EVALUATION OF THE POTENTIAL FOR INDOOR AIR VAPOR INTRUSION IN RESIDENTIAL AREAS ADJACENT TO CAMP STANLEY STORAGE ACTIVITY AREA OF CONCERN 65

PARSONS

Austin, Texas

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ABBREVIATIONS AND ACRONYMS

1,1,1-TCA	1,1,1-trichloroethane
1,1-DCA	1,1-dichloroethane
1,2-DCE	1,2-dichloroethene
AOC-65	Area of Concern 65
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	*cis*-1,2-dichlorothene
CSSA	Camp Stanley Storage Activity
EI	Environmental Indicator
HI	Hazard index
IRA	Interim removal action
LGR	Lower Glen Rose
MCL	Maximum contaminant level
μg/L	micrograms per liter
OEL	Occupational Exposure Limit
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
PEL	Permissible exposure limit
ppbv	parts per billion volume
ppm	parts per million
psi	pounds per square inch
RBEL	Risk-based exposure limit
RCRA	Resource Conservation and Recovery Act
REL	Recommended exposure limit
RME	Reasonable maximum exposure
RRS1	Risk Reduction Standard No. 1
RSL	Regional screening level
SIM	Selective Ion Monitoring
SIW	Steam injection well
SVE	Soil vapor extraction
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
TLV	Threshold limit value
TR	Target risk
trans-1,2-DCE	*trans*-1,2-dichlorothene
UGR	Upper Glen Rose

USEPA	U. S. Environmental Protection Agency
VEW	Vapor extraction well
VIS	Vapor Intrusion Survey
VOC	Volatile organic compound

EVALUATION OF THE POTENTIAL FOR INDOOR AIR VAPOR INTRUSION IN RESIDENTIAL AREAS ADJACENT TO CAMP STANLEY STORAGE ACTIVITY AREA OF CONCERN 65

Executive Summary

This paper presents an evaluation of the potential for indoor air vapor intrusion in off-post residential areas downgradient from Area of Concern 65 (AOC-65) in the southwestern portion of Camp Stanley Storage Activity (CSSA). AOC-65 includes Building 90 and its potential source areas. Indoor air, soil gas and groundwater data were used in the evaluation to determine if actual or predicted indoor air concentrations exceed indoor air screening levels. Screening levels used in the evaluation are based on U.S. Environmental Protection Agency (USEPA) and Texas Commission on Environmental Quality (TCEQ) guidance.

Based on findings in this paper, the following recommendations are made:

- Continued operation of the current soil vapor extraction (SVE) system, including the use of thermal enhanced SVE within Building 90;
- An interim removal action (IRA) for vadose zone limestone in the ditchline area west of Building 90;
- In-situ oxidation in the vadose zone; and
- If necessary, further repair of a leaking water line near Building 90 to reduce potential for migration of contaminants in the vadose zone.

These activities are expected to reduce the amount of contaminants present in the surface, subsurface, and groundwater at AOC-65. Monitoring data for the site will continue to be collected to evaluate effectiveness of remediation activities and ensure remediation goals are met.

Introduction

Building 90 in the southwestern portion of CSSA (**Figure 1**) and its potential source areas comprise AOC-65. A soil gas survey performed in January and February 2001 and subsequent groundwater monitoring revealed a volatile organic compound (VOC) plume beneath and to the south and west of Building 90. Tetrachloroethene (PCE) and trichloroethene (TCE) are the primary chemicals of concern that have been detected in groundwater in this area. Several residential subdivisions have since been developed outside of CSSA on the outer area of the VOC plume (**Figure 2** shows the March 2011 PCE concentrations for this plume).

Vapor intrusion is the migration of volatile chemicals from the subsurface into overlying buildings (USEPA 2002). **Figure 3** schematically depicts a typical vapor intrusion scenario involving both residential and commercial dwellings. Chemicals volatilize from impacted soil and/or groundwater beneath a building and diffuse toward regions of lower chemical concentration (e.g., the atmosphere, conduits, basements). Soil gas can flow into a building or home through various pathways, including utility corridors and foundation cracks. A number of factors also affect the degree of vapor intrusion, including barometric pressure changes, wind load, thermal currents, or depressurization from building exhaust fans. The rate of movement of the vapors into the structure is difficult to quantify and depends on soil type, chemical properties, building design and condition, and pressure differential. Upon entry into a structure, soil gas mixes with the existing air through the natural or mechanical ventilation of the building (ITRC 2007).

In a residential community, concerns over vapor intrusion are often magnified due to the presence of children, elderly, and other at-risk members of the public who may reside in these areas. Degradation of indoor air quality causes more apprehension and anxiety among building occupants than are typically associated with other environmental problems (ITRC 2007). Indoor air quality is also of concern for employees working in areas where vapors from contaminated media may be present.

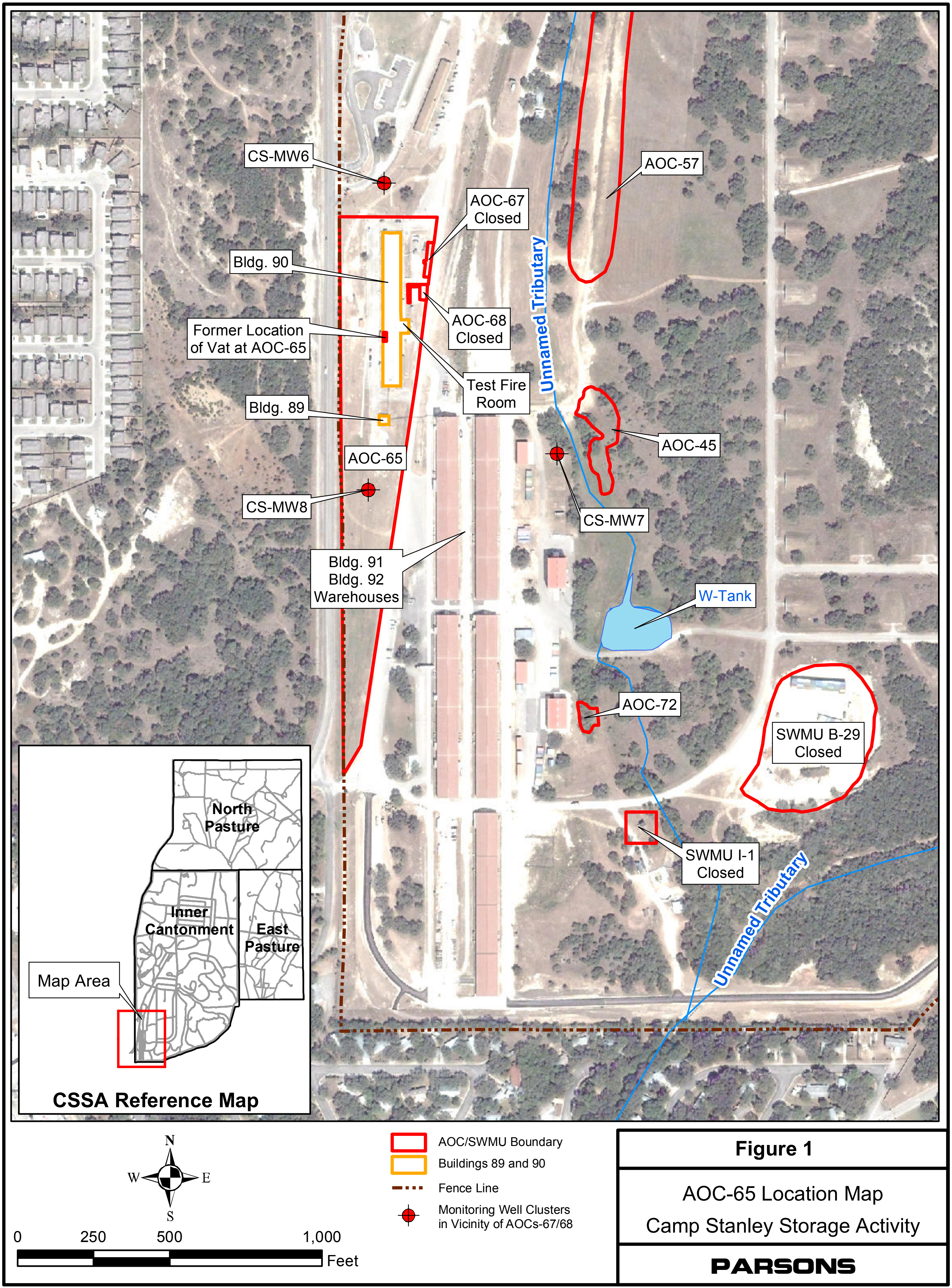

Figure 1

AOC-65 Location Map

Camp Stanley Storage Activity

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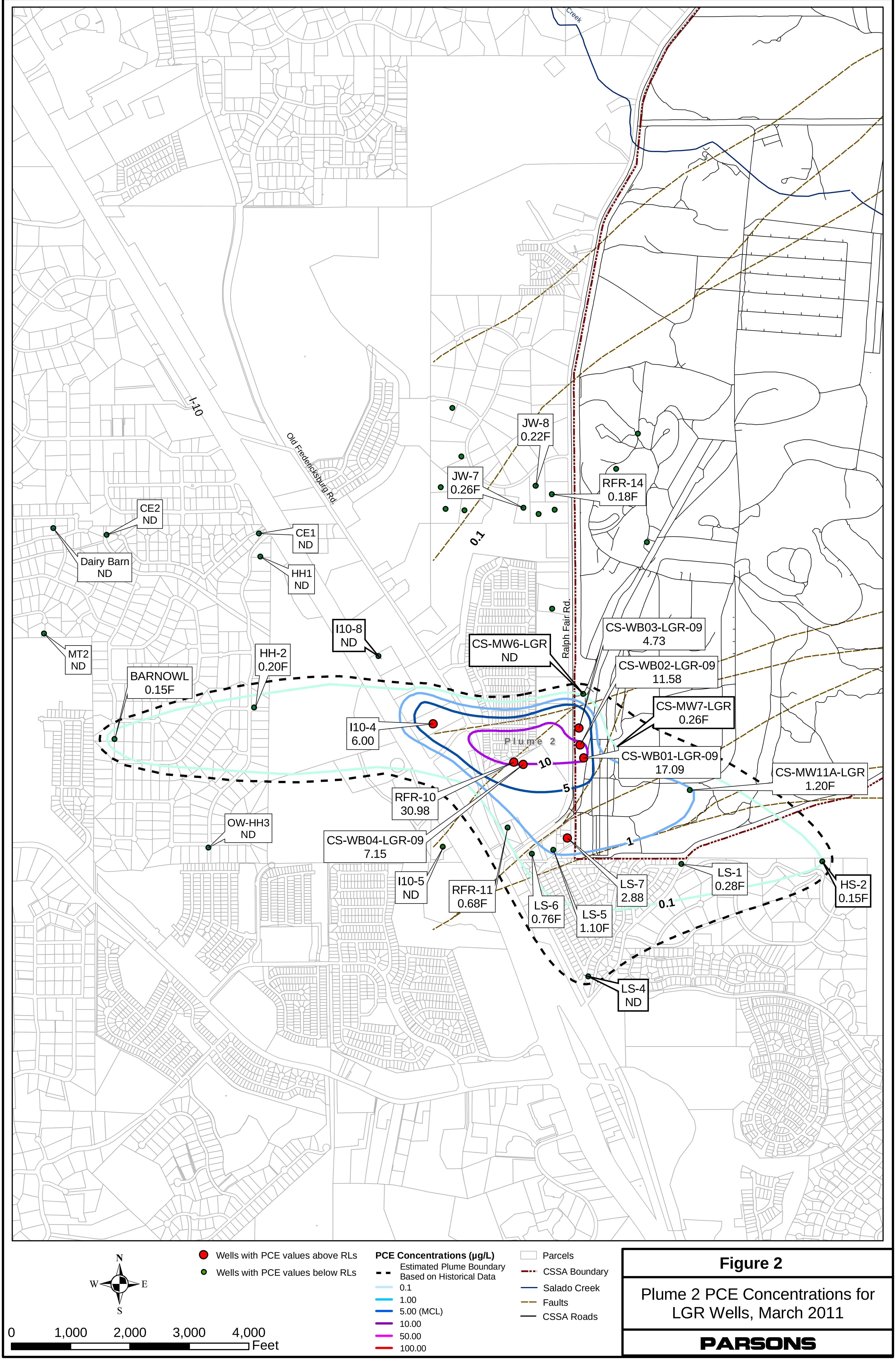

Figure 2

Plume 2 PCE Concentrations for LGR Wells, March 2011

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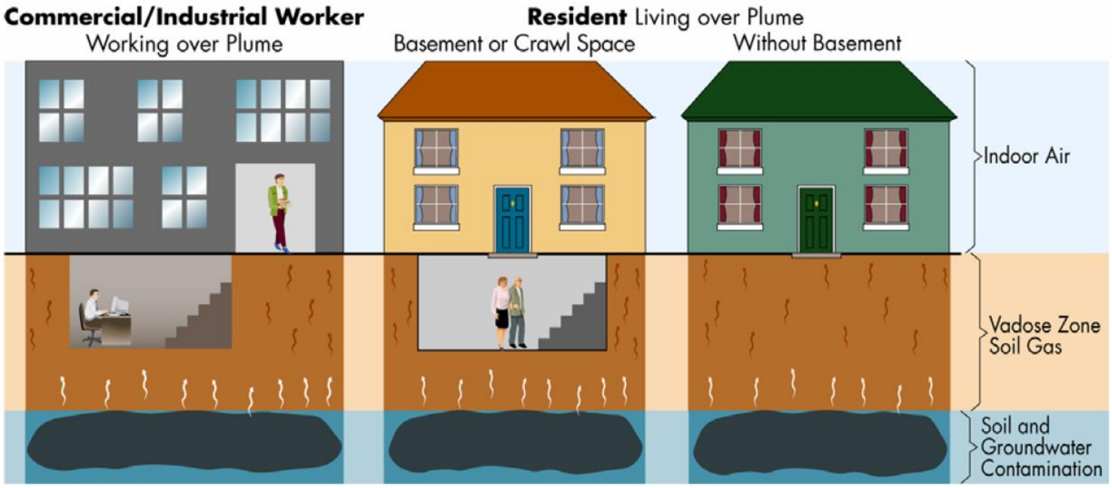
Figure 3 Typical Conceptual Model of Vapor Intrusion (ITRC 2007)



The overall approach used to assess the potential risks posed by the vapor intrusion pathway and possible mitigation and remediation options is summarized below (Department of Defense 2009).

