U	0.25 U	0.25 U	0.25 U	3.13	0.25 U	0.25 U	0.25 U	1 U	1 U
Trichloroethene (TCE)	79-01-6	µg/L	12.5	5.00E+00	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1.53	0.736	2.32 J	1.79	0.729 J	1.81	0.858 J	2.58	2.9	1.9
1,2,3-Trichloropropane	96-18-4	µg/L	0.322	2.90E+02	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	1 U	1 U	0.75 U	0.75 U	0.75 U	0.75 U	0.322 J	0.75 U	0.75 U	0.75 U	1 U	1 U
1,2,4-Trimethylbenzene	95-63-6	µg/L	1.89	2.40E+01	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	µg/L	0.759	2.50E+01	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.759 J	0.25 U	0.25 U	0.25 U	1 U	1 U
SEMIVOLATILES																								
Naphthalene	91-20-3	µg/L	1.75		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1.75	0.2 U	0.2 U	0.2 U	1 U	1 U
METALS																								
Lead	7439-92-1	µg/L	293		13.8	6.4	164	48.9	5.31	15.2	4.71 J	2.77 J	5 U	1.8 J	21	10.8	27.7	20	9.68	17.2	7.68	3.85	5 U	5 U

Notes:
U -- Analyte undetected
J -- Estimated Value
NA -- Not analyzed in this sample

Table D.2
Chemicals Detected in Groundwater
AOC 3 Former SADVA

PARAMETER	MW-3 Sep-03 Unknown Result	MW-3 Dec-03 Unknown Result	MW-3 Mar-04 Unknown Result	MW-3 Jun-04 Unknown Result	MW-3 Sep-04 Unknown Result	MW-3 Jan-05 Unknown Result	MW-3 Mar-05 Unknown Result	MW-3 Jul-05 Unknown Result	MW-3 Aug-06 Unknown Result	MW-3 Nov-06 Unknown Result	MW-4-2 Sep-03 Unknown Result	MW-4-2 Dec-03 Unknown Result	MW-4-2 Mar-04 Unknown Result	MW-4-2 Jun-04 Unknown Result	MW-4-2 Sep-04 Unknown Result	MW-4-2 Jan-05 Unknown Result	MW-4-2 Mar-05 Unknown Result	MW-4-2 Jul-05 Unknown Result	MW-4-2 Aug-06 Unknown Result	MW-4-2 Nov-06 Unknown Result	MW-5 Sep-03 Unknown Result	MW-5 Dec-03 Unknown Result	MW-5 Mar-04 Unknown Result	MW-5 Jun-04 Unknown Result	MW-5 Sep-0 Unknov Resul
VOLATILES																										
2-Butanone	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	14.2	4.73	2.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5
Carbon Tetrachloride	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.658	0.25 U	0.25 U	1.09
Chloroform	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125
1,2-Dichloroethene (total)	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1.25	0.632	1.18	1.58	0.738
Hexachlorobutadiene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
Isopropylbenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
Methyene chloride	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.63 J	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.63 J	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
n-Propylbenzene	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.353 J	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125
Tetrachloroethene (PCE)	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.266
Toluene	0.25 U	0.25 U	0.25 U	0.25 U	1.92	0.377	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.421 J	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	1.91
Trichloroethene (TCE)	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.343	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	4.53	3.98	3.93	3.93	3.79
1,2,3-Trichloropropane	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	1 U	1 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	1 U	1 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75
1,2,4-Trimethylbenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.89	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
1,3,5-Trimethylbenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.608 J	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
SEMIVOLATILES																										
Naphthalene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 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	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2
METALS																										
Lead	2.69	4.92	13.1	3.88	7.81 J	2.99 J	7.81	2.65 J	5 U	1.8 J	2.5 U	3.4	293	4.98	5 U	5 U	3.31 J	2.77 J	5 U	1.7 J	10.7	12.8	166	17.1	70.6

Notes:
U -- Analyte undetected
J -- Estimated Value
NA -- Not analyzed in this samp

Table D.2
Chemicals Detected in Groundwater
AOC 3 Former SADVA

PARAMETER	MW-5 Jan-05 Unknown	MW-5 Mar-05 Unknown	MW-5 Jul-05 Unknown	MW-5 Aug-06 Unknown	MW-5 Nov-06 Unknown	Supply Well Sep-03 Unknown	Supply Well Dec-03 Unknown	Supply Well Mar-04 Unknown	Supply Well Jun-04 Unknown	Supply Well Sep-04 Unknown	Supply Well Jan-05 Unknown	Supply Well Mar-05 Unknown	Supply Well Jul-05 Unknown	Supply Well Aug-06 Unknown	Supply Well Nov-06 Unknown	MW-9 Aug-06 Unknown	MW-9 Nov-06 Unknown
	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
VOLATILES																	
2-Butanone	2.5 U	2.5 U	2.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.599 J	0.25 U	0.25 U	0.25 U	0.25 U	1.01	1 U	1 U	1 U	1 U
Chloroform	0.125 U	0.125 U	0.125 U	1 U	1 U	0.125 U	0.125 U	1.08	0.200	0.125 U	0.125 U	0.125 U	0.316 J	1 U	1 U	1 U	1 U
1,2-Dichloroethene (total)	1.06	0.792 J	1.53	1 U	1 U	0.25 U	0.25 U	3.57	0.250 U	0.250 U	0.250 U	0.250 U	1.570	1 U	1 U	1 U	1 U
Hexachlorobutadiene	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Isopropylbenzene	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.82 J	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Methyene chloride	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.87 J	1 U	1 U	1 U
n-Propylbenzene	0.125 U	0.125 U	0.125 U	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	1 U	1 U
Tetrachloroethene (PCE)	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Toluene	0.25 U	0.25 U	0.25 U	1 U	1 U	0.297	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Trichloroethene (TCE)	4.39	3.46	3.84	2.7	2	0.25 U	0.25 U	12.5	0.281	0.25 U	0.25 U	0.25 U	5.45	1 U	1 U	6.3	6.6
1,2,3-Trichloropropane	0.75 U	0.75 U	0.75 U	1 U	1 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	0.25 U	0.25 U	0.25 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U
SEMIVOLATILES																	
Naphthalene	0.2 U	0.2 U	0.2 U	1 U	1 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	1 U	1 U	1 U	1 U
METALS																	
Lead	4.32 J	21.7	5 U	5 U	1.2 J	3.83	2.62	24.30	NA	5.00 U	51.30	6.24	5.12 J	5 U	2.3 J	5 U	5 U

Notes:
U -- Analyte undetected
J -- Estimated Value
NA -- Not analyzed in this samp

Table D.3
Comparison of Site Concentration to Background
AOC 3
Mixed Depth Soils
Former SADVA

CAS No.	Compound	Exposure Point Concentration (units)		EPC Max or UCL?	Site Background Range (units)				Exceeds Background
	Volatiles								
540-59-0	1,2-Dichloroethene (total)	5	µg/kg	Max					yes
67-64-1	Acetone	41	µg/kg	Max	ND	-	3.1	µg/kg	yes
108-90-7	Chlorobenzene	96	µg/kg	Max					yes
100-41-4	Ethylbenzene	66	µg/kg	Max					yes
75-09-2	Methylene Chloride	43	µg/kg	Max					yes
127-18-4	Tetrachloroethene	8	µg/kg	Max					yes
108-88-3	Toluene	6	µg/kg	Max					yes
156-60-5	trans-1,2-Dichloroethene	1.2	µg/kg	Max					yes
79-01-6	Trichloroethene	15	µg/kg	UCL					yes
1330-20-7	Xylenes (total)	110	µg/kg	Max					yes
	Semivolatiles								
91-57-6	2-Methylnaphthalene	250	µg/kg	Max					yes
83-32-9	Acenaphthene	83	µg/kg	Max					yes
120-12-7	Anthracene	66	µg/kg	Max	ND	-	61	µg/kg	yes
65-85-0	Benzoic Acid	389	µg/kg	Max					yes
117-81-7	bis(2-ethylhexyl)phthalate	162	µg/kg	Max					yes
218-01-9	Chrysene	46	µg/kg	Max	ND	-	680	µg/kg	no
132-64-9	Dibenzofuran	37	µg/kg	Max					yes
86-73-7	Fluorene	140	µg/kg	Max	ND	-	23	µg/kg	yes
91-20-3	Naphthalene	140	µg/kg	Max					yes
87-86-5	Pentochlorophenol	569	µg/kg	Max					yes
85-01-8	Phenanthrene	420	µg/kg	Max	ND	-	480	µg/kg	no
129-00-0	Pyrene	67	µg/kg	Max	ND	-	750	µg/kg	no
	Pesticides								
72-54-8	4,4'-DDD	2.59	µg/kg	Max	ND	-	1.2	µg/kg	yes
72-55-9	4,4'-DDE	23.8	µg/kg	Max	ND	-	9.4	µg/kg	yes
50-29-3	4,4'-DDT	95.1	µg/kg	Max	0.61	-	15	µg/kg	yes
	Metals								
7429-90-5	Aluminum	19,700	mg/kg	UCL	7,080	-	12,800	mg/kg	yes
7440-36-0	Antimony	3.39	mg/kg	Max	0.2	-	0.59	mg/kg	yes
7440-38-2	Arsenic	11.5	mg/kg	Max	4.3	-	16.4	mg/kg	no
7440-39-3	Barium	123	mg/kg	Max	33	-	104	mg/kg	yes
7440-41-7	Beryllium	1.53	mg/kg	Max	0.38	-	0.67	mg/kg	yes
7440-43-9	Cadmium	14.6	mg/kg	UCL	0.21	-	0.52	mg/kg	yes
7440-47-3	Chromium	26.4	mg/kg	UCL	9.3	-	17.5	mg/kg	yes
7440-48-4	Cobalt	26.5	mg/kg	Max	5.3	-	12.2	mg/kg	yes
7440-50-8	Copper	68.6	mg/kg	Max	13.4	-	26.9	mg/kg	yes
7439-92-1	Lead	316.9	mg/kg	Max	16.5	-	60.8	mg/kg	yes
7439-96-5	Manganese	832	mg/kg	Max	197	-	875	mg/kg	no
7439-97-6	Mercury	0.17	mg/kg	Max	0.039	-	0.095	mg/kg	yes
7440-02-0	Nickel	59.1	mg/kg	UCL	10.6	-	24.8	mg/kg	yes
7782-49-2	Selenium	7.71	mg/kg	Max	0.44	-	1.2	mg/kg	yes
7440-22-4	Silver	3.97	mg/kg	Max	0.16	-	0.17	mg/kg	yes
7440-28-0	Thallium	2.16	mg/kg	UCL	ND	-	0.67	mg/kg	yes
7440-62-2	Vanadium	31.1	mg/kg	UCL	13.7	-	24	mg/kg	yes
7440-66-6	Zinc	192	mg/kg	Max	46	-	134	mg/kg	yes

ND non-detect
UCL 95% Upper Confidence Limit

Table D.4
Comparison of Site Concentration to NYSDEC Screening Criteria
AOC 3
Mixed Depth Soils
Former SADVA

CAS No.	Compound	Exposure Point Concentration (units)		EPC Max or UCL?	NYSDEC Recommended Soil Cleanup Objective (units)		EPC Exceed NYSDEC?	Residential USEPA Region 6 Risk-Based Screening Level (units)		Industrial USEPA Region 6 Risk-Based Screening Level (units)		EPC Exceed Residential USEPA?	EPC Exceed Industrial USEPA?
	Volatiles												
67-64-1	Acetone	41	µg/kg	Max	200	µg/kg	no	14,151,000	µg/kg	60,480,000	µg/kg	no	no
108-90-7	Chlorobenzene	96	µg/kg	Max	1700	µg/kg	no	273,000	µg/kg	503,000	µg/kg	no	no
540-59-0	1,2-Dichloroethene (total)	5	µg/kg	Max	300	µg/kg	no	43,000	µg/kg	163,000	µg/kg	no	no
100-41-4	Ethylbenzene	66	µg/kg	Max	5,500	µg/kg	no	234,000	µg/kg	234,000	µg/kg	no	no
75-09-2	Methylene Chloride	43	µg/kg	Max	100	µg/kg	no	521,000	µg/kg	521,000	µg/kg	no	no
127-18-4	Tetrachloroethene	8	µg/kg	Max	1,400	µg/kg	no	1,000	µg/kg	2,000	µg/kg	no	no
108-88-3	Toluene	6	µg/kg	Max	1,500	µg/kg	no	521,000	µg/kg	521,000	µg/kg	no	no
156-60-5	trans-1,2-Dichloroethene	1.2	µg/kg	Max	300	µg/kg	no	122,000	µg/kg	204,000	µg/kg	no	no
79-01-6	Trichloroethene	15	µg/kg	UCL	700	µg/kg	no	40	µg/kg	100	µg/kg	no	no
1330-20-7	Xylenes (total)	110	µg/kg	Max	1,200	µg/kg	no	214,000	µg/kg	214,000	µg/kg	no	no
	Semivolatiles												
91-57-6	2-Methylnaphthalene	250	µg/kg	Max	36,400	µg/kg	no	125,000	µg/kg	209,000	µg/kg	no	no
83-32-9	Acenaphthene	83	µg/kg	Max	50,000	µg/kg	no	3,683,000	µg/kg	32,503,000	µg/kg	no	no
120-12-7	Anthracene	66	µg/kg	Max	50,000	µg/kg	no	21,900,000	µg/kg	100,000,000	µg/kg	no	no
65-85-0	Benzoic Acid	389	µg/kg	Max	--	µg/kg	no	100,000,000	µg/kg	100,000,000	µg/kg	no	no
117-81-7	bis(2-ethylhexyl)phthalate	162	µg/kg	Max	50000	µg/kg	no	35,000	µg/kg	137,000	µg/kg	no	no
218-01-9	Chrysene	46	µg/kg	Max	400	µg/kg	no	15,000	µg/kg	234,000	µg/kg	no	no
132-64-9	Dibenzofuran	37	µg/kg	Max	6,200	µg/kg	no	145,000	µg/kg	1,738,000	µg/kg	no	no
86-73-7	Fluorene	140	µg/kg	Max	50,000	µg/kg	no	2,644,000	µg/kg	26,222,000	µg/kg	no	no
91-20-3	Naphthalene	140	µg/kg	Max	13,000	µg/kg	no	125,000	µg/kg	209,000	µg/kg	no	no
87-86-5	Pentochlorophenol	569	µg/kg	Max	1,000	µg/kg	no	3,000	µg/kg	10,000	µg/kg	no	no
85-01-8	Phenanthrene	420	µg/kg	Max	50,000	µg/kg	no	2,309,000	µg/kg	31,979,000	µg/kg	no	no
129-00-0	Pyrene	67	µg/kg	Max	50,000	µg/kg	no	2,309,000	µg/kg	31,979,000	µg/kg	no	no
	Pesticides												
72-54-8	4,4'-DDD	2.59	µg/kg	Max	2900	µg/kg	no	2,400	µg/kg	11,100	µg/kg	no	no
72-55-9	4,4'-DDE	23.8	µg/kg	Max	2100	µg/kg	no	1,700	µg/kg	7,800	µg/kg	no	no
50-29-3	4,4'-DDT	95.1	µg/kg	Max	2100	µg/kg	no	1,700	µg/kg	7,800	µg/kg	no	no
	Metals												
7429-90-5	Aluminum	19700	mg/kg	UCL	--	mg/kg	no	76,190,000	µg/kg	100,000,000	µg/kg	no	no
7440-36-0	Antimony	3.39	mg/kg	Max	--	mg/kg	no	30,000	µg/kg	454,000	µg/kg	no	no
7440-38-2	Arsenic	11.5	mg/kg	Max	7.5	mg/kg	yes	390	µg/kg	2,000	µg/kg	no	no
7440-39-3	Barium	123	mg/kg	Max	300	mg/kg	no	15,640,000	µg/kg	100,000,000	µg/kg	no	no
7440-41-7	Beryllium	1.53	mg/kg	Max	0.16	mg/kg	yes	150,000	µg/kg	2,156,000	µg/kg	no	no
7440-43-9	Cadmium	14.6	mg/kg	UCL	1	mg/kg	yes	40,000	µg/kg	563,000	µg/kg	no	no
7440-47-3	Chromium	26.4	mg/kg	UCL	10	mg/kg	yes	210,000	µg/kg	498,000	µg/kg	no	no
7440-48-4	Cobalt	26.5	mg/kg	Max	30	mg/kg	no	900,000	µg/kg	2,135,000	µg/kg	no	no
7440-50-8	Copper	68.6	mg/kg	Max	25	mg/kg	yes	2,910,000	µg/kg	42,178,000	µg/kg	no	no
7439-92-1	Lead	316.9	mg/kg	Max	--	mg/kg	no	3,240,000	µg/kg	35,171,000	µg/kg	no	no
7439-96-5	Manganese	832	mg/kg	Max	--	mg/kg	no	3,240,000	µg/kg	35,171,000	µg/kg	no	no
7439-97-7	Mercury	0.17	mg/kg	Max	0.1	mg/kg	yes	20,000	µg/kg	341,000	µg/kg	no	no
7440-02-0	Nickel	59.1	mg/kg	UCL	13	mg/kg	yes	1,560,000	µg/kg	22,711,000	µg/kg	no	no
7782-49-2	Selenium	7.71	mg/kg	Max	2	mg/kg	yes	390,000	µg/kg	5,678,000	µg/kg	no	no
7440-22-4	Silver	3.97	mg/kg	Max	--	mg/kg	no	390,000	µg/kg	5,678,000	µg/kg	no	no
7440-28-0	Thallium	2.16	mg/kg	UCL	--	mg/kg	no	10,000	µg/kg	79,000	µg/kg	no	no
7440-62-2	Vanadium	31.1	mg/kg	UCL	150	mg/kg	no	390,000	µg/kg	5,678,000	µg/kg	no	no
7440-66-6	Zinc	192	mg/kg	Max	20	mg/kg	yes	23,460,000	µg/kg	100,000,000	µg/kg	no	no