- **Evaluate whether exposure to the vapors poses an immediate risk to building occupants:** This can include both acute health risks and the risk of explosion. If such short-term risks are identified due to vapor intrusion, it may be necessary to evacuate the property until the risks are mitigated. If there are no immediate risks, a screening level vapor intrusion evaluation may be conducted.
- **Conduct a screening level assessment of site contaminants:** This evaluation typically involves comparing soil gas or groundwater data with conservative risk-based screening values. If concentrations are below the screening levels, it is concluded that the site does not pose a vapor intrusion risk. If exceedances are observed, it may be advisable to re-evaluate the data in a vapor intrusion model using site-specific parameters. In some cases, these site-specific modeling results may be sufficient to determine that the site does not pose a vapor intrusion risk; in other cases, modeling results can become one of the multiple lines of evidence used to evaluate whether there is a significant vapor intrusion risk. It is noted that vapor intrusion modeling is not recommended in areas where preferential pathways are present, such as areas having fractured bedrock and karstic features like those in the CSSA area.
- **Conduct a site-specific vapor intrusion pathway evaluation:** This is usually a more data intensive effort and may include collecting near-slab soil gas, sub-slab soil gas, and/or indoor air samples. Multiple lines of evidence may be used to evaluate the magnitude and extent of vapor intrusion. Depending on the results of the investigation and a human health risk assessment, it may be determined that either no further action is necessary or that mitigation or remediation may be warranted.

- **Evaluate mitigation/remediation options, if necessary:** Mitigation involves using techniques that prevent (or minimize) subsurface vapors from migrating into buildings present above the contamination. Common mitigation measures include installation of sub-slab depressurization or pressurization devices, sealing all cracks, sumps and preferential pathways, and installation of vapor-proof membranes. On active bases, land use (or building use) controls may also be an option to control exposure. Remediation is the treatment and removal of chemicals from contaminated subsurface media, such as soil and groundwater. Common remediation options include soil removal, soil gas extraction, and groundwater treatment. Mitigation and remediation may be performed concurrently or individually, depending on site needs.

AOC-65 consists of VOC source areas believed to be associated with Building 90 and is located approximately 50 feet from CSSA's boundary. One potential source area is a sunken concrete-lined pit on the west side of Building 90 that had previously housed a metal vat that held PCE and TCE. The vat (approximately 500 to 750 gallons) was installed prior to 1966 and removed in 1995 when CSSA began using a citrus-based cleaner for operations instead of chlorinated solvents. This AOC also includes an area extending outside Building 90 along abandoned drain lines and related storm water ditches. The nearest off-post resident is located approximately 750 feet west of AOC-65's soil vapor extraction (SVE) unit as shown on **Figure 4**.

The release of chlorinated solvents to the environment at CSSA resulted in contamination of the Middle Trinity Aquifer, which is a drinking water source for the area. Contamination is most widespread within the Lower Glen Rose (LGR) water-bearing unit, which has depths ranging from about 80 to 300 feet below ground surface (bgs). Locally, the Bexar Shale serves as a confining unit between the water-bearing LGR and Cow Creek limestones. Environmental studies demonstrate that most of the contamination resides within the LGR.

Groundwater contamination originating from AOC-65 was first identified in an off-post well sample in December 1999. The groundwater plume spread southward and westward from the post. The greatest concentrations of VOCs were reported at the near subsurface and adjacent to Building 90 (3,400 micrograms per liter [µg/L] in well MW-2A which is screened from 9 to 19 feet). Within the post, concentrations in excess of 100 µg/L had been reported in perched water intervals above the main aquifer body in the LGR. However, within the main aquifer body in the AOC-65 area, the concentrations are only present at trace levels, ranging from 0.06 µg/L to 17 µg/L.

Off-post, PCE and TCE concentrations in excess of their respective maximum contaminant levels (MCL), both 5 µg/L, were detected in private and public wells with open borehole completions. Concentrations exceeding 30 µg/L were reported in a well located 1,200 feet west-southwest of CSSA. Vertical profiling within that well showed that discrete intervals within uncased upper strata contribute PCE concentrations over 90 µg/L. Only sporadic, trace concentrations of solvents were detected in Bexar Shale and Cow Creek wells within the plume (Pearson and Murphy 2004).

Figure 4

AOC-65 Steam Injection
and Vapor Extraction Wells
Camp Stanley Storage Activity

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Following detection of PCE in the off-post well in 1999, two soil samples were collected from a cored area under the vat inside Building 90. Results of these samples confirmed the presence of PCE and TCE in soil at Building 90. As discussed in more detail below and in attachments to this report, a soil gas survey was conducted at AOC-65 in 2001 to characterize the nature and extent of VOCs in soil gas originating from the contaminated soil and groundwater at Building 90. In 2002, an interim removal action (IRA) was conducted and an SVE pilot system installed to remediate contaminated media, both beneath and surrounding Building 90. Additionally, two industrial hygiene surveys were conducted by the Industrial Hygiene Office at Red River Army Depot in 2002 to determine if indoor air concentrations of VOCs at Building 90 posed a potential health hazard to on-site employees.

Since the time of its installation in 2002, the SVE system has been expanded to its current configuration, totaling 35 vapor extraction wells (VEW) and two steam injection wells. Additionally, in 2010, CSSA performed a Vapor Intrusion Survey (VIS) with collection of soil gas samples and indoor air samples. Soil gas samples were collected along the southwestern boundary of CSSA to evaluate the potential for off-post migration of organic vapors to residential areas to the west and southwest (downgradient of AOC-65/Building 90). The indoor air samples were collected within Building 90. Summaries of these surveys and other activities at AOC-65/Building 90 are provided below and in attachments to this report.

Soil Gas Survey - January/February 2001

In January and February 2001 a total of 324 soil gas samples were collected from areas inside and surrounding Building 90. Sample depths ranged from 0.5 to 4.5 feet as determined by refusal of the Geoprobe® rig when bedrock was encountered. Analytical results from this investigation are presented in both tabular and figure format in **Attachment 1**.

PCE was detected in 67 soil gas samples at concentrations ranging from 0.08 to 1,590 µg/L. The highest outside concentration was detected at sample location BLDG90-15, which was collected within the vicinity of the former solvent vat (shown on Figures 3.3 and 3.4 of Attachment 1). TCE was detected in five soil gas samples (BLDG90-8, BLDG90-15, BLDG90-16, BLDG90-17, and BLDG90-37) located along the outer western wall of Building 90, as shown on Figure 3.1 of Attachment 1. TCE concentrations ranged from 0.04 µg/L to 8.56 µg/L, with the highest outside concentration detected in sample BLDG90-15 (Figure 3.2 of Attachment 1).

The detection of TCE, *cis*-1,2-dichlorothene (*cis*-1,2-DCE), and *trans*-1,2-dichlorothene (*trans*-1,2-DCE) during this investigation at significantly lower levels than PCE suggests that some natural degradation of the PCE has already begun near the solvent vat, which appears to be the most likely source for the VOC contamination. Soil gas VOC concentrations peak inside Building 90 near the vat location, and dissipate immediately outside of, and within a short distance from the building. PCE levels exceeded 24,000 µg/L in a soil gas sample under the building near the former solvent vat, decreased to 1,590 µg/L in a soil gas sample approximately 25 feet from the building, and were not detected above 5 µg/L in any of the soil gas samples located more than 50 feet from the building. Based on these results, it appears the lateral extent of the PCE plume in soil gas is generally confined to the immediate vicinity of Building 90 (Parsons 2002).

Industrial Hygiene Survey Report - April 2002

The first industrial hygiene survey in 2002 included placement of six organic vapor monitors within Building 90 in the vicinity of the former solvent vat area. Analytical results from this report are provided in **Attachment 2**. Laboratory analysis included PCE and other chlorinated hydrocarbons that may result as by-products of PCE. The list of analytes included PCE, 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethene (1,2-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and vinyl chloride. The report concluded that organic vapor measurements in all six monitors were below analytical sensitivity and could not be detected. Based on these results, the report also concluded that there were no airborne concentrations of PCE or other chlorinated hydrocarbons that exceed the threshold limit values (TLV) or permissible exposure limits (PEL) for occupational exposure, and that respiratory protection was not required for Building 90 (Red River Army Depot, Industrial Hygiene Office 2002a).

The AOC-65/Building 90 area is in an industrial area of CSSA which is not expected to change in the future. The study was performed to compare results to Occupational Exposure Limits (OEL) (i.e., TLVs and PELs). In addition, the monitors were placed in locations of possible worst-case vapor concentrations (i.e., around vat #2, vat #3, and the hazardous chemical waste station south of vat #6) so that the maximum potential for occupational risk could be assessed. Since residential screening levels are generally much lower than OELs, the analytical sensitivity for all compounds measured in the survey, with the exception of 1,1,1-TCA, was not sufficient for comparison to these levels. However, for 1,1,1-TCA, the detection limits were lower than USEPA and TCEQ residential screening levels for indoor air indicating that there were no unacceptable airborne concentrations of 1,1,1-TCA related to potential residential exposure. Information on the derivation and use of the USEPA and TCEQ screening levels is discussed in more detail below.

Industrial Hygiene Survey Report - October/November 2002

A second industrial hygiene study was also conducted in 2002 to assess potential worker exposures to PCE, TCE, 1,1,1-TCA, and other indoor vapors potentially volatilizing from the subsurface due to past activities at Building 90 (Red River Army Depot, Industrial Hygiene Office 2002b). Analytical results for this study are provided in **Attachment 3**. The survey did not identify any concentrations that would pose a potential health hazard to workers. All detected results were well below their respective PELs and recommended exposure limits (REL). The maximum PCE concentration detected during the study was 0.03 parts per million (ppm), and the maximum 1,1,1-TCA concentration was 0.02 ppm. The PEL and REL for PCE are 100 ppm and 0.4 ppm, respectively, and for 1,1,1-TCA, the PEL and REL are both 350 ppm. TCE was not detected at any sample locations. As above, the analytical sensitivity was not sufficient to compare the detected concentrations of PCE or the non-detected TCE results to lower residential screening levels. However, for 1,1,1-TCA, the detected results were lower than the USEPA and TCEQ residential screening levels for indoor air, again indicating that there were no unacceptable airborne concentrations of 1,1,1-TCA related to potential residential exposure. As stated above, the derivation of the USEPA and TCEQ screening levels and other information on their use is discussed in more detail below.

Interim Removal Action - April 2002

The purpose of the 2002 IRA was to excavate surface soil material from AOC-65 that contained VOCs at levels greater than TCEQ Risk Reduction Standard No. 1 (RRS1) criteria, with the objective of qualifying the surface-based portion of the site for partial closure under TCEQ's RRS1 (Parsons 2003a). The focus of the IRA was to address removal of contaminants in the surface soil, not contamination within the subsurface limestone. The subsurface contamination is currently being addressed using the SVE system as discussed below.

Closure of the site to RRS1 could not be obtained following the IRA due to the presence of some VOCs, polychlorinated biphenyls (PCB), and metals above background levels in excavation confirmation samples. However, excavation of 1,255 total cubic yards of media (contaminated soil, asphalt, and concrete) outside Building 90 under this interim measure significantly reduced the amount of contaminants available for migration from surface soils to groundwater at AOC-65 and surrounding areas. The final recommendation following the IRA was to address PCBs and metals in surface and subsurface soil, and to implement SVE at Building 90 to further reduce soil gas VOC concentrations (Parsons 2003a).

Soil Vapor Extraction System - 2002 through Present

In 2002, a pilot study SVE system was installed to address the contaminated media that remained within AOC-65 and around Building 90 (refer to **Figure 4**). SVE is the forced evacuation of soil gas from the subsurface using vacuum equipment. Vacuum blowers connected to VEWs with pipe are typically used to evacuate VOCs, water vapor, and any air from the subsurface. Contaminated soil gas as well as VOCs dissolved in groundwater can be removed using SVE, thereby either remediating contamination or reducing its continued migration (Parsons 2003b).

Beginning in 2002, seven VEWs were installed on the west side of Building 90 and 12 VEWs were installed beneath the building along with the associated piping and equipment comprising the SVE system. Two regenerative vacuum blowers were installed and piped to a vessel of granular activated carbon, designed to remove all VOC emissions prior to discharge to the atmosphere (Parsons 2003b). In 2007, the system was expanded with the addition of one deep nested VEW near Building 90, four shallow VEWs, three intermediate-depth VEWs, and two more regenerative vacuum blowers. The expanded SVE system is organized into two separate sub-systems: the Building 90 (or Eastern) system and the AOC-65 Western system. The Building 90 system contains the original system installed in 2002 (optimized and expanded in 2007 and 2011), and is divided into the Sub-slab and Exterior components. The AOC-65 Western system (installed in 2007) is divided into the Deep and Shallow components. Each component runs independently and includes a blower and set of VEWs.

The objective of operating these systems is to enable removal of VOC vapor to promote remediation, to reduce migration of contaminants in the groundwater, and to reduce the amount of VOC vapor that could potentially migrate into nearby buildings. To enhance volatilization of contaminants and increase contaminant mass removal, a steam injection treatability study is currently being evaluated in areas of higher contaminant concentrations (i.e., the subsurface area of the Building 90 footprint and the subsurface area along the AOC-65 drainage ditch west of Building 90). Two steam injection wells (SIW) were completed in 2011 and connected to a low pressure (15 psi) steam line originating from a boiler located within Building 89. SIW-01 was installed in the vat area inside Building 90, and SIW-02 was installed in the drainage ditch west of Building 90. Results of the study indicate that thermal heating within SIW-01 resulted in a greater mass removal rate for the shallow VEWs within the Building 90 footprint. More information on these results can be found in the *AOC-65 Steam Enhanced Soil Vapor Extraction Treatability Study* (in preparation). A notable finding during drilling of the SIWs and VEWs in April 2011 was that groundwater was unexpectedly encountered at shallow depths within the Upper Glen Rose (UGR) despite the exceptional drought conditions. Degradation by-products of chlorination (trihalomethanes) were also detected, indicating a likely water line leak in the vicinity of the AOC-65 contamination source area.

Vapor Intrusion Surveys (VIS) – 2010

The VIS included collection of soil gas and indoor air samples to be used for evaluating potential worst-case exposure and human health risk in the residential areas west and southwest (downgradient) of AOC-65/Building 90. The survey was completed in three phases of data collection.

Phase 1 was performed in March 2010 and included collection of 12 soil gas samples (including one field duplicate) at 11 points along the western perimeter CSSA fenceline, adjacent to and west (downgradient) of Building 90. This is the closest location to residential receptors without going off post and represents potential worst-case conditions (shallow groundwater and high VOC concentrations close to Building 90) for evaluating residential areas where groundwater is less contaminated and depth to groundwater is greater. Samples were analyzed for PCE, TCE, 1,2-DCA, 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1,1-TCA, and vinyl chloride.

Phase 2 included collection of four indoor air samples at Building 90. Samples were analyzed for PCE based on results of the Phase 1 soil gas sampling. These samples were collected to evaluate potential indoor worker exposure to PCE, and also to evaluate potential worst-case exposure for residential areas (i.e., shallow groundwater and high VOC concentrations within Building 90) without going into off-post homes or buildings. Samples from within the building as well as background samples were collected during four sampling events from July through September 2010.

Phase 3 was conducted in December 2010 and included collection of three additional soil gas samples at three points along the CSSA fenceline and southwest (also downgradient) of Building 90. Samples were analyzed for PCE based on results of the Phase 1 sampling. This area has similar groundwater contamination and depth to groundwater as off-post locations. However, it is closer to the Building 90 contamination source.

The soil gas samples (Phases 1 and 3) and the indoor air samples (Phase 2) are discussed below. The laboratory results for the samples are provided in **Attachment 4**.

VIS Soil Gas Surveys - March and December 2010

The soil gas surveys involved collection of 15 soil gas samples: 12 samples including one field duplicate in March 2010 (Phase 1 of the VIS), and three samples in December 2010 (Phase 3 of the VIS). The soil gas data were collected to evaluate potential exposure and health risk to residential receptors downgradient from the AOC-65/Building 90 area. The locations of the March samples, to the west of Building 90, represent potential worst-case residential exposure scenarios (i.e., an area of shallow groundwater and high VOC concentrations close to the Building 90 source), while locations of the December samples, to the southwest of Building 90, represent similar groundwater conditions as those off-post, but still higher VOC concentrations closer to the Building 90 source.

Soil gas samples provide the preferred subsurface media for evaluating the vapor intrusion pathway. Using soil gas data instead of soil or groundwater data avoids the modeling needed to predict a gas concentration from soil or groundwater data. In addition, vapor intrusion or groundwater modeling is not recommended in areas where preferential pathways are present (e.g., fractured bedrock like that in the CSSA area). Direct measurement of soil gas will capture vapors from all sources that may be present, such as contaminated groundwater, soil, or laterally transported vapors (DoD 2009). It is important that the soil gas samples be taken from the appropriate depth, as the site-specific geology and the type and location of the contamination can affect how soil gas behaves in the soil column.

The previous soil gas work at AOC-65/Building 90 demonstrated that the soil/bedrock interface is relatively shallow, and that the probes typically cannot be driven below 4-6 feet below grade. A pneumatic hammer and jack were used to drive and retrieve rods. Samples were obtained in certified clean Summa canisters under vacuum and analyzed using Level III analysis with USEPA Method TO-15 for VOCs (March samples), and Method TO-15 Selective Ion Monitoring (SIM) for PCE (December samples).

The 12 samples collected in March 2010 were analyzed for PCE, TCE, 1,2-DCA, 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1,1-TCA, and vinyl chloride. Methylene chloride, benzene and toluene were also included in the analyses, but are not discussed in this report. Methylene chloride, a common lab contaminant, was not detected in the samples, and benzene and toluene would be expected in samples collected along roads and highways, such as those adjacent to the CSSA southwest perimeter fenceline where the soil gas samples were collected. The additional three soil gas samples collected in December 2010 were analyzed for PCE using USEPA Method TO-15 SIM to obtain lower detection/reporting limits. **Attachment 4** of this report provides the analytical results of the VIS samples (including both the soil gas and indoor air samples).

Results of the 15 soil gas samples indicate that concentrations of PCE (and to a limited extent TCE and 1,2-DCA) were above potential residential indoor air screening levels. Both the June 2011 regional screening levels (RSL) for residential air (USEPA 2011a) and the May 2011 risk-based exposure limits (RBEL), specifically ${}^{Air}RBEL_{Inh}$ levels, (TCEQ 2011) were used in developing screening levels. An attenuation factor of 0.85 as noted by USEPA (2010) guidance was applied to both the USEPA RSLs and the TCEQ RBELs to obtain the "derived" screening levels for indoor air. The derived indoor air screening levels and results of the soil gas sample analyses are provided in **Table 1**. **Figure 5** includes the concentrations of PCE in the soil gas samples.

Eleven (including one field duplicate) of the 15 samples analyzed for PCE had PCE concentrations above the USEPA derived residential indoor air RSL, which is 0.07 parts per billion volume (ppbv). There were no concentrations of PCE that exceeded the TCEQ derived residential indoor air RBEL for PCE (11 ppbv). PCE was not detected in three of the soil gas samples, and detected at a low concentration flagged with an "F" qualifier in one sample. Of

Table 1 Summary of Chemical Constituents Detected in Soil Gas at AOC65/Building 90

Chemical	CAS Number	USEPA Regional Indoor Air Screening Level - Residential[1]		Derived Soil Gas-to-Indoor Air Screening Level - Residential[2]		TO-15 Laboratory Reporting Level		TO-15 SIM Laboratory Detection Level	
		ppbv	µg/m³	ppbv	µg/m³	ppbv	µg/m³	ppbv	µg/m³
Volatile Organic Compounds									
1,1,1-Trichloroethane	71-55-6	950	5200	1177.6	6118	0.50	2.7		
1,1-Dichloroethene	75-35-4	53	210	62.36	247	0.50	2.0		
1,2-Dichloroethane	107-06-2	0.023	0.094	0.03	0.2	0.50	2.0		
Benzene	71-43-2	0.097	0.31	0.12	0.4	0.50	1.6		
cis-1,2-Dichloroethene	156-59-2	na	na	na	na	0.50	2.0		
Methylene chloride	75-09-2					0.50	1.7		
Tetrachloroethene (PCE)	127-18-4	0.060	0.41	0.08	0.5	0.50	3.4	0.0016	0.01
Toluene	108-88-3					0.50	1.9		
trans-1,2-Dichloroethene	156-60-5	16	63	18.83	74.2	0.50	2.0		
Trichloroethene (TCE)	79-01-6	0.22	1.2	0.26	1.5	0.50	2.7		
Vinyl chloride	75-01-4	0.063	0.16	0.08	0.2	0.50	1.3		

Sample Locations

Chemical	VIP-AOC65-01 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-02 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-03 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-04 04-Mar-2010 ppbv	Qual	DF
Volatile Organic Compounds												
1,1,1-Trichloroethane	0.085	U	2	0.068	U	1	**1.6**		1	0.068	U	1
1,1-Dichloroethene	0.19	U	2	0.15	U	1	0.15	U	1	0.15	U	1
1,2-Dichloroethane	0.12	U	2	0.099	U	1	**1.9**	J	1	0.10	U	1
Benzene	**1.1**		2	**0.90**		1	**1.6**		1	**2.0**		1
cis-1,2-Dichloroethene	0.11	U	2	0.085	U	1	0.085	U	1	0.086	U	1
Methylene chloride	0.11	U	2	0.090	U	1	0.090	U	1	0.091	U	1
Tetrachloroethene (PCE)	**1.2**		2	**0.60**	F	1	**1.4**		1	**0.52**	F	1
Toluene	**2.6**		2	**1.6**		1	**0.60**	F	1	**0.65**	F	1
trans-1,2-Dichloroethene	0.14	U	2	0.11	U	1	0.11	U	1	0.11	U	1
Trichloroethene (TCE)	0.12	U	2	0.092	U	1	**2.2**		1	0.092	U	1
Vinyl chloride	0.17	U	2	0.14	U	1	0.14	U	1	0.14	U	1

Chemical	VIP-AOC65-05 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-06 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-07 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-07-DUP 04-Mar-2010 ppbv	Qual	DF
Volatile Organic Compounds												
1,1,1-Trichloroethane	0.068	U	1	**0.32**	F	1	0.069	U	1	0.070	U	2
1,1-Dichloroethene	0.15	U	1	0.15	U	1	0.15	U	1	0.15	U	2
1,2-Dichloroethane	0.099	U	1	0.099	U	1	0.10	U	1	0.10	U	2
Benzene	**3.3**		1	**3.7**		1	**1.4**		1	**0.83**		2
cis-1,2-Dichloroethene	0.085	U	1	0.084	U	1	0.087	U	1	0.088	U	2
Methylene chloride	0.090	U	1	0.090	U	1	0.092	U	1	0.093	U	2
Tetrachloroethene (PCE)	**1.7**		1	**0.89**		1	**1.2**		1	**1.1**		2
Toluene	**1.2**		1	**1.3**		1	**0.63**	F	1	**0.38**	F	2
trans-1,2-Dichloroethene	0.11	U	1	0.11	U	1	0.11	U	1	0.11	U	2
Trichloroethene (TCE)	0.092	U	1	**0.58**	F	1	0.094	U	1	0.095	U	2
Vinyl chloride	0.14	U	1	0.14	U	1	0.14	U	1	0.14	U	2

Chemical	VIP-AOC65-08 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-09 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-10 04-Mar-2010 ppbv	Qual	DF	VIP-AOC65-11 04-Mar-2010 ppbv	Qual	DF
Volatile Organic Compounds												
1,1,1-Trichloroethane	0.068	U	1	0.068	U	1	0.068	U	1	0.068	U	1
1,1-Dichloroethene	0.15	U	1	0.15	U	1	0.15	U	1	0.15	U	1
1,2-Dichloroethane	0.10	U	1	0.10	U	1	0.099	U	1	0.099	U	1
Benzene	**0.73**	F	1	**1.0**		1	**0.81**		1	**1.4**		1
cis-1,2-Dichloroethene	0.086	U	1	0.086	U	1	0.085	U	1	0.085	U	1
Methylene chloride	0.091	U	1	0.091	U	1	0.090	U	1	0.090	U	1
Tetrachloroethene (PCE)	0.080	U	1	**0.36**	F	1	0.078	U	1	0.078	U	1
Toluene	**0.23**	F	1	**0.44**	F	1	**0.21**	F	1	**0.52**	F	1
trans-1,2-Dichloroethene	0.11	U	1	0.11	U	1	0.11	U	1	0.11	U	1
Trichloroethene (TCE)	0.093	U	1	0.093	U	1	0.092	U	1	0.092	U	1
Vinyl chloride	0.14	U	1	0.14	U	1	0.14	U	1	0.14	U	1

Chemical	VIP-AOC65-12 16-Dec-2010 ppbv	Qual	DF	VIP-AOC65-13 16-Dec-2010 ppbv	Qual	DF	VIP-AOC65-14 16-Dec-2010 ppbv	Qual	DF
Volatile Organic Compounds									
1,1,1-Trichloroethane									
1,1-Dichloroethene									
1,2-Dichloroethane									
Benzene									
cis-1,2-Dichloroethene									
Methylene chloride									
Tetrachloroethene (PCE)	**0.11**		1	**0.21**		2	**0.0053**	F	2
Toluene									
trans-1,2-Dichloroethene									
Trichloroethene (TCE)									
Vinyl chloride									

NOTES:

[1] Regional Screening Levels for Chemical Contaminants at Superfund Sites - May, 2010.