ND non-detect
UCL 95% Upper Confidence Limit
-- Criteria not available

Table D.5
Comparison to NYSDEC and USEPA Screening Criteria
AOC 3 -- Monitoring Well 1
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	NYSDEC Recommended Cleanup Objective (units)		Basis of Cleanup Objective	EPC Exceed NYSDEC?	USEPA Region 6 Risk-Based Screening Level (units)		EPC Exceed USEPA?
	VOLATILES										
78-93-3	2-Butanone	17.7	µg/L	max	N/A	µg/L		no	7,100	µg/L	no
56-23-5	Carbon Tetrachloride		µg/L			µg/L				µg/L	
67-66-3	Chloroform		µg/L			µg/L				µg/L	
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L				µg/L	
87-68-3	Hexachlorobutadiene		µg/L			µg/L				µg/L	
98-82-8	Isopropylbenzene		µg/L			µg/L				µg/L	
75-09-2	Methyene chloride		µg/L			µg/L				µg/L	
103-65-1	n-Propylbenzene		µg/L			µg/L				µg/L	
127-18-4	Tetrachloroethene (PCE)	0.285	µg/L	mean	5	µg/L	H(WS)	no	0.1	µg/L	yes
108-88-3	Toluene	3.13	µg/L	max	5	µg/L	H(WS)	no	2,300	µg/L	no
79-01-6	Trichloroethene (TCE)		µg/L			µg/L				µg/L	
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L				µg/L	
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L				µg/L	
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L				µg/L	
	SEMIVOLATILES										
91-20-3	Naphthalene		µg/L			µg/L				µg/L	
	METALS										
7439-92-1	Lead	1.80	µg/L	latest	25	µg/L	H(WS)	no	15	µg/L	no

N/A Screening value not available
H(WS) Source of drinking water (groundwater).
max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration
blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.6
Comparison to NYSDEC and USEPA Screening Criteria
AOC 3 Monitoring Well 2
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	NYSDEC Recommended Cleanup Objective (units)		Basis of Cleanup Objective	EPC Exceed NYSDEC?	USEPA Region 6 Risk-Based Screening Level (units)		EPC Exceed USEPA?
	VOLATILES										
78-93-3	2-Butanone	4.46	µg/L	max	N/A	µg/L		no	7,100	µg/L	no
56-23-5	Carbon Tetrachloride		µg/L			µg/L				µg/L	
67-66-3	Chloroform		µg/L			µg/L				µg/L	
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L				µg/L	
87-68-3	Hexachlorobutadiene	0.23	µg/L	mean	N/A	µg/L		no	0.86	µg/L	no
98-82-8	Isopropylbenzene		µg/L			µg/L				µg/L	
75-09-2	Methyene chloride		µg/L			µg/L				µg/L	
103-65-1	n-Propylbenzene	0.957	µg/L	max	5	µg/L	H(WS)	no	61	µg/L	no
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L				µg/L	
108-88-3	Toluene	3.13	µg/L	max	5	µg/L	H(WS)	no	2,300	µg/L	no
79-01-6	Trichloroethene (TCE)	1.90	µg/L	latest	5	µg/L	H(WS)	no	0.028	µg/L	yes
96-18-4	1,2,3-Trichloropropane	0.322	µg/L	max	0.04	µg/L	H(WS)	yes	0.002	µg/L	yes
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L				µg/L	
108-67-8	1,3,5-Trimethylbenzene	0.26	µg/L	mean	5	µg/L	H(WS)	no	12.33	µg/L	no
	SEMIVOLATILES										
91-20-3	Naphthalene	0.35	µg/L	mean	N/A	µg/L			6.2	µg/L	no
	METALS										
7439-92-1	Lead	3.85	µg/L	latest	25	µg/L	H(WS)	no	15	µg/L	no