[2] Assumes a soil gas-to-indoor air attenuation factor of 0.85.

QA NOTES AND DATA QUALIFIERS:

(NO CODE) - Confirmed identification.
U - Analyte was not detected above the indicated Method Detection Limit (MDL).
F - Analyte was positively identified, but the quantitation is an estimation above the MDL and below the Reporting Limit (RL).
J - Analyte was positively identified, but the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
Detections are bolded.

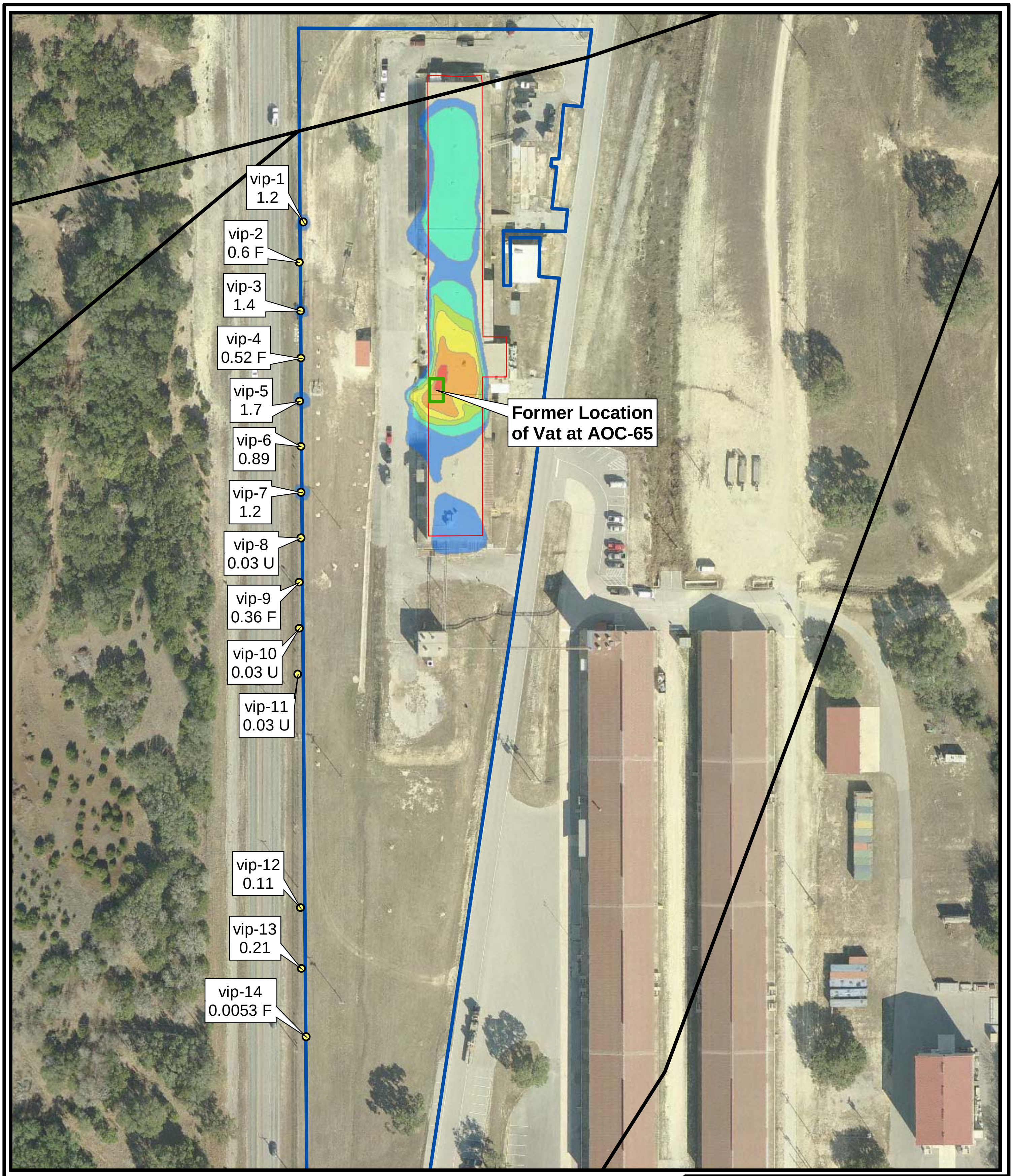

Figure 5

Soil Gas Survey
Sampling Points

Camp Stanley Storage Activity

PARSONS

J:\CSSA\GIS\AOC65_Bldg90\Maps\AOC65_SGSurvey_Results.mxd - 1/20/2011 @ 2:43:38 PM the eleven samples with PCE, the highest concentration was found in sample VIP-AOC65-05 at 1.7 ppbv.

TCE was only detected in two of the 12 samples that were analyzed for TCE. The two samples where TCE was detected (VIP-AOC65-03 and VIP-AOC65-06) had TCE concentrations of 2.2 ppbv and 0.58"F" ppbv, respectively, which are above the USEPA derived residential indoor air RSL for TCE (0.26 ppbv), but not above the TCEQ derived residential indoor air RBEL for TCE (2.6 ppbv).

1,2-DCA was only detected in one of the 12 samples analyzed for 1,2-DCA. The one sample where 1,2-DCA was detected (VIP-AOC65-03) had a concentration of 1.9 ppbv, which is above both the USEPA derived residential RSL of 0.027 ppbv and the TCEQ derived residential indoor air RBEL of 0.27 ppbv.

The soil gas samples were collected in an area of shallow groundwater and high VOC concentrations close to Building 90. This is the closest location to residential receptors without going off post and represents potential worst-case conditions for evaluating residential areas where groundwater is less contaminated and depth to water is greater. In addition, a leaking pipe at the north end of Building 90 has caused an artificial shallow water zone in the area. The presence of chlorination by-products (trihalomethanes, chloroform) indicate that the source of the water is due to a leaking pipe. Although efforts have recently been made to repair the leak, it is not known when the pipe started leaking. Water contributed from this leak has moved into the UGR and likely transported contaminants to the south and west of Building 90, and thus may have contributed to contamination in the area where the soil gas samples were collected. Piezometers and VEWs in the area confirm the presence of the shallow water zone, which appears to be located in the immediate area west of Building 90. The UGR is present on post in this area, but tapers off to the west just beyond the CSSA boundary. Thus, contaminants in this shallow water zone would not move laterally to off-post areas. Additionally, contamination in this shallow zone does not appear to move downward. The UGR is fractured in this area but the LGR appears to be less fractured.

It is also noted that the RSLs and RBELs shown in **Table 1** are calculated based on whether the chemical is a carcinogen, a noncarcinogen, or both. If the chemical is both a carcinogen and a noncarcinogen, then the lower of the two calculated screening levels is used, one calculated for a cancer target risk (TR) and one calculated for a noncancer hazard index (HI). The USEPA RSLs are based on: (1) TR = 1E-06 for carcinogens, (2) HI = 1 for noncarcinogens, where HI = 1 < 10x the cancer screening level at TR = 1E-06, or (3) the lower of the two screening levels for chemicals that are both a carcinogen and noncarcinogen. For the TCEQ RBELs, the screening values are based on (1) a cancer TR = 1E-05, (2) a noncancer HI = 1, or (3) the lower of the two screening values. No cumulative cancer or noncancer adjustments were needed for any of the chemicals.

The cancer risk screening level of 1E-06 used in the USEPA RSLs is the most conservative of the target risk range of 1E-04 to 1E-06, which is the acceptable range for sites addressed under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund Act. For PCE, TCE, and 1,2-DCA, the RSLs are based on the screening levels for cancer risk at TR = 1E-06, which is the most conservative of the USEPA acceptable cancer risk range.

Current TCEQ guidance recommends a cancer risk screening level of 1E-05 unless multiple (more than 10) carcinogens are present at the site (TCEQ 2008). The use of 1E-05 is also consistent with other guidance as referenced by USEPA. The current USEPA (2011b) RSL guidance for evaluating the vapor intrusion to indoor air pathway from groundwater and soils references the USEPA (2002) *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* The approaches recommended in the *Draft Guidance* are primarily designed to ensure protection of the public in residential settings. The guidance provides targeted indoor air concentrations set at 1E-04, 1E-05, and 1E-06 for incremental individual lifetime cancer risk levels and an HQ of 1 for noncancer risk. For purposes of making Current Human Exposures Under Control Environmental Indicator (EI) determinations with respect to vapor intrusion under RCRA and CERCLA, the guidance recommends the use of 1E-05 target cancer risk values. This level, in USEPA's view serves as a generally reasonable screening mechanism for the vapor intrusion pathway. Thus, based on TCEQ and USEPA guidance, the USEPA RSLs that are calculated at TR = 1E-06 for carcinogens in indoor air are 10x more conservative than the TCEQ RBELs based on 1E-05. This accounts for some of the difference between the TCEQ and USEPA screening levels for carcinogens. In addition, TCEQ has developed their own toxicity values for certain chemicals (including PCE) that are used in the calculations. The toxicity values used by TCEQ were updated in 2011 by the TCEQ Toxicology Division. This also accounts for differences between the TCEQ and USEPA screening levels. There are no other differences between the TCEQ and USEPA calculations. The equations are the same and all exposure factors used in the equations are based on conservative reasonable maximum exposure (RME) factors.

It is also noted that the RSLs and RBELs are adjusted for a vapor intrusion attenuation factor of 0.85 which is a conservative upper bound (95th percentile) estimate of the attenuation factor for non-sub-slab soil gas data (USEPA 2010). The attenuation factor of 0.85 is based on the USEPA's updated 2010 vapor intrusion database and indicates that most all the vapors measured in soil gas would be emitted to the indoors. This is the current recommended attenuation factor for soil gas when site-specific data are not available. Thus, 0.85 is used for the soil gas data in this report. Previous attenuation factors recommended by USEPA were less conservative (0.33 and 0.1) and would result in higher screening levels than those presented here.

The soil gas data presented in this report represent a worst-case scenario for evaluating potential residential exposure. It is expected that potential soil vapors that may enter homes in the area downgradient of AOC-65/Building 90 would be much less due to the depth of contamination and the distance from the contamination source. Contaminated groundwater which has migrated off-post and under the residential areas is discussed below.

VIS Indoor Air Sampling – July through September 2010

Because the Phase 1 soil gas survey showed the presence of PCE in soil gas samples above USEPA RSLs, indoor air samples were collected within Building 90. These samples were collected in July, August, and September of 2010 as part of Phase 2 of the VIS. The purpose of the sampling was to assess the potential for indoor worker exposure to PCE vapors and to evaluate potential worst-case residential exposure to PCE vapors downgradient of the site without going into off-post homes or buildings. Indoor air samples were analyzed using Level III analysis with USEPA Method TO-15 SIM for PCE.

Indoor air sampling and analysis provides the most direct estimate of inhalation exposures. However, source attribution for the many compounds typically present in indoor air can be challenging. Constituents of indoor air can originate from indoor emission sources, from ambient (outdoor) air contributions, as well as from possible vapor intrusion from contaminated media. Each of these sources can introduce concentrations of volatile chemicals to the indoor environment sufficient to pose an unacceptable health risk. In addition, concentrations of compounds found in indoor air are often subject to temporal and spatial variations, which may complicate estimates of exposure.

Prior to indoor air sampling at Building 90, efforts were made to address sources of background contamination. Some background sources will occur on a fairly constant basis and are difficult to eliminate (e.g., off-gassing from Building 90 processes and volatiles released from long-term storage of chemicals and fuels). However, other sources are intermittent and have the potential to skew the data (e.g., cigarette smoke, exhaust from SVE blowers, etc.). A building walkthrough was conducted in advance of the interior sampling events to identify potential background sources, eliminate them, and educate the occupants on those activities that should be avoided immediately before and during the sample collection.

Summa sampling canisters were delivered to the field under vacuum and certified clean and leak-free. For indoor air sampling, air collection was at a fixed flow rate over a preset period of time with use of a flow controller calibrated and set in the laboratory. Initial and final vacuums were recorded for each canister. Canisters were equipped with dedicated vacuum gauges to facilitate this effort. The canisters were retrieved prior to being completely filled (with some residual vacuum remaining) to ensure proper collection periods.

The sampling canisters were placed within the normal breathing zone, approximately 5 feet above the floor, near the former vat location in Building 90. All windows and doors were shut 12 hours prior to sampling, with the HVAC system on, and the sub-slab SVE system turned off 10 days before the measurements began. A background sample was also collected concurrently and was located upwind and outside of Building 90.

Samples from within Building 90 as well as the background samples were collected during four sampling events from July through September 2010 (July 6, July 19, August 22, and September 12). Analytical results are provided in **Attachment 4** and summarized in **Table 2**. Upon collection of the indoor air samples within Building 90 with the HVAC system on and SVE system off, the sampling process was repeated with the SVE system on, including the background sampling. This sampling was expected to provide results on the effectiveness of the SVE system to mitigate indoor vapor intrusion, if any. The indoor air sampling events (i.e., SVE system on and off) were then repeated but with the HVAC system off.

Results for the indoor air samples analyzed by USEPA Method TO-15 SIM for PCE showed the presence of PCE above the USEPA RSL for residential indoor air (0.06 ppbv) in the four samples from each of the four sampling events as well as in one of the background samples collected in the second sampling event (July 19). All results were below the USEPA industrial RSL for indoor air (0.31 ppbv) and the TCEQ industrial and residential RBELs for indoor air (15.9 ppbv and 9.44 ppbv, respectively). Analytical results for PCE concentrations collected over a 24-hour period ranged from a high of 0.25 ppbv with the HVAC and the SVE

Table 2 Summary of Chemical Constituents Detected in Soil Gas at AOC65/Building 90

Chemical	**CAS Number**	**USEPA Regional Indoor Air Screening Level - Residential[1]**		**Derived Soil Gas-to-Indoor Air Screening Level - Residential[2]**		**TO-15 SIM Laboratory Reporting Level**		**Sample Locations**																							
		ppbv	**µg/m^3**	**ppbv**	**µg/m^3**	**ppbv**	**µg/m^3**	**BLDG90-VIP01_BGD 06-Jul-2010 ppbv**	**Qual**	**DF**	**BLDG90-VIP01 06-Jul-2010 ppbv**	**Qual**	**DF**	**BLDG90-VIP02_BGD 19-Jul-2010 ppbv**	**Qual**	**DF**	**BLDG90-VIP02 19-Jul-2010 ppbv**	**Qual**	**DF**	**BLDG90-VIP03_BGD 22-Aug-2010 ppbv**	**Qual**	**DF**	**BLDG90-VIP03 22-Aug-2010 ppbv**	**Qual**	**DF**	**BLDG90-VIP04_BGD 12-Sep-2010 ppbv**	**Qual**	**DF**	**BLDG90-VIP04 12-Sep-2010 ppbv**	**Qual**	**DF**
Volatile Organic Compounds																															
Tetrachloroethene (PCE)	127-18-4	0.060	0.41	0.08	0.5	0.020	0.14	0.0024	U	1.7	**0.24**		1.9	**0.096**		1.7	**0.22**		1.6	0.0016	U	1.8	**0.15**		1.7	0.0017	U	1.8	**0.25**		1.8

NOTES:

[1] Regional Screening Levels for Chemical Contaminants at Superfund Sites - May, 2010

[2] Assumes a soil gas-to-indoor air attenuation factor of 0.85

QA NOTES AND DATA QUALIFIERS:

(NO CODE) - Confirmed identification.

U - Analyte was not detected above the indicated Method Detection Limit (MDL).

Detections are bolded.

systems off to 0.15 ppbv with the HVAC system off and the SVE system on. Background samples collected during the sampling events were non-detect with the exception of the background sample result of 0.096 ppbv collected during the event with the SVE system on.

Groundwater Data – 1999 to Present

Groundwater data were also used to evaluate potential exposure to residents in the off-post areas downgradient from AOC-65/Building 90. Several residential subdivisions have been developed outside of CSSA on the outer area of the VOC plume originating from Building 90. This plume, known as Plume 2, and the off-post residential areas were shown on **Figure 2**, which shows March 2011 PCE concentrations. Plume 2 groundwater monitoring includes analyses for PCE, TCE, 1,2-DCA, 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1,1-TCA, and vinyl chloride. Based on comparison of data to USEPA (2011c) MCLs, PCE and TCE are the chemicals of concern in this area.

Groundwater concentrations were used to calculate indoor air concentrations following California Environmental Protection Agency, Department of Toxic Substances Control (DTSC 2005) guidance and using an attenuation factor of 0.0015 (USEPA 2010). Each groundwater concentration was converted to a soil gas concentration, which was then adjusted to an indoor air concentration using the attenuation factor of 0.0015. Both USEPA RSLs and TCEQ RBELs for residential indoor air were calculated and used for screening.

Groundwater concentrations and calculated indoor air concentrations are presented in **Table 3**. USEPA (2011c) MCLs are also shown in **Table 3** for comparison. For contaminants exceeding MCLs in this area (PCE and TCE), cleanup to MCLs would also be protective of potential indoor air exposure based on the TCEQ RBELs for indoor air, but not sufficiently protective if screening levels are calculated using USEPA RSLs. Thus, the TCEQ RBELs for PCE and TCE are the more reasonable screening levels to use in the comparisons.

A total of 40 off-base wells have been sampled in the Plume 2 area. Monitoring of these wells has taken place since late 1999 to present, and is expected to continue in the future to meet corrective action goals. The most recent sampling event included in this evaluation is June 2011.

PCE and TCE were the chemicals having the highest number of detected concentrations and the only chemicals that exceeded the calculated indoor air screening levels (in which only one sample exceeded the TCEQ RBEL). All other exceedances were based on the calculated USEPA RSLs for indoor air. The one exceedance of the TCEQ RBEL was for TCE in a sample collected September 2, 2009 in well CS-WB04-LGR-06, which had a calculated air concentration of 13 $\mu g/m^3$ compared to the TCEQ RBEL of 12.2 $\mu g/m^3$. Thus, the predicted indoor air concentration was only slightly above the TCEQ screening value. Since that time, four additional samples have been collected at that well and shown calculated air concentrations ranging from 9.6 to 9.0 $\mu g/m^3$, which are below the TCEQ screening level. For USEPA RSLs, which are overly conservative, exceedances occurred at least one time in 22 of the 40 off-post wells for PCE, and nine of the off-post wells for TCE. The MCL was exceeded at least one time in 10 of the wells for PCE, and 5 of the wells for TCE. Plume maps showing the March 2011 data for PCE and TCE are provided in **Figure 2** and **Figure 6**, respectively.

1,2-DCA, *cis*-1,2-DCE and *trans*-1,2-DCE were detected in several off-post wells, but concentrations did not exceed RBELs, RSLs, or MCLs.

1,1-DCE, 1,1,1-TCA and vinyl chloride have not been detected in off-post wells.

CONCLUSIONS AND RECOMMENDATIONS

Based on results of the 2001 soil vapor sampling, the lateral extent of the PCE and TCE in soil gas was generally confined to the immediate vicinity of Building 90 (Parsons 2002). The highest VOC vapor concentrations were detected under Building 90 near the source of the VOC groundwater plume. To address potential exposure and health risk to Building 90 workers, two industrial hygiene studies were performed at the site in 2002 which showed that indoor vapors at Building 90 did not pose a human health hazard and that respiratory protection was not required (Red River Army Depot, Industrial Hygiene Office 2002a and 2002b). The industrial hygiene studies included analyses for PCE, TCE, 1,1-DCA, 1,2-DCE, 1,1,1-TCA, vinyl chloride and other indoor vapors potentially coming from the subsurface due to past activities at Building 90.

The 2002 industrial hygiene studies addressed potential exposure and health risk related to occupational exposure. Since the time of the industrial hygiene studies, additional indoor air sampling has been conducted at Building 90 to assess the potential for indoor worker exposure to PCE vapors and to evaluate potential worst-case residential exposure to PCE vapors downgradient of the site without going into off-post homes or buildings. Air samples were analyzed for PCE based on results of the soil gas sampling conducted during this same period of time. Samples from within Building 90 as well as background samples were collected during four sampling events (from July through September 2010) and analyzed for PCE using USEPA Method TO-15 SIM. Results from the indoor air survey showed all results below the USEPA industrial RSL for indoor air (0.31 ppbv) and the TCEQ industrial and residential RBELs for indoor air (15.9 ppbv and 9.44 ppbv, respectively). Although the survey showed PCE concentrations above the USEPA RSL for residential indoor air (0.06 ppbv) in all four samples as well as in one of the background samples, it is noted that the USEPA RSLs are more conservative (based on TR = 1E-06), while TCEQ guidance recommends protective screening levels at TR = 1E-05. The TCEQ has also developed specific toxicity values for certain chemicals (including PCE) that are used in the calculations.

The soil gas survey performed in March and December 2010 included collection of 15 soil gas samples (including one field duplicate) at 14 points along the western perimeter CSSA fenceline, adjacent to and downgradient of Building 90. The 12 samples collected in March (including the field duplicate) were analyzed for PCE, TCE, 1,2-DCA, 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1,1-TCA, and vinyl chloride. The samples collected in December 2010 were analyzed for PCE using USEPA Method TO-15 SIM to obtain lower detection/reporting limits. Results of the survey showed 11 (including one field duplicate) of the 15 samples analyzed for PCE had PCE concentrations above the USEPA derived residential indoor air RSL (0.07 ppbv). There were no concentrations of PCE that exceeded the derived TCEQ RBEL for residential indoor air (11 ppbv). TCE was only detected in two of the 12 samples that were analyzed for TCE, which were above the USEPA derived residential indoor air RSL for TCE (0.26 ppbv), but not above the TCEQ derived residential indoor air RBEL for TCE (2.6 ppbv). 1,2-DCA was only detected in one of the 12 samples analyzed for 1,2-DCA and was above both the USEPA derived residential RSL (0.027 ppbv) and the TCEQ derived residential indoor air RBEL (0.27 ppbv). (The differences between the USEPA and TCEQ derived screening levels are discussed in this paper.)

It is noted that the soil gas sampling locations are in an area of shallow groundwater and high VOC concentrations close to Building 90. This is the closest location to residential receptors without going off post and represents potential worst-case conditions for evaluating the residential areas where groundwater is less contaminated and depth to water is greater. In addition, a leaking pipe at the north end of Building 90 has caused an artificial shallow water zone in the area. Although efforts to repair the pipe were recently made, it is not known when the leak initially occurred. Water contributed from this leak has moved in the UGR and likely transported contaminants to the south and west of Building 90, and thus may have contributed to contamination in the area where the soil gas samples were collected. Piezometers in the area confirm the presence of the shallow water zone, which appears to be located in the immediate area west of Building 90. The UGR is present on post in this area, but tapers off to the west as it approaches the CSSA boundary. Thus, contaminants in this shallow water zone would not move laterally to off-post areas. Additionally, contamination in this shallow zone does not appear to move downward. The UGR is fractured in this area but the LGR is competent. It is expected that potential soil vapors that may enter homes in the area downgradient of AOC-65/Building 90 would be much less due to the depth of contamination and the distance from the contamination source.

Off-post groundwater data in the area of Plume 2 were also used to evaluate potential exposure to residents downgradient from AOC-65/Building 90. Groundwater monitoring includes analyses for PCE, TCE, 1,2-DCA, 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1,1-TCA, and vinyl chloride. Based on comparison of data to USEPA MCLs, PCE and TCE are the chemicals of concern in groundwater in this area. A total of 40 off-base wells have been sampled in the Plume 2 area. Monitoring of these wells has taken place since late 1999 to present, and is expected to continue in the future based on 2020 cleanup goals. The most recent sampling event included in this evaluation is June 2011.

PCE and TCE were the chemicals having the highest number of detected concentrations and the only chemicals that exceeded the calculated indoor air screening levels (in which only one sample exceeded the TCEQ RBEL). The one exceedance of the TCEQ RBEL was for TCE in a sample collected September 2, 2009 in well CS-WB04-LGR-06, which had a calculated air concentration of 13 $\mu g/m^3$ compared to the TCEQ RBEL of 12.2 $\mu g/m^3$. Thus, the predicted indoor air concentration was only slightly above the TCEQ screening value. Since that time, four additional samples have been collected at that well and shown calculated air concentrations ranging from 9.6 to 9.0 $\mu g/m^3$, which are below the TCEQ screening level. For USEPA RSLs, which are overly conservative, exceedances occurred at least one time in 22 of the 40 off-post wells for PCE, and nine of the off-post wells for TCE. The MCL was exceeded at least one time in 10 of the wells for PCE, and 5 of the wells for TCE. 1,2-DCA, *cis*-1,2-DCE and *trans*-1,2-DCE were detected in several off-post wells, but concentrations did not exceed RBELs, RSLs, or MCLs. 1,1-DCE, 1,1,1-TCA and vinyl chloride have not been detected in off-post wells. For contaminants exceeding MCLs in this area (PCE and TCE), cleanup to MCLs would also be protective of potential indoor air exposure based on the TCEQ indoor air screening levels (RBELs) but not sufficiently protective if screening levels are calculated using USEPA RSLs. Thus, the TCEQ RBELs for PCE and TCE are the more reasonable screening levels to use in the comparisons.

Based on results presented in this paper, risk management decisions need to be made whether to use derived TCEQ RBELs as the protective concentration levels for the site.

Remediation activities are in place, or planned for the site, to help reduce surface, subsurface, and groundwater contamination. These activities include:

- Continued operation of the current SVE system;
- Use of thermal enhanced SVE within Building 90;
- An IRA for vadose zone limestone in the ditchline area west of Building 90; and
- In-situ oxidation in the vadose zone.