N/A Screening value not available
H(WS) Source of drinking water (groundwater).
max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.7
Comparison to NYSDEC and USEPA Screening Criteria
AOC 3 Monitoring Well 3
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	NYSDEC Recommended Cleanup Objective (units)		Basis of Cleanup Objective	EPC Exceed NYSDEC?	USEPA Region 6 Risk-Based Screening Level (units)		EPC Exceed USEPA?
	VOLATILES										
78-93-3	2-Butanone	14.2	µg/L	max	N/A	µg/L		no	7,100	µg/L	no
56-23-5	Carbon Tetrachloride		µg/L			µg/L				µg/L	
67-66-3	Chloroform		µg/L			µg/L				µg/L	
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L				µg/L	
87-68-3	Hexachlorobutadiene		µg/L			µg/L				µg/L	
98-82-8	Isopropylbenzene		µg/L			µg/L				µg/L	
75-09-2	Methyene chloride	0.63	µg/L	max	5	µg/L	H(WS)		4.3	µg/L	no
103-65-1	n-Propylbenzene		µg/L			µg/L				µg/L	
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L				µg/L	
108-88-3	Toluene	1.92	µg/L	max	5	µg/L	H(WS)	no	2,300	µg/L	no
79-01-6	Trichloroethene (TCE)		µg/L			µg/L				µg/L	
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L				µg/L	
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L				µg/L	
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L				µg/L	
	SEMIVOLATILES										
91-20-3	Naphthalene		µg/L			µg/L				µg/L	
	METALS										
7439-92-1	Lead	13.80	µg/L	max	25	µg/L	H(WS)	no	15	µg/L	no

N/A Screening value not available
H(WS) Source of drinking water (groundwater).
max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.8
Comparison to NYSDEC Screening Criteria
AOC 3 -- Monitoring Well 4-2
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	NYSDEC Recommended Cleanup Objective (units)		Basis of Cleanup Objective	EPC Exceed NYSDEC?	USEPA Region 6 Risk-Based Screening Level (units)		EPC Exceed USEPA?
	VOLATILES										
78-93-3	2-Butanone		µg/L			µg/L				µg/L	
56-23-5	Carbon Tetrachloride		µg/L			µg/L				µg/L	
67-66-3	Chloroform		µg/L			µg/L				µg/L	
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L				µg/L	
87-68-3	Hexachlorobutadiene		µg/L			µg/L				µg/L	
98-82-8	Isopropylbenzene		µg/L			µg/L				µg/L	
75-09-2	Methyene chloride	0.63	µg/L	max	5	µg/L	H(WS)	no	4.3	µg/L	no
103-65-1	n-Propylbenzene	0.353	µg/L	max	5	µg/L	H(WS)	no	61	µg/L	no
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L				µg/L	
108-88-3	Toluene	0.421	µg/L	max	5	µg/L	H(WS)	no	2,300	µg/L	no
79-01-6	Trichloroethene (TCE)	0.22	µg/L	mean	5	µg/L	H(WS)	no	0.028	µg/L	yes
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L				µg/L	
95-63-6	1,2,4-Trimethylbenzene	0.38	µg/L	mean	5	µg/L	H(WS)	no	12	µg/L	no
108-67-8	1,3,5-Trimethylbenzene	0.608	µg/L	max	5	µg/L	H(WS)	no	12	µg/L	no
	SEMIVOLATILES										
91-20-3	Naphthalene		µg/L			µg/L				µg/L	
	METALS										
7439-92-1	Lead	1.70	µg/L	latest	25	µg/L	H(WS)	no	15	µg/L	no

H(WS) Source of drinking water (groundwater).
max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.9
Comparison to NYSDEC Screening Criteria
AOC 3 -- Monitoring Well 5
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	NYSDEC Recommended Cleanup Objective (units)		Basis of Cleanup Objective	EPC Exceed NYSDEC?	USEPA Region 6 Risk-Based Screening Level (units)		EPC Exceed USEPA?
	VOLATILES										
78-93-3	2-Butanone		µg/L			µg/L				µg/L	
56-23-5	Carbon Tetrachloride	1.09	µg/L	max	5	µg/L	H(WS)	no	0.17	µg/L	yes
67-66-3	Chloroform		µg/L			µg/L				µg/L	
540-59-0	1,2-Dichloroethene (total)	1.58	µg/L	max	5	µg/L	H(WS)	no	61	µg/L	no
87-68-3	Hexachlorobutadiene		µg/L			µg/L				µg/L	
98-82-8	Isopropylbenzene		µg/L			µg/L				µg/L	
75-09-2	Methyene chloride		µg/L			µg/L				µg/L	
103-65-1	n-Propylbenzene		µg/L			µg/L				µg/L	
127-18-4	Tetrachloroethene (PCE)	0.266	µg/L	max	5	µg/L	H(WS)	no	0.1	µg/L	yes
108-88-3	Toluene	1.91	µg/L	max	5	µg/L	H(WS)	no	2,300	µg/L	no
79-01-6	Trichloroethene (TCE)	2	µg/L	latest	5	µg/L	H(WS)	no	0.028	µg/L	yes
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L				µg/L	
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L				µg/L	
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L				µg/L	
	SEMIVOLATILES										
91-20-3	Naphthalene		µg/L			µg/L				µg/L	
	METALS										
7439-92-1	Lead	1.20	µg/L	latest	25	µg/L	H(WS)	no	15	µg/L	no

H(WS) Source of drinking water (groundwater).
max is the maximum detected concentration
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.10
Comparison to NYSDEC Screening Criteria
AOC 3 Supply Well
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	NYSDEC Recommended Cleanup Objective (units)		Basis of Cleanup Objective	EPC Exceed NYSDEC?	USEPA Region 6 Risk-Based Screening Level (units)		EPC Exceed USEPA?
	VOLATILES										
78-93-3	2-Butanone		µg/L			µg/L				µg/L	
56-23-5	Carbon Tetrachloride	1.01	µg/L	max	5	µg/L	H(WS)	no	0.17	µg/L	yes
67-66-3	Chloroform	0.29	µg/L	mean	7	µg/L	H(WS)	no	0.17	µg/L	yes
540-59-0	1,2-Dichloroethene (total) [(a)]	3.57	µg/L	max	5	µg/L	H(WS)	no	61	µg/L	no
87-68-3	Hexachlorobutadiene		µg/L			µg/L				µg/L	
98-82-8	Isopropylbenzene		µg/L			µg/L				µg/L	
75-09-2	Methyene chloride	0.87	µg/L	max		µg/L				µg/L	
103-65-1	n-Propylbenzene		µg/L			µg/L				µg/L	
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L				µg/L	
108-88-3	Toluene	0.297	µg/L	max	5	µg/L	H(WS)	no	2,300	µg/L	no
79-01-6	Trichloroethene (TCE)	12.5	µg/L	max	5	µg/L	H(WS)	yes	0.028	µg/L	yes
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L				µg/L	
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L				µg/L	
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L				µg/L	
	SEMIVOLATILES										
91-20-3	Naphthalene		µg/L			µg/L				µg/L	
	METALS										
7439-92-1	Lead	2.30	µg/L	latest	25	µg/L	H(WS)	no	15	µg/L	no

N/A Screening value not available
H(WS) Source of drinking water (groundwater).
max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
[(a)] The lowest value of 1,2-Dichloroethene, *cis* or *trans* was used as a screening value

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.11
Comparison to NYSDEC Screening Criteria
AOC 3 Monitoring Well 9
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)	Basis of EPC?	NYSDEC Recommended Cleanup Objective (units)	Basis of Cleanup Objective	EPC Exceed NYSDEC?	USEPA Region 6 Risk-Based Screening Level (units)	EPC Exceed USEPA?
	VOLATILES							
78-93-3	2-Butanone	µg/L		µg/L			µg/L	
56-23-5	Carbon Tetrachloride	µg/L		µg/L			µg/L	
67-66-3	Chloroform	µg/L		µg/L			µg/L	
540-59-0	1,2-Dichloroethene (total)	µg/L		µg/L			µg/L	
87-68-3	Hexachlorobutadiene	µg/L		µg/L			µg/L	
98-82-8	Isopropylbenzene	µg/L		µg/L			µg/L	
75-09-2	Methyene chloride	µg/L		µg/L			µg/L	
103-65-1	n-Propylbenzene	µg/L		µg/L			µg/L	
127-18-4	Tetrachloroethene (PCE)	µg/L		µg/L			µg/L	
108-88-3	Toluene	µg/L		µg/L			µg/L	
79-01-6	Trichloroethene (TCE)	6.6 µg/L	max	5 µg/L	H(WS)	yes	0.028 µg/L	yes
96-18-4	1,2,3-Trichloropropane	µg/L		µg/L			µg/L	
95-63-6	1,2,4-Trimethylbenzene	µg/L		µg/L			µg/L	
108-67-8	1,3,5-Trimethylbenzene	µg/L		µg/L			µg/L	
	SEMIVOLATILES							
91-20-3	Naphthalene	µg/L		µg/L			µg/L	
	METALS							
7439-92-1	Lead	µg/L		µg/L			µg/L	

H(WS) Source of drinking water (groundwater).
max is the maximum detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.12
Risk Ratio Calculations
AOC 3
Mixed Depth Soils
Former SADVA

CAS No.	Compound	Exposure Point Concentration (units)		EPC Max or UCL?	Residential USEPA Region 6 Risk-Based Screening Level (units)		Industrial USEPA Region 6 Risk-Based Screening Level (units)		Carcino-genic?	Residential Non-Carc Risk Ratio (EPC/USEPA)	Residential Carc Risk Ratio (EPC/USEPA)	Industrial Non-Carc Risk Ratio (EPC/USEPA)	Industrial Carc Risk Ratio (EPC/USEPA)
	Volatiles												
540-59-0	1,2-Dichloroethene (total)	5	µg/kg	Max	43,000	µg/kg	163,000	µg/kg	no	1.2E-04	--	3.1E-05	--
67-64-1	Acetone	41	µg/kg	Max	14,151,000	µg/kg	60,480,000	µg/kg	no	2.9E-06	--	6.8E-07	--
108-90-7	Chlorobenzene	96	µg/kg	Max	273,000	µg/kg	503,000	µg/kg	no	3.5E-04	--	1.9E-04	--
100-41-4	Ethylbenzene	66	µg/kg	Max	234,000	µg/kg	234,000	µg/kg	no	2.8E-04	--	2.8E-04	--
75-09-2	Methylene Chloride	43	µg/kg	Max	521,000	µg/kg	521,000	µg/kg	yes	--	8.3E-11	--	8.3E-11
127-18-4	Tetrachloroethene	8	µg/kg	Max	1,000	µg/kg	2,000	µg/kg	yes	--	8.0E-09	--	4.0E-09
108-88-3	Toluene	6	µg/kg	Max	521,000	µg/kg	521,000	µg/kg	no	1.2E-05	--	1.2E-05	--
156-60-5	trans-1,2-Dichloroethene	1.2	µg/kg	Max	122,000	µg/kg	204,000	µg/kg	no	9.8E-06	--	5.9E-06	--
79-01-6	Trichloroethene	15	µg/kg	UCL	40	µg/kg	100	µg/kg	yes	--	3.8E-07	--	1.5E-07
1330-20-7	Xylenes (total)	110	µg/kg	Max	214,000	µg/kg	214,000	µg/kg	no	5.1E-04	--	5.1E-04	--
	Semivolatiles												
91-57-6	2-Methylnaphthalene	250	µg/kg	Max	125,000	µg/kg	209,000	µg/kg	no	2.0E-03	--	1.2E-03	--
83-32-9	Acenaphthene	83	µg/kg	Max	3,683,000	µg/kg	32,503,000	µg/kg	no	2.3E-05	--	2.6E-06	--
120-12-7	Anthracene	66	µg/kg	Max	21,900,000	µg/kg	100,000,000	µg/kg	no	3.0E-06	--	6.6E-07	--
65-85-0	Benzoic Acid	389	µg/kg	Max	100,000,000	µg/kg	100,000,000	µg/kg	no	3.9E-06	--	3.9E-06	--
117-81-7	bis(2-ethylhexyl)phthalate	162	µg/kg	Max	35,000	µg/kg	137,000	µg/kg	yes	--	4.6E-09	--	1.2E-09
132-64-9	Dibenzofuran	37	µg/kg	Max	145,000	µg/kg	1,738,000	µg/kg	no	2.6E-04	--	2.1E-05	--
86-73-7	Fluorene	140	µg/kg	Max	2,644,000	µg/kg	26,222,000	µg/kg	no	5.3E-05	--	5.3E-06	--
91-20-3	Naphthalene	140	µg/kg	Max	125,000	µg/kg	209,000	µg/kg	no	1.1E-03	--	6.7E-04	--
86-30-6	N-Nitrosodiphenylamine		µg/kg	Max	99,000	µg/kg	391,000	µg/kg	yes	--	0.0E+00	--	0.0E+00
87-86-5	Pentochlorophenol	569	µg/kg	Max	3,000	µg/kg	10,000	µg/kg	yes	--	1.9E-07	--	5.7E-08
	Pesticides												
72-54-8	4,4'-DDD	2.59	µg/kg	Max	2,400	µg/kg	11,100	µg/kg	yes	--	1.1E-09	--	2.3E-10
72-55-9	4,4'-DDE	23.8	µg/kg	Max	1,700	µg/kg	7,800	µg/kg	yes	--	1.4E-08	--	3.1E-09
50-29-3	4,4'-DDT	95.1	µg/kg	Max	1,700	µg/kg	7,800	µg/kg	yes	--	5.6E-08	--	1.2E-08
	Metals												
7429-90-5	Aluminum	19700	mg/kg	UCL	76,190,000	mg/kg	100,000,000	mg/kg	no	2.6E-04	--	2.0E-04	--
7440-36-0	Antimony	3.39	mg/kg	Max	30,000	mg/kg	454,000	mg/kg	no	1.1E-04	--	7.5E-06	--
7440-39-3	Barium	123	mg/kg	Max	15,640,000	mg/kg	100,000,000	mg/kg	no	7.9E-06	--	1.2E-06	--
7440-41-7	Beryllium	1.53	mg/kg	Max	150,000	mg/kg	2,156,000	mg/kg	no	1.0E-05	--	7.1E-07	--
7440-43-9	Cadmium	14.6	mg/kg	UCL	40,000	mg/kg	563,000	mg/kg	no	3.7E-04	--	2.6E-05	--
7440-47-3	Chromium	26.4	mg/kg	UCL	210,000	mg/kg	498,000	mg/kg	no	1.3E-04	--	5.3E-05	--
7440-48-4	Cobalt	26.5	mg/kg	Max	900,000	mg/kg	2,135,000	mg/kg	yes	--	2.9E-11	--	1.2E-11
7440-50-8	Copper	68.6	mg/kg	Max	2,910,000	mg/kg	42,178,000	mg/kg	no	2.4E-05	--	1.6E-06	--
7439-92-1	Lead	316.9	mg/kg	Max	3,240,000	mg/kg	35,171,000	mg/kg	no	9.8E-05	--	9.0E-06	--
7439-97-7	Mercury	0.17	mg/kg	Max	20,000	mg/kg	341,000	mg/kg	no	8.5E-06	--	5.0E-07	--
7440-02-0	Nickel	59.1	mg/kg	UCL	1,560,000	mg/kg	22,711,000	mg/kg	no	3.8E-05	--	2.6E-06	--
7782-49-2	Selenium	7.71	mg/kg	Max	390,000	mg/kg	5,678,000	mg/kg	no	2.0E-05	--	1.4E-06	--
7440-22-4	Silver	3.97	mg/kg	Max	390,000	mg/kg	5,678,000	mg/kg	no	1.0E-05	--	7.0E-07	--
7440-28-0	Thallium	2.16	mg/kg	UCL	10,000	mg/kg	79,000	mg/kg	no	2.2E-04	--	2.7E-05	--
7440-62-2	Vanadium	31.1	mg/kg	UCL	390,000	mg/kg	5,678,000	mg/kg	no	8.0E-05	--	5.5E-06	--
7440-66-6	Zinc	192	mg/kg	Max	23,460,000	mg/kg	100,000,000	mg/kg	no	8.2E-06	--	1.9E-06	--
							Cumulative Risk Ratio			**0.01**	**6.48E-07**	**0.003**	**2.28E-07**

UCL 95% Upper Confidence Limit

Note: Cumulative Risk Ratio does not include lead.