These activities will continue to reduce the overall amount of contaminants present in the surface, subsurface, and groundwater at AOC-65/Building 90. Monitoring at the site will continue to ensure remediation goals are met.

As a case study for CSSA's VIS, the USEPA has investigated and prepared a Proposed Plan identifying the preferred alternatives for cleanup of contaminated vapor, soil and groundwater at the Bandera Road Ground Water Plume Site. The Bandera Road Ground Water Plume Site is situated in Bexar County, in the City of Leon Valley in the northwest section of the City of San Antonio, Texas approximately 19 miles to the south of CSSA. This site consists of releases of chlorinated solvents from at least two dry cleaning facilities. These solvents included PCE and TCE which have impacted the indoor air, subsurface soils, and underlying groundwater. The Bandera Road Ground Water Plume Site serves as an example of the mitigation actions proposed by CSSA to effectively protect public health or welfare or the environment from actual or threatened releases of hazardous substances.

The site overlays three different karst and fractured dominated water bearing units: the Austin Chalk, the Buda Limestone, and the Edwards Aquifer. Two confirmed source areas were among the five potential areas identified by the USEPA during the investigation. A summary of USEPA's Proposed Plan for the Bandera Road Ground Water Plume Superfund Site is included in **Attachment 5**.

The USEPA evaluated a number of alternatives and selected the following combination of alternatives as preferred way to address vapor, soil, and groundwater contaminated by chlorinated solvents.

- Indoor Air – Vapor Barrier with Vapor Vent
- Surface and Subsurface Soil – Excavation and Offsite Disposal and Soil Vapor Extraction
- Bedrock Above the Water Table – Soil Vapor Extraction
- Ground Water – In-place Biological Treatment (includes Long-term Monitoring, Institutional and Engineering Controls)