Table D.13
Risk Ratio Calculation
AOC 3 Monitoring Well 1
Groundwater
Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	USEPA Region 6 Risk-Based Screening Level (units)		Carcinogenic?	Non-Carc Risk Ratio (EPC/USEPA)	Carc Risk Ratio (EPC/USEPA)
	VOLATILES								
78-93-3	2-Butanone	17.7	µg/L	max	7,100	µg/L	no	0.0025	--
56-23-5	Carbon Tetrachloride		µg/L			µg/L			
67-66-3	Chloroform		µg/L			µg/L			
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L			
87-68-3	Hexachlorobutadiene		µg/L			µg/L			
98-82-8	Isopropylbenzene		µg/L			µg/L			
75-09-2	Methyene chloride		µg/L			µg/L			
103-65-1	n-Propylbenzene		µg/L			µg/L			
127-18-4	Tetrachloroethene (PCE)	0.285	µg/L	mean	0.1	µg/L	yes	--	2.9E-06
108-88-3	Toluene	3.13	µg/L	max	2,300	µg/L	no	0.0014	--
79-01-6	Trichloroethene (TCE)		µg/L			µg/L			
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L			
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L			
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L			
	SEMIVOLATILES								
91-20-3	Naphthalene		µg/L			µg/L			
	METALS								
7439-92-1	Lead	1.80	µg/L	latest	15	µg/L	no	0.1	--
					Cumulative Risk Ratio			**0.0039**	**2.9E-06**

max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
Cumulative Risk Ratio does not include lead

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.14
Risk Ratio Calculations
AOC 3 Monitoring Well 2
Groundwater Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	USEPA Region 6 Risk-Based Screening Level (units)		Carcinogenic?	Non-Carc Risk Ratio (EPC/USEPA)	Carc Risk Ratio (EPC/USEPA)
	VOLATILES								
78-93-3	2-Butanone	4.46	µg/L	max	7,100	µg/L	no	0.00063	--
56-23-5	Carbon Tetrachloride		µg/L			µg/L			
67-66-3	Chloroform		µg/L			µg/L			
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L			
87-68-3	Hexachlorobutadiene	0.23	µg/L	mean	0.86	µg/L	yes	--	2.7E-07
98-82-8	Isopropylbenzene		µg/L			µg/L			
75-09-2	Methyene chloride		µg/L			µg/L			
103-65-1	n-Propylbenzene	0.957	µg/L	max	61	µg/L	no	0.016	--
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L			
108-88-3	Toluene	3.13	µg/L	max	2,300	µg/L	no	0.0014	--
79-01-6	Trichloroethene (TCE)	1.90	µg/L	latest	0.028	µg/L	yes	--	6.8E-05
96-18-4	1,2,3-Trichloropropane	0.322	µg/L	max	0.002	µg/L	yes	--	1.6E-04
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L			
108-67-8	1,3,5-Trimethylbenzene	0.26	µg/L	mean	12.3	µg/L	no	0.0	--
	SEMIVOLATILES								
91-20-3	Naphthalene	0.35	µg/L	mean	6.2	µg/L	no	0.06	--
	METALS								
7439-92-1	Lead	3.85	µg/L	latest	15	µg/L	no	0.3	--
	Cumulative Risk Ratio							**0.1**	**2E-04**

max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
Cumulative Risk Ratio does not include lead

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.15
Risk Ratio Calculations
AOC 3 Monitoring Well 3
Groundwater Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	USEPA Region 6 Risk-Based Screening Level (units)		Carcinogenic?	Non-Carc Risk Ratio (EPC/USEPA)	Carc Risk Ratio (EPC/USEPA)
	VOLATILES								
78-93-3	2-Butanone	14.2	µg/L	max	7,100	µg/L	no	0.0020	--
56-23-5	Carbon Tetrachloride		µg/L			µg/L			
67-66-3	Chloroform		µg/L			µg/L			
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L			
87-68-3	Hexachlorobutadiene		µg/L			µg/L			
98-82-8	Isopropylbenzene		µg/L			µg/L			
75-09-2	Methyene chloride	0.63	µg/L	max	4.3	µg/L	yes	--	1.5E-07
103-65-1	n-Propylbenzene		µg/L			µg/L			
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L			
108-88-3	Toluene	1.92	µg/L	max	2,300	µg/L	no	0.00083	--
79-01-6	Trichloroethene (TCE)		µg/L			µg/L			
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L			
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L			
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L			
	SEMIVOLATILES								
91-20-3	Naphthalene		µg/L			µg/L			
	METALS								
7439-92-1	Lead	13.80	µg/L	max	15	µg/L	no	0.92	--
					Cumulative Risk Ratio			**0.0028**	**1.5E-07**

max is the maximum detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
Cumulative Risk Ratio does not include lead

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.16
Risk Ratio Calculations
AOC 3 Monitoring Well 4-2
Groundwater Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	USEPA Region 6 Risk-Based Screening Level (units)		Carcinogenic?	Non-Carc Risk Ratio (EPC/USEPA)	Carc Risk Ratio (EPC/USEPA)
	VOLATILES								
78-93-3	2-Butanone		µg/L			µg/L			
56-23-5	Carbon Tetrachloride		µg/L			µg/L			
67-66-3	Chloroform		µg/L			µg/L			
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L			
87-68-3	Hexachlorobutadiene		µg/L			µg/L			
98-82-8	Isopropylbenzene		µg/L			µg/L			
75-09-2	Methyene chloride	0.63	µg/L	max	4.3	µg/L	yes	--	1.5E-07
103-65-1	n-Propylbenzene	0.353	µg/L	max	61	µg/L	no	0.0058	--
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L			
108-88-3	Toluene	0.421	µg/L	max	2,300	µg/L	no	0.00018	--
79-01-6	Trichloroethene (TCE)	0.22	µg/L	mean	0.028	µg/L	yes	--	7.9E-06
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L			
95-63-6	1,2,4-Trimethylbenzene	0.38	µg/L	mean	12	µg/L	no	0.031	--
108-67-8	1,3,5-Trimethylbenzene	0.608	µg/L	max	12	µg/L	no	0.051	--
	SEMIVOLATILES								
91-20-3	Naphthalene		µg/L			µg/L			
	METALS								
7439-92-1	Lead	1.70	µg/L	latest	15	µg/L	no	0.1	--
					Cumulative Risk Ratio			**0.09**	**8.0E-06**

max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
Cumulative Risk Ratio does not include lead

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.17
Risk Ratio Calculations
AOC 3 Monitoring Well 5
Groundwater Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	USEPA Region 6 Risk-Based Screening Level (units)		Carcinogenic?	Non-Carc Risk Ratio (EPC/USEPA)	Carc Risk Ratio (EPC/USEPA)
	VOLATILES								
78-93-3	2-Butanone		µg/L			µg/L			
56-23-5	Carbon Tetrachloride	1.09	µg/L	max	0.17	µg/L	yes	--	6.4E-06
67-66-3	Chloroform		µg/L			µg/L			
540-59-0	1,2-Dichloroethene (total)	1.58	µg/L	max	61	µg/L	no	0.026	--
87-68-3	Hexachlorobutadiene		µg/L			µg/L			
98-82-8	Isopropylbenzene		µg/L			µg/L			
75-09-2	Methyene chloride		µg/L			µg/L			
103-65-1	n-Propylbenzene		µg/L			µg/L			
127-18-4	Tetrachloroethene (PCE)	0.266	µg/L	max	0.1	µg/L	yes	--	2.7E-06
108-88-3	Toluene	1.91	µg/L	max	2,300	µg/L	no	0.00083	--
79-01-6	Trichloroethene (TCE)	2	µg/L	latest	0.028	µg/L	yes	--	7.1E-05
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L			
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L			
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L			
	SEMIVOLATILES								
91-20-3	Naphthalene		µg/L			µg/L			
	METALS								
7439-92-1	Lead	1.20	µg/L	latest	15	µg/L	no	0.1	--
					Cumulative Risk Ratio			**0.027**	**8.1E-05**

max is the maximum detected concentration
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
Cumulative Risk Ratio does not include lead

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.18
Risk Ratio Calculations
AOC 3 Supply Well
Groundwater Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	USEPA Region 6 Risk-Based Screening Level (units)		Carcinogenic?	Non-Carc Risk Ratio (EPC/USEPA)	Carc Risk Ratio (EPC/USEPA)
	VOLATILES								
78-93-3	2-Butanone		µg/L			µg/L			
56-23-5	Carbon Tetrachloride	1.01	µg/L	max	0.17	µg/L	yes	--	5.9E-06
67-66-3	Chloroform	0.29	µg/L	mean	0.17	µg/L	yes	--	1.7E-06
540-59-0	1,2-Dichloroethene (total) [(a)]	3.57	µg/L	max	61	µg/L	no	0.059	--
87-68-3	Hexachlorobutadiene		µg/L			µg/L			
98-82-8	Isopropylbenzene		µg/L			µg/L			
75-09-2	Methyene chloride	0.87	µg/L	max	4.3	µg/L	yes	--	2.0E-07
103-65-1	n-Propylbenzene		µg/L			µg/L			
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L			
108-88-3	Toluene	0.297	µg/L	max	2,300	µg/L	no	0.00013	--
79-01-6	Trichloroethene (TCE)	1.98	µg/L	mean	0.028	µg/L	yes	--	7.1E-05
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L			
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L			
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L			
	SEMIVOLATILES								
91-20-3	Naphthalene		µg/L			µg/L			
	METALS								
7439-92-1	Lead	2.30	µg/L	latest	15	µg/L	no	0.2	--
					Cumulative Risk Ratio			**0.059**	**7.9E-05**

The Supply Well is an irrigation supply well located within the Guilderland School District Garage and is located outside the area shown on Figure D.4.
max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
Cumulative Risk Ratio does not include lead

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.19
Risk Ratio Calculations
AOC 3 Monitoring Well 9
Groundwater Former SADVA

CAS NUMBER	Compound	Exposure Point Concentration (units)		Basis of EPC?	USEPA Region 6 Risk-Based Screening Level (units)		Carcinogenic?	Non-Carc Risk Ratio (EPC/USEPA)	Carc Risk Ratio (EPC/USEPA)
	VOLATILES								
78-93-3	2-Butanone		µg/L			µg/L			
56-23-5	Carbon Tetrachloride		µg/L			µg/L			
67-66-3	Chloroform		µg/L			µg/L			
540-59-0	1,2-Dichloroethene (total)		µg/L			µg/L			
87-68-3	Hexachlorobutadiene		µg/L			µg/L			
98-82-8	Isopropylbenzene		µg/L			µg/L			
75-09-2	Methyene chloride		µg/L			µg/L			
103-65-1	n-Propylbenzene		µg/L			µg/L			
127-18-4	Tetrachloroethene (PCE)		µg/L			µg/L			
108-88-3	Toluene		µg/L			µg/L			
79-01-6	Trichloroethene (TCE)	6.6	µg/L	max	0.028	µg/L	yes	--	2.4E-04
96-18-4	1,2,3-Trichloropropane		µg/L			µg/L			
95-63-6	1,2,4-Trimethylbenzene		µg/L			µg/L			
108-67-8	1,3,5-Trimethylbenzene		µg/L			µg/L			
	SEMIVOLATILES								
91-20-3	Naphthalene		µg/L			µg/L			
	METALS								
7439-92-1	Lead		µg/L			µg/L			
					Cumulative Risk Ratio			**0**	**2.4E-04**

max is the maximum detected concentration

blank cells for Exposure Point Concentration indicates the chemical was below detection limits in this well
Cumulative Risk Ratio does not include lead

USEPA Region 6 Risk-Based Screening Levels were obtained from the Downloadable Excel Spreadsheet (Excel format - 1224 kb) (revised 05/04/07) located at http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm.

Table D.20
Comparison of Groundwater Concentration to Indoor Air Screening Values
Monitoring Well 1
AOC 3 Former SADVA

CAS Number	Compound	Exposure Point Concentration (units)		Basis of EPC	USEPA Indoor Air Screening Value [1]	EPC Exceed USEPA?
78-93-3	2-Butanone	17.7	µg/L	max	440000	no
56-23-5	Carbon Tetrachloride		µg/L		5	
67-66-3	Chloroform		µg/L		80	
540-59-0	1,2-Dichloroethene (total)		µg/L		5	
87-68-3	Hexachlorobutadiene		µg/L		0.33	
98-82-8	Isopropylbenzene		µg/L		8.4	
75-09-2	Methyene chloride		µg/L		58	
103-65-1	n-Propylbenzene		µg/L		320	
127-18-4	Tetrachloroethene (PCE)	0.285	µg/L	mean	5	no
108-88-3	Toluene	3.13	µg/L	max	1500	no
79-01-6	Trichloroethene (TCE)		µg/L		5	
96-18-4	1,2,3-Trichloropropane		µg/L		290	
95-63-6	1,2,4-Trimethylbenzene		µg/L		24	
108-67-8	1,3,5-Trimethylbenzene		µg/L		25	

[1] Indoor air screening concentration is the groundwater concentration corresponding to a target indoor air concentration and based on a cancer risk level of 1×10^{-6}

max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects

Table D.21
Comparison of Groundwater Concentration to Indoor Air Screening Values
Monitoring Well 2
AOC 3 Former SADVA

CAS Number	Compound	Exposure Point Concentration (units)		Basis of EPC	USEPA Indoor Air Screening Value [1]	EPC Exceed USEPA?
78-93-3	2-Butanone	4.46	µg/L	max	440000	no
56-23-5	Carbon Tetrachloride		µg/L		5	
67-66-3	Chloroform		µg/L		80	
540-59-0	1,2-Dichloroethene (total)		µg/L		5	
87-68-3	Hexachlorobutadiene	0.23	µg/L	max	0.33	no
98-82-8	Isopropylbenzene		µg/L		8.4	
75-09-2	Methyene chloride		µg/L		58	
103-65-1	n-Propylbenzene	0.957	µg/L	max	320	no
127-18-4	Tetrachloroethene (PCE)		µg/L		5	
108-88-3	Toluene	3.13	µg/L	max	1500	no
79-01-6	Trichloroethene (TCE)	1.9	µg/L	latest	5	no
96-18-4	1,2,3-Trichloropropane	0.322	µg/L	max	290	no
95-63-6	1,2,4-Trimethylbenzene		µg/L		24	
108-67-8	1,3,5-Trimethylbenzene	0.26	µg/L	mean	25	no