Table 3 Groundwater Results

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
Wells Downgrade West of AOC65																		
	I10-2	9/19/2001	0.11 U	NA	**0.23 F**	**0.15**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	12/18/2001	**0.16 F**	**0.18**	**0.22 F**	**0.14**	**0.11 F**	**0.0088**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/20/2002	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/12/2002	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/18/2002	**0.10 F**	**0.11**	**0.15 F**	**0.096**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/5/2002	**0.080 F**	**0.092**	**0.12 F**	**0.077**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/13/2003	**0.10 F**	**0.11**	**0.060 F**	**0.039**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/10/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2004	0.060 U	NA	0.050 U	NA			0.12 M	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2004	**0.11 F**	**0.13**	**0.11 F**	**0.071**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/22/2004	**0.11 F**	**0.13**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	9/22/2004	**0.12 F**	**0.14**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/16/2004	**0.11 F**	**0.13**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/22/2005	**0.12 F**	**0.14**	**0.12 F**	**0.077**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/19/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2007	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/4/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2010	**0.19 F**	**0.22**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/2/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/13/2011	0.060 U	NA	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	I10-4	12/19/2001	**0.12 F**	**0.14**	0.14 U	NA	**0.11 F**	**0.0088**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	3/21/2002	0.11 U	NA	0.14 U	NA	**0.12 F**	**0.0096**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 UJ	NA
	Duplicate	3/21/2002	0.11 U	NA	0.14 U	NA	**0.11 F**	**0.0088**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 UJ	NA
		6/11/2002	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/18/2002	0.060 U	NA	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	Duplicate	9/18/2002	0.060 U	NA	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/4/2002	0.060 U	NA	0.050 U	NA	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/4/2002	0.060 U	NA	0.050 U	NA	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/13/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/13/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/11/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/10/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2004	**2.2**	**2.5**	**0.87 F**	**0.56**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		4/14/2004	**0.48 F**	**0.55**	**0.25 F**	**0.16**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2004	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/22/2004	**0.15 F**	**0.17**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/15/2004	**0.12 F**	**0.14**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/21/2005	**3.5**	**4.0**	**1.2**	**0.77**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/21/2005	**0.13 F**	**0.15**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/19/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/22/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)[†]	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)[††]	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW* *(ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**
		6/22/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2006	**0.62 F**	**0.71**	**0.29 F**	**0.19**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/12/2006	**0.84 F**	**0.96**	**0.48 F**	**0.31**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/12/2006	**0.95 F**	**1.1**	**0.49 F**	**0.31**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/22/2007	**2.3**	**2.6**	**1.1**	**0.71**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/10/2008	**5.9**	**6.8**	**2.2**	**1.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2009	**6.7**	**7.7**	**2.2**	**1.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2009	**6.5**	**7.5**	**2.7**	**1.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/1/2009	**6.9**	**7.9**	**2.5**	**1.6**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2009	**7.4**	**8.5**	**2.7**	**1.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2010	**0.69 F**	**0.79**	**0.21 F**	**0.13**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
	Duplicate	3/2/2010	**0.59 F**	**0.68**	**0.20 F**	**0.13**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/1/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2010	**7.0**	**8.0**	**3.5**	**2.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2010	**7.9**	**9.1**	**3.1**	**2.0**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2011	**6.0**	**6.9**	**2.3**	**1.5**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	**5.6 J**	**6.4**	**2.0 J**	**1.3**	0.050 UJ	NA	0.12 UJ	NA	0.070 UJ	NA	0.080 UJ	NA	0.030 UJ	NA	0.080 UJ	NA
	I10-5	12/6/2002	0.060 U	NA	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	Min/Max - na *Duplicate*	12/6/2002	0.060 U	NA	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/2/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/16/2004	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/14/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/14/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/4/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2010	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/2/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/2/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	I10-7	3/21/2002	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	3/13/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/13/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/12/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2004	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/16/2004	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/21/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/20/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/20/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/20/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/19/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/12/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2007	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/20/2007	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/12/2007	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/18/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		12/4/2007	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/4/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/4/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		9/3/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	9/3/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/3/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/2/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/1/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	9/1/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/3/2009	0.060 U	NA	**0.17 F**	**0.11**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/3/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2010	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/15/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	I10-8	12/19/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	12/12/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/4/2007	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/2/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2010	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/4/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/2/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/16/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OFR-3	10/25/2001	**4.2**	**4.8**	**2.2**	**1.4**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	12/18/2001	**1.9**	**2.2**	**2.2**	**1.4**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		1/16/2002	**2.7**	**3.1**	**2.1**	**1.3**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		2/13/2002	**3.4**	**3.9**	**2.6**	**1.7**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/19/2002	**12**	**14**	**5.7**	**3.7**	0.10 U	NA	0.16 U	NA	**0.14 F**	**0.039**	0.14 U	NA	0.080 U	NA	0.27 U	NA
		4/16/2002	**9.4**	**11**	**3.8**	**2.4**	**0.10 F**	**0.0080**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 UJ	NA
		4/30/2002	0.11 U	NA	0.14 U	NA			0.16 U	NA	0.11 U	NA	0.14 U	NA			0.27 UJ	NA
		6/11/2002	**10**	**11**	**6.2**	**4.0**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Duplicate	6/11/2002	**10**	**11**	**6.2**	**4.0**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/16/2002	**3.0**	**3.4**	**2.6**	**1.7**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/2/2002	**3.5**	**4.0**	**3.2**	**2.1**	0.050 U	NA			**0.11 F**	**0.031**	0.080 U	NA			0.080 U	NA
		3/12/2003	**2.8**	**3.2**	**3.2**	**2.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2003	**3.6**	**4.1**	**2.8**	**1.8**			0.12 U	NA	**0.12 F**	**0.034**	0.080 U	NA			0.080 U	NA
		9/11/2003	**11**	**13**	**6.4**	**4.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/4/2003	**13**	**15**	**7.9**	**5.1**			0.12 U	NA	**0.21 F**	**0.059**	0.080 U	NA			0.080 U	NA
		3/1/2004	**2.9**	**3.3**	**2.0**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/7/2004	**5.0**	**5.7**	**2.5**	**1.6**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2004	**1.6**	**1.8**	**1.7**	**1.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2004	**1.8**	**2.1**	**2.2**	**1.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/21/2005	**1.4 F**	**1.6**	**2.1**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/20/2005	**2.5**	**2.9**	**2.1**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/19/2005	**9.2**	**11**	**4.7**	**3.0**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/20/2005	**2.0**	**2.3**	**2.0**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/22/2006	**0.35 F**	**0.40**	**0.46 F**	**0.30**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/22/2006	**0.41 F**	**0.47**	**0.52 F**	**0.33**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/19/2006	**0.57 F**	**0.65**	**0.60 F**	**0.39**			0.12 U	NA	0.070 M	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		9/18/2006	**2.4**	**2.8**	**2.0**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/11/2006	**4.3**	**4.9**	**3.3**	**2.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/19/2007	**8.1**	**9.3**	**4.8**	**3.1**			0.12 U	NA	**0.18 F**	**0.051**	0.080 U	NA			0.080 U	NA
		6/11/2007	**2.8**	**3.2**	**2.1**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/17/2007	**1.1 F**	**1.3**	**1.2**	**0.77**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		12/3/2007	**2.9**	**3.3**	**1.9**	**1.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2008	**4.4**	**5.0**	**3.4**	**2.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2008	**6.6**	**7.6**	**5.5**	**3.5**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/2/2008	**7.6**	**8.7**	**4.6**	**3.0**			0.12 U	NA	**0.11 F**	**0.031**	0.080 U	NA			0.080 U	NA
		12/1/2008	**4.5**	**5.2**	**3.7**	**2.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2009	**5.9**	**6.8**	**3.5**	**2.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2009	**6.0**	**6.9**	**3.2**	**2.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2009	**0.84 F**	**0.96**	**0.91 F**	**0.58**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		11/30/2009	**4.8**	**5.5**	**2.5**	**1.6**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2010	**2.3**	**2.6**	**2.4**	**1.5**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/1/2010	**3.2**	**3.7**	**3.0**	**1.9**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/30/2010	**8.0**	**9.2**	**5.0**	**3.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	**3.3**	**3.8**	**1.9**	**1.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	RFR-10	9/19/2001	**14**	**16**	**7.5**	**4.8**	0.10 U	NA	0.16 U	NA	**0.42 F**	**0.12**	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min - 72.35(12/02/04)	10/3/2001	**19**	**22**	**8.7**	**5.6**	0.10 U	NA	0.16 U	NA	**0.49 F**	**0.14**	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Max - 221.08 (12/08/03)	10/12/2001	**21**	**24**	**8.2**	**5.3**	0.10 U	NA	0.16 U	NA	**0.49 F**	**0.14**	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/17/2001	**9.0**	**10**	**5.8**	**3.7**	0.10 U	NA	0.16 U	NA	**0.26 F**	**0.073**	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/18/2002	**4.5**	**5.2**	**2.2**	**1.4**	**0.13 F**	**0.010**	0.16 U	NA	**0.87 F**	**0.24**	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/11/2002	**9.8**	**11**	**4.9**	**3.1**	0.10 U	NA	0.16 U	NA	**0.92 F**	**0.26**	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/16/2002	**9.2**	**11**	**4.8**	**3.1**	0.050 U	NA	0.12 U	NA	**0.33 F**	**0.093**	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/2/2002	**15**	**17**	**7.3**	**4.7**	0.050 U	NA			**0.28 F**	**0.079**	0.080 U	NA			0.080 U	NA
		3/12/2003	**14**	**16**	**8.4**	**5.4**			0.12 U	NA	**0.31 F**	**0.087**	0.080 U	NA			0.080 U	NA
		6/9/2003	**21**	**24**	**9.5**	**6.1**			0.12 U	NA	**0.33 F**	**0.093**	0.080 U	NA			0.080 U	NA
		9/11/2003	**24**	**28**	**10**	**6.4**			0.12 U	NA	**0.40 F**	**0.11**	0.080 U	NA			0.080 U	NA
	Duplicate	9/11/2003	**22**	**25**	**9.3**	**6.0**			0.12 U	NA	**0.40 F**	**0.11**	0.080 U	NA			0.080 U	NA
		12/2/2003	**26**	**30**	**8.2**	**5.3**			0.12 U	NA	**0.96 F**	**0.27**	0.080 U	NA			0.080 U	NA
	Duplicate	12/2/2003	**30**	**34**	**9.3**	**6.0**			0.12 U	NA	**0.87 F**	**0.24**	0.080 U	NA			0.080 U	NA
		3/1/2004	**23**	**26**	**10**	**6.4**			0.12 U	NA	**0.44 F**	**0.12**	0.080 U	NA			0.080 U	NA
		6/7/2004	**6.3**	**7.2**	**2.9**	**1.9**			0.12 U	NA	**0.55 F**	**0.15**	0.080 U	NA			0.080 U	NA
		9/20/2004	**19**	**22**	**8.0**	**5.1**			0.12 U	NA	**0.43 F**	**0.12**	0.080 U	NA			0.080 U	NA
		12/13/2004	**12**	**14**	**5.5**	**3.5**			0.12 U	NA	**0.25 F**	**0.070**	0.080 U	NA			0.080 U	NA
		3/21/2005	**8.0**	**9.2**	**5.2**	**3.3**			0.12 U	NA	**0.43 F**	**0.12**	0.080 U	NA			0.080 M	NA
		6/20/2005	**18**	**21**	**8.1**	**5.2**			0.12 U	NA	**0.41 F**	**0.12**	0.080 U	NA			0.080 U	NA
		9/19/2005	**20**	**23**	**8.9**	**5.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/22/2005	**7.3**	**8.4**	**3.3**	**2.1**			0.12 U	NA	**0.74 F**	**0.21**	0.080 U	NA			0.080 U	NA
		3/20/2006	**6.3**	**7.2**	**2.8**	**1.8**			0.12 U	NA	**0.64 F**	**0.18**	0.080 U	NA			0.080 U	NA
		6/19/2006	**11**	**13**	**2.9**	**1.9**			0.12 U	NA	**0.15 M**	**0.042**	0.080 U	NA			0.080 U	NA
		9/18/2006	**5.2**	**6.0**	**1.9**	**1.2**			0.12 U	NA	**0.33 F**	**0.093**	0.080 U	NA			0.080 U	NA
	Duplicate	9/18/2006	**5.4**	**6.2**	**1.8**	**1.2**			0.12 U	NA	**0.36 F**	**0.10**	0.080 U	NA			0.080 U	NA
		12/11/2006	**2.4**	**2.8**	**1.3**	**0.83**			0.12 U	NA	**0.67 F**	**0.19**	0.080 U	NA			0.080 U	NA
		3/19/2007	**12**	**14**	**4.6**	**3.0**			0.12 U	NA	**0.13 F**	**0.037**	0.080 U	NA			0.080 U	NA
		6/11/2007	**11**	**13**	**5.9**	**3.8**			0.12 U	NA	**0.34 F**	**0.096**	0.080 U	NA			0.080 U	NA
		9/17/2007	**8.4**	**9.6**	**4.5**	**2.9**			0.30 U	NA	**0.34 F**	**0.096**	0.19 U	NA			0.23 U	NA
		12/3/2007	**10**	**11**	**5.4**	**3.5**			0.12 U	NA	**0.38 F**	**0.11**	0.080 U	NA			0.080 U	NA
		3/3/2008	**4.4**	**5.0**	**3.3**	**2.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2008	**14**	**16**	**6.9**	**4.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
	Duplicate	6/2/2008	**13**	**15**	**6.9**	**4.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/2/2008	**5.9**	**6.8**	**3.5**	**2.2**			0.12 U	NA	**0.46 F**	**0.13**	0.080 U	NA			0.080 U	NA
		12/1/2008	**7.6**	**8.7**	**3.0**	**1.9**			0.12 U	NA	**0.28 F**	**0.079**	0.080 U	NA			0.080 U	NA
		3/2/2009	**8.2**	**9.4**	**2.3**	**1.5**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2009	**8.8**	**10**	**2.6**	**1.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2009	**5.2**	**6.0**	**1.2**	**0.77**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		11/30/2009	**20**	**23**	**8.8**	**5.7**			0.12 U	NA	**0.25 F**	**0.070**	0.080 U	NA			0.080 U	NA
		3/1/2010	**13**	**15**	**7.5**	**4.8**			0.30 U	NA	**0.21 F**	**0.059**	0.19 U	NA			0.23 U	NA
		6/2/2010	**11**	**13**	**5.0**	**3.2**			0.12 U	NA	**0.21 F**	**0.059**	0.080 U	NA			0.080 U	NA
		8/30/2010	**12**	**14**	**8.0**	**5.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2010	**35**	**40**	**13**	**8.3**			0.12 U	NA	**0.45 F**	**0.13**	0.080 U	NA			0.080 U	NA
		2/28/2011	**31**	**36**	**13**	**8.3**			0.12 U	NA	**0.39 F**	**0.11**	0.080 U	NA			0.080 U	NA
		5/31/2011	**4.4**	**5.0**	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	RFR-11	10/4/2001	**16**	**18**	**0.35 F**	**0.22**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	10/12/2001	**17**	**20**	**0.58 F**	**0.37**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		10/25/2001	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/17/2001	**12**	**14**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/19/2002	**5.7**	**6.5**	**1.0**	**0.64**	**0.13 F**	**0.010**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/13/2002	**2.8**	**3.2**	**1.5**	**0.96**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/16/2002	**8.4**	**9.6**	**0.67 F**	**0.43**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/2/2002	**13**	**15**	**0.17 F**	**0.11**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	**10**	**11**	**0.12 F**	**0.077**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2003	**3.1**	**3.6**	**1.2**	**0.77**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/11/2003	**0.99 F**	**1.1**	**1.6**	**1.0**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/4/2003	**0.89 F**	**1.0**	**1.7**	**1.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/4/2004	**0.99 F**	**1.1**	**1.2**	**0.77**			0.12 M	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/8/2004	**1.1 F**	**1.3**	**0.87 F**	**0.56**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2004	**1.9**	**2.2**	**1.0**	**0.64**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2004	**5.3**	**6.1**	**0.58 F**	**0.37**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/21/2005	**4.8**	**5.5**	**0.32 F**	**0.21**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/20/2005	**1.6**	**1.8**	**1.2**	**0.77**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/19/2005	**0.66 F**	**0.76**	**1.5**	**0.96**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/22/2005	**0.68 F**	**0.78**	**1.4**	**0.90**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2006	**0.33 F**	**0.38**	**1.4**	**0.90**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/19/2006	**0.33 F**	**0.38**	**1.5**	**0.96**			0.12 U	NA	0.070 M	NA	0.080 U	NA			0.080 U	NA