[1] Indoor air screening concentration is the groundwater concentration corresponding to a target indoor air concentration and based on a cancer risk level of 1×10^{-6}

max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects
latest is the latest detected concentration

Table D.22
Comparison of Groundwater Concentration to Indoor Air Screening Values
Monitoring Well 3
AOC 3 Former SADVA

CAS Number	Compound	Exposure Point Concentration (units)		Basis of EPC	USEPA Indoor Air Screening Value [1]	EPC Exceed USEPA?
78-93-3	2-Butanone	14.2	µg/L	max	440000	no
56-23-5	Carbon Tetrachloride		µg/L		5	
67-66-3	Chloroform		µg/L		80	
540-59-0	1,2-Dichloroethene (total)		µg/L		5	
87-68-3	Hexachlorobutadiene		µg/L		0.33	
98-82-8	Isopropylbenzene		µg/L		8.4	
75-09-2	Methyene chloride	0.63	µg/L	max	58	no
103-65-1	n-Propylbenzene		µg/L		320	
127-18-4	Tetrachloroethene (PCE)		µg/L		5	
108-88-3	Toluene	1.92	µg/L	max	1500	no
79-01-6	Trichloroethene (TCE)		µg/L		5	
96-18-4	1,2,3-Trichloropropane		µg/L		290	
95-63-6	1,2,4-Trimethylbenzene		µg/L		24	
108-67-8	1,3,5-Trimethylbenzene		µg/L		25	

[1] Indoor air screening concentration is the groundwater concentration corresponding to a target indoor air concentration and based on a cancer risk level of 1×10^{-6}

max is the maximum detected concentration

Table D.23
Comparison of Groundwater Concentration to Indoor Air Screening Values
Monitoring Well 4-2
AOC 3 Former SADVA

CAS Number	Compound	Exposure Point Concentration (units)		Basis of EPC	USEPA Indoor Air Screening Value [1]	EPC Exceed USEPA?
78-93-3	2-Butanone		µg/L		440000	
56-23-5	Carbon Tetrachloride		µg/L		5	
67-66-3	Chloroform		µg/L		80	
540-59-0	1,2-Dichloroethene (total)		µg/L		5	
87-68-3	Hexachlorobutadiene		µg/L		0.33	
98-82-8	Isopropylbenzene		µg/L		8.4	
75-09-2	Methyene chloride	0.63	µg/L	max	58	no
103-65-1	n-Propylbenzene	0.353	µg/L	max	320	no
127-18-4	Tetrachloroethene (PCE)		µg/L		5	
108-88-3	Toluene	0.421	µg/L	max	1500	no
79-01-6	Trichloroethene (TCE)	0.22	µg/L	mean	5	no
96-18-4	1,2,3-Trichloropropane		µg/L		290	
95-63-6	1,2,4-Trimethylbenzene	0.38	µg/L	mean	24	no
108-67-8	1,3,5-Trimethylbenzene	0.608	µg/L	max	25	no

[1] Indoor air screening concentration is the groundwater concentration corresponding to a target indoor air concentration and based on a cancer risk level of 1×10^{-6}

max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects

Table D.24
Comparison of Groundwater Concentration to Indoor Air Screening Values
Monitoring Well 5
AOC 3 Former SADVA

CAS Number	Compound	Exposure Point Concentration (units)		Basis of EPC	USEPA Indoor Air Screening Value [1]	EPC Exceed USEPA?
78-93-3	2-Butanone		µg/L		440000	
56-23-5	Carbon Tetrachloride	1.09	µg/L	max	5	no
67-66-3	Chloroform		µg/L		80	
540-59-0	1,2-Dichloroethene (total)	1.58	µg/L	max	5	no
87-68-3	Hexachlorobutadiene		µg/L		0.33	
98-82-8	Isopropylbenzene		µg/L		8.4	
75-09-2	Methyene chloride		µg/L		58	
103-65-1	n-Propylbenzene		µg/L		320	
127-18-4	Tetrachloroethene (PCE)	0.266	µg/L	max	5	no
108-88-3	Toluene	1.91	µg/L	max	1500	no
79-01-6	Trichloroethene (TCE)	2	µg/L	latest	5	no
96-18-4	1,2,3-Trichloropropane		µg/L		290	
95-63-6	1,2,4-Trimethylbenzene		µg/L		24	
108-67-8	1,3,5-Trimethylbenzene		µg/L		25	

[1] Indoor air screening concentration is the groundwater concentration corresponding to a target indoor air concentration and based on a cancer risk level of 1×10^{-6}

max is the maximum detected concentration
latest is the latest detected concentration

Table D.25
Comparison of Groundwater Concentration to Indoor Air Screening Values
Supply Well
AOC 3 Former SADVA

CAS Number	Compound	Exposure Point Concentration (units)		Basis of EPC	USEPA Indoor Air Screening Value [1]	EPC Exceed USEPA?
78-93-3	2-Butanone		µg/L		440000	
56-23-5	Carbon Tetrachloride	1.01	µg/L	max	5	no
67-66-3	Chloroform	0.29	µg/L	mean	80	no
540-59-0	1,2-Dichloroethene (total)	3.57	µg/L	max	5	no
87-68-3	Hexachlorobutadiene		µg/L		0.33	
98-82-8	Isopropylbenzene		µg/L		8.4	
75-09-2	Methyene chloride	0.87	µg/L	max	58	no
103-65-1	n-Propylbenzene		µg/L		320	
127-18-4	Tetrachloroethene (PCE)		µg/L		5	
108-88-3	Toluene	0.297	µg/L	max	1500	no
79-01-6	Trichloroethene (TCE)	1.98	µg/L	mean	5	no
96-18-4	1,2,3-Trichloropropane		µg/L		290	
95-63-6	1,2,4-Trimethylbenzene		µg/L		24	
108-67-8	1,3,5-Trimethylbenzene		µg/L		25	

[1] Indoor air screening concentration is the groundwater concentration corresponding to a target indoor air concentration and based on a cancer risk level of 1×10^{-6}

max is the maximum detected concentration
mean is calculated as the mean of the detected concentrations and 1/2 the detection limit for non-detects

Table D.26
Comparison of Groundwater Concentration to Indoor Air Screening Values
Monitoring Well 9
AOC 3 Former SADVA

CAS Number	Compound	Exposure Point Concentration (units)		Basis of EPC	USEPA Indoor Air Screening Value [1]	EPC Exceed USEPA?
78-93-3	2-Butanone		µg/L		440000	
56-23-5	Carbon Tetrachloride		µg/L		5	
67-66-3	Chloroform		µg/L		80	
540-59-0	1,2-Dichloroethene (total)		µg/L		5	
87-68-3	Hexachlorobutadiene		µg/L		0.33	
98-82-8	Isopropylbenzene		µg/L		8.4	
75-09-2	Methyene chloride		µg/L		58	
103-65-1	n-Propylbenzene		µg/L		320	
127-18-4	Tetrachloroethene (PCE)		µg/L		5	
108-88-3	Toluene		µg/L		1500	
79-01-6	Trichloroethene (TCE)	6.6	µg/L	max	5	yes
96-18-4	1,2,3-Trichloropropane		µg/L		290	
95-63-6	1,2,4-Trimethylbenzene		µg/L		24	
108-67-8	1,3,5-Trimethylbenzene		µg/L		25	

[1] Indoor air screening concentration is the groundwater concentration corresponding to a target indoor air concentration and based on a cancer risk level of 1×10^{-6}

max is the maximum detected concentration