		9/18/2006	0.060 U	NA	**1.5**	**0.96**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/11/2006	**0.34 F**	**0.39**	**1.7**	**1.1**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/19/2007	**3.8**	**4.4**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/11/2007	**7.5**	**8.6**	**0.32 F**	**0.21**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/17/2007	**1.5**	**1.7**	**1.1**	**0.71**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		12/3/2007	**1.3 F**	**1.5**	**1.2**	**0.77**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2008	0.060 U	NA	**0.080 F**	**0.051**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2008	**0.88 F**	**1.0**	**1.3**	**0.83**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/2/2008	**0.34 F**	**0.39**	**1.6**	**1.0**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/1/2008	0.060 U	NA	**2.1**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2009	**0.50 F**	**0.57**	**1.4**	**0.90**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2009	**0.49 F**	**0.56**	**1.4**	**0.90**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2009	**0.39 F**	**0.45**	**2.0**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		11/30/2009	**1.1 F**	**1.3**	**1.6**	**1.0**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2010	**1.4**	**1.6**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/1/2010	**1.1 F**	**1.3**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		8/30/2010	**0.59 F**	**0.68**	**1.1**	**0.71**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2010	**1.1 F**	**1.3**	**1.6**	**1.0**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		2/28/2011	**0.68 F**	**0.78**	**1.4**	**0.90**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	0.060 U	NA	**1.9**	**1.2**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	RFR-12	8/30/2001	0.11 U	NA	**0.16 F**	**0.10**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na Duplicate	8/30/2001	0.11 U	NA	**0.15 F**	**0.096**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/18/2001	0.11 U	NA	**0.15 F**	**0.096**	**0.12 F**	**0.0096**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/20/2002	0.11 U	NA	**0.15 F**	**0.096**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/12/2002	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/18/2002	0.060 U	NA	**0.14 F**	**0.090**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/5/2002	**0.080 F**	**0.092**	**0.24 F**	**0.15**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/13/2003	**0.10 F**	**0.11**	**0.23 F**	**0.15**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2003	0.060 U	NA	**0.24 F**	**0.15**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/10/2003	0.060 U	NA	**0.14 F**	**0.090**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2003	**0.23 F**	**0.26**	**0.18 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2004	0.060 U	NA	0.050 U	NA			0.12 M	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2004	0.060 U	NA	**0.13 F**	**0.083**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/10/2004	0.060 U	NA	**0.12 F**	**0.077**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/22/2004	0.060 U	NA	**0.11 F**	**0.071**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/16/2004	0.060 U	NA	**0.18 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/22/2005	0.060 U	NA	**0.20 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/22/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/19/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2007	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/4/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2010	**0.26 F**	**0.30**	**0.38 F**	**0.24**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/2/2010	0.060 U	NA	**0.38 F**	**0.24**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/2/2010	0.060 U	NA	**0.35 F**	**0.22**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2010	0.060 U	NA	**0.25 F**	**0.16**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/15/2011	**0.20 F**	**0.23**	**0.63 F**	**0.40**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-BARNOWL	2/28/2011	**0.15 F**	**0.17**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-CE1	2/28/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na Duplicate	2/28/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-CE2	2/28/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-DAIRYWELL	2/28/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-HH1	2/28/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-HH2	2/28/2011	**0.20 F**	**0.23**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-HH3	2/28/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	OW-MT2	2/28/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Min/Max - na	6/1/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)[†]			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)[††]			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)**[†††]
	CS-WB04-UGR-01 *Min - 43.93 (11/18/04)* *Max - 47.12 (04/28/04)*	11/18/2004	**9.5**	**11**	0.60 U	NA					0.20 U	NA	0.20 U	NA				
	CS-WB04-LGR-01	10/16/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
	Min - 55.82 (11/18/04)	11/20/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
	Max - 79.00 (10/19/03)	12/18/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/24/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		3/21/2006	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		9/28/2006	**0.44 F**	**0.50**	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		3/15/2007	**0.24 F**	**0.28**	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	**0.28 F**	**0.32**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.54 F**	**0.62**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/18/2008	**0.54 F**	**0.62**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	**0.42 F**	**0.48**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2009	**0.86 F**	**0.99**	**0.20 F**	**0.13**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	**0.60 F**	**0.69**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2010	**0.44 F**	**0.50**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	**0.39 F**	**0.45**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	CS-WB04-LGR-02	5/12/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
	Min - 58.02 (12/01/04)	5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
	Max - 100.18 (12/16/03)	7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		3/15/2007	0.14 U	NA	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	**0.30 F**	**0.34**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.25 F**	**0.29**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	**0.33 F**	**0.38**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
	CS-WB04-LGR-03	10/16/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^{3})†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^{3})††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**
	Min - 61.70 (10/03/07)	11/20/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
	Max - 130.00 (10/09/03)	12/18/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/24/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		3/21/2006	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		9/28/2006	**0.20 F**	**0.23**	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		3/15/2007	0.14 U	NA	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.21 F**	**0.24**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/18/2008	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	**0.17 F**	**0.20**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2009	**0.27 F**	**0.31**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	**0.19 F**	**0.22**	**0.18 F**	**0.12**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2010	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	**0.17 F**	**0.20**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	CS-WB04-LGR-04	9/19/2003	0.70 U	NA	**0.13 F**	**0.083**					0.20 U	NA	0.70 U	NA				
	Min - 63.02 (10/03/07)	10/16/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
	Max - 158.94 (03/21/06)	11/20/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/24/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		3/21/2006	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		9/28/2006	**0.17 F**	**0.20**	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		3/15/2007	0.14 U	NA	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.17 F**	**0.20**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/18/2008	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	**0.23 F**	**0.26**	**0.25 F**	**0.16**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2009	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	0.15 U	NA	**0.24 F**	**0.15**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2010	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	**0.20 F**	**0.23**	**0.25 F**	**0.16**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	CS-WB04-LGR-06	9/19/2003	**4.7**	**5.4**	**0.72 F**	**0.46**					**2.0**	**0.56**	0.70 U	NA				
	Min - 57.56 (12/01/04)	10/16/2003	0.70 U	NA	**0.77 F**	**0.49**					0.20 U	NA	0.70 U	NA				
	Max - 173.43 (12/19/06)	11/20/2003	0.70 U	NA	**0.70 F**	**0.45**					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.90 F**	**0.58**					**1.0**	**0.28**	0.70 U	NA				
		1/22/2004	0.70 U	NA	**1.0**	**0.64**					**0.94**	**0.26**	0.20 U	NA				
		2/25/2004	0.70 U	NA	**1.2**	**0.77**					**0.90**	**0.25**	0.20 U	NA				
		3/24/2004	0.70 U	NA	**1.2**	**0.77**					**0.85**	**0.24**	0.20 U	NA				
		4/7/2004	0.70 U	NA	**1.8**	**1.2**					**1.1**	**0.31**	0.20 U	NA				
		4/28/2004	0.70 U	NA	**1.8**	**1.2**					**0.98**	**0.28**	0.20 U	NA				
		5/26/2004	0.70 U	NA	**1.1**	**0.71**					**0.75**	**0.21**	0.20 U	NA				
		6/21/2004	0.70 U	NA	**1.1**	**0.71**					**0.67**	**0.19**	0.20 U	NA				
		7/27/2004	0.70 U	NA	**1.1**	**0.71**					**0.67**	**0.19**	0.20 U	NA				
		9/3/2004	0.70 U	NA	**1.1**	**0.71**					**0.77**	**0.22**	0.20 U	NA				
		10/7/2004	0.70 U	NA	**1.7 F**	**1.1**					**0.93 F**	**0.26**	0.20 U	NA				
		12/1/2004	0.60 U	NA	**1.9 F**	**1.2**					**1.2**	**0.34**	0.20 U	NA				
		12/28/2004	0.60 U	NA	**1.2 F**	**0.77**					**0.79 F**	**0.22**	0.20 U	NA				
		1/26/2005	0.60 U	NA	**1.1 F**	**0.71**					**0.64 F**	**0.18**	0.20 U	NA				
		2/24/2005	0.60 U	NA	**1.2 F**	**0.77**					**2.2**	**0.62**	0.20 U	NA				
		4/21/2005	0.60 U	NA	**0.89 F**	**0.57**					**0.55 F**	**0.15**	0.20 U	NA				
		5/25/2005	0.60 U	NA	**1.3 F**	**0.83**					**1.1**	**0.31**	0.20 U	NA				
		6/29/2005	0.60 U	NA	**0.88 F**	**0.57**					**0.72 F**	**0.20**	0.20 U	NA				
		7/21/2005	0.60 U	NA	**1.3 F**	**0.83**					**0.97 F**	**0.27**	0.20 U	NA				
		8/30/2005	0.60 U	NA	**1.6 F**	**1.0**					**1.2**	**0.34**	0.20 U	NA				
		10/20/2005	0.60 U	NA	**1.7 F**	**1.1**					**1.0**	**0.28**	0.20 U	NA				
		3/21/2006	0.60 U	NA	**2.9**	**1.9**					**1.6**	**0.45**	0.20 U	NA				
		9/28/2006	**0.65 F**	**0.75**	**8.2**	**5.3**			0.074 U	NA	**3.0**	**0.84**	**0.27 F**	**0.16**			0.078 U	NA
		3/15/2007	**2.1**	**2.4**	**11**	**7.1**			0.074 U	NA	**3.0**	**0.84**	**0.24 F**	**0.14**			0.078 U	NA
		10/3/2007	**1.4**	**1.6**	**9.1**	**5.8**			0.30 U	NA	**2.9**	**0.82**	**0.36 F**	**0.21**			0.23 U	NA
		3/19/2008	**1.5**	**1.7**	**12**	**7.7**			0.30 U	NA	**4.2**	**1.2**	**0.35 F**	**0.20**			0.23 U	NA
		9/18/2008	**6.5**	**7.5**	**16**	**10**			0.30 U	NA	**3.8**	**1.1**	**0.33 F**	**0.19**			0.23 U	NA
		3/10/2009	**12**	**14**	**13**	**8.3**			0.30 U	NA	**2.5**	**0.70**	**0.31 F**	**0.18**			0.23 U	NA
		9/3/2009	**33**	**38**	**20**	**13**			0.30 U	NA	**4.0**	**1.1**	**0.65**	**0.38**			0.23 U	NA
		3/10/2010	**12**	**14**	**14**	**9.0**			0.30 U	NA	**3.2**	**0.90**	**0.23 F**	**0.13**			0.23 U	NA
		9/3/2010	**11**	**13**	**15**	**9.6**			0.30 U	NA	**2.8**	**0.79**	**0.53 F**	**0.31**			0.23 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		3/15/2011	**22**	**25**	**15**	**9.6**			0.12 U	NA	**2.9**	**0.82**	**0.36 F**	**0.21**			0.080 U	NA
		6/6/2011	**29**	**33**	**14**	**9.0**			0.12 U	NA	**3.0**	**0.84**	**0.32 F**	**0.19**			0.080 U	NA
	CS-WB04-LGR-07	9/19/2003	**2.4**	**2.8**	**1.5**	**0.96**					**1.7**	**0.48**	0.70 U	NA				
	Min - 55.68 (12/01/04)	10/16/2003	**0.84 F**	**0.96**	**1.3**	**0.83**					0.20 U	NA	0.70 U	NA				
	Max - 251.16 (03/21/06)	11/20/2003	**0.73 F**	**0.84**	**1.3**	**0.83**					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.79 F**	**0.51**					**0.30 F**	**0.084**	0.70 U	NA				
		1/22/2004	0.70 U	NA	**0.86**	**0.55**					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	**0.74**	**0.48**					**0.54**	**0.15**	0.20 U	NA				
		3/24/2004	0.70 U	NA	**0.80**	**0.51**					**0.59**	**0.17**	0.70 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					**0.52**	**0.15**	0.20 U	NA				
		4/28/2004	0.70 U	NA	**0.89**	**0.57**					**0.46**	**0.13**	0.20 U	NA				
		5/26/2004	0.70 U	NA	**0.85**	**0.55**					**0.43**	**0.12**	0.20 U	NA				
		6/21/2004	0.70 U	NA	**0.80**	**0.51**					**0.27**	**0.076**	0.20 U	NA				
		7/27/2004	0.70 U	NA	**0.97**	**0.62**					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	**1.1**	**0.71**					**0.77**	**0.22**	0.20 U	NA				
		10/7/2004	0.70 U	NA	**0.95 F**	**0.61**					0.20 U	NA	0.20 U	NA				
		12/1/2004	**0.97 F**	**1.1**	**1.5 F**	**0.96**					**0.27 F**	**0.076**	0.20 U	NA				
		12/28/2004	**0.72 F**	**0.83**	**1.1 F**	**0.71**					0.20 U	NA	0.20 U	NA				
		1/26/2005	**0.97 F**	**1.1**	**1.4 F**	**0.90**					0.20 U	NA	0.20 U	NA				
		2/24/2005	**0.90 F**	**1.0**	**1.2 F**	**0.77**					**1.7**	**0.48**	0.20 U	NA				
		4/21/2005	**1.0 F**	**1.1**	**1.3 F**	**0.83**					0.20 U	NA	0.20 U	NA				
		5/25/2005	**0.94 F**	**1.1**	**1.7 F**	**1.1**					**0.26 F**	**0.073**	0.20 U	NA				
		6/29/2005	**1.1 F**	**1.3**	**1.4 F**	**0.90**					0.20 U	NA	0.20 U	NA				
		7/21/2005	**1.8 F**	**2.1**	**2.3**	**1.5**					**0.20 F**	**0.056**	0.20 U	NA				
		8/30/2005	**1.4 F**	**1.6**	**1.8 F**	**1.2**					0.20 U	NA	0.20 U	NA				
		10/20/2005	**1.8 F**	**2.1**	**2.1**	**1.3**					0.20 U	NA	0.20 U	NA				
		3/21/2006	**1.1 F**	**1.3**	**2.1**	**1.3**					**0.71 F**	**0.20**	0.20 U	NA				
		9/28/2006	**0.87 F**	**1.0**	**5.8**	**3.7**			0.074 U	NA	**2.3**	**0.65**	**0.24 F**	**0.14**			0.078 U	NA
		3/15/2007	**1.3 F**	**1.5**	**8.8**	**5.7**			0.074 U	NA	**2.9**	**0.82**	**0.20 F**	**0.12**			0.078 U	NA
		10/3/2007	**1.4**	**1.6**	**8.0**	**5.1**			0.30 U	NA	**2.2**	**0.62**	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.34 F**	**0.39**	**8.4**	**5.4**			0.30 U	NA	**6.2**	**1.7**	**0.33 F**	**0.19**			0.23 U	NA
		9/18/2008	**6.0**	**6.9**	**15**	**9.6**			0.30 U	NA	**3.6**	**1.0**	**0.22 F**	**0.13**			0.23 U	NA
		3/10/2009	**7.0**	**8.0**	**10**	**6.4**			0.30 U	NA	**2.1**	**0.59**	0.19 U	NA			0.23 U	NA
		9/3/2009	**19**	**22**	**14**	**9.0**			0.30 U	NA	**3.6**	**1.0**	0.19 U	NA			0.23 U	NA
		3/10/2010	**0.34 F**	**0.39**	**6.8**	**4.4**			0.30 U	NA	32	9.0	**0.33 F**	**0.19**			0.23 U	NA
		9/3/2010	**1.7**	**2.0**	**18**	**12**			0.30 U	NA	**13**	**3.7**	1.2	0.70			0.23 U	NA
		3/15/2011	**9.2**	**11**	**19**	**12**			0.12 U	NA	**3.8**	**1.1**	**0.31 F**	**0.18**			0.080 U	NA
		6/6/2011	**18**	**21**	**11**	**7.1**			0.12 U	NA	**2.2**	**0.62**	**0.23 F**	**0.13**			0.080 U	NA
	CS-WB04-LGR-08	9/19/2003	**2.2**	**2.5**	**2.8**	**1.8**					**1.6**	**0.45**	0.70 U	NA				
	Min - 57.54 (12/01/04)	10/16/2003	**1.2 F**	**1.4**	**1.6**	**1.0**					0.20 U	NA	0.70 U	NA				
	Max - 274.58 (09/03/09)	11/20/2003	**0.93 F**	**1.1**	**1.3**	**0.83**					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**1.3**	**0.83**					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	**0.94**	**0.60**					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	**1.0**	**0.64**					0.20 U	NA	0.20 U	NA				
		3/24/2004	0.70 U	NA	**0.90**	**0.58**					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	**0.84**	**0.54**					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	**0.78**	**0.50**					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	**0.84**	**0.54**					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	**0.86**	**0.55**					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	**0.74**	**0.48**					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	**0.74 F**	**0.48**					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	**0.61 F**	**0.39**					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	**0.68 F**	**0.44**					0.20 U	NA	0.20 U	NA				
		5/25/2005	**0.61 F**	**0.70**	**0.97 F**	**0.62**					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	**0.81 F**	**0.52**					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	**0.79 F**	**0.51**					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	**0.60 F**	**0.39**					0.20 U	NA	0.20 U	NA				
		3/21/2006	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		9/28/2006	**0.43 F**	**0.49**	**1.1**	**0.71**			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		3/15/2007	0.14 U	NA	**0.65 F**	**0.42**			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	**0.33 F**	**0.38**	**1.1**	**0.71**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.40 F**	**0.46**	**0.79 F**	**0.51**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/18/2008	**0.42 F**	**0.48**	**0.64 F**	**0.41**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	**0.29 F**	**0.33**	**0.70 F**	**0.45**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2009	**0.62 F**	**0.71**	**1.1**	**0.71**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	**0.40 F**	**0.46**	**1.0**	**0.64**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2010	**0.31 F**	**0.36**	**0.92 F**	**0.59**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	**0.38 F**	**0.44**	**1.0**	**0.64**			0.12 U	NA	**0.15 F**	**0.042**	0.080 U	NA			0.080 U	NA
	CS-WB04-LGR-09	9/19/2003	**8.5**	**9.8**	**9.4**	**6.0**					**1.6**	**0.45**	0.70 U	NA				
	Min - 56.64 (12/01/04)	10/16/2003	**6.9**	**7.9**	**8.9**	**5.7**					0.20 U	NA	0.70 U	NA				
	Max - 305.43 (09/03/09)	11/20/2003	**7.7**	**8.8**	**9.5**	**6.1**					0.20 U	NA	0.70 U	NA				
		12/18/2003	**7.7**	**8.8**	**10**	**6.4**					**0.25 F**	**0.070**	0.70 U	NA				
		1/22/2004	**7.4**	**8.5**	**8.2**	**5.3**					0.20 U	NA	0.20 U	NA				
		2/25/2004	**6.5**	**7.5**	**8.6**	**5.5**					0.20 U	NA	0.20 U	NA				
		3/24/2004	**7.8**	**8.9**	**9.0**	**5.8**					0.20 U	NA	0.20 U	NA				
		4/7/2004	**7.4**	**8.5**	**9.5**	**6.1**					0.20 U	NA	0.20 U	NA				
		4/28/2004	**6.6**	**7.6**	**7.9**	**5.1**					0.20 U	NA	0.20 U	NA				
		5/26/2004	**9.5**	**11**	**10**	**6.4**					0.20 U	NA	0.20 U	NA				
		6/21/2004	**10**	**11**	**11**	**7.1**					0.20 U	NA	0.20 U	NA				
		7/27/2004	**6.6**	**7.6**	**7.7**	**4.9**					0.20 U	NA	0.20 U	NA				
		9/3/2004	**7.9**	**9.1**	**6.9**	**4.4**					0.20 U	NA	0.20 U	NA				
		10/7/2004	**7.5**	**8.6**	**7.6**	**4.9**					0.20 U	NA	0.20 U	NA				
		12/1/2004	**8.6**	**9.9**	**9.9**	**6.4**					0.20 U	NA	0.20 U	NA				
		12/28/2004	**8.1**	**9.3**	**7.8**	**5.0**					0.20 U	NA	0.20 U	NA				
		1/26/2005	**8.3**	**9.5**	**8.3**	**5.3**					0.20 U	NA	0.20 U	NA				
		2/24/2005	**7.8**	**8.9**	**8.4**	**5.4**					**1.6**	**0.45**	0.20 U	NA				
		4/21/2005	**10**	**11**	**8.8**	**5.7**					0.20 U	NA	0.20 U	NA				
		5/25/2005	**13**	**15**	**13**	**8.3**					**0.20 F**	**0.056**	0.20 U	NA				
		6/29/2005	**9.7**	**11**	**9.2**	**5.9**					0.20 U	NA	0.20 U	NA				
		7/21/2005	**14**	**16**	**13**	**8.3**					**0.22 F**	**0.062**	0.20 U	NA				
		8/30/2005	**10**	**11**	**10**	**6.4**					0.20 U	NA	0.20 U	NA				
		10/20/2005	**8.0**	**9.2**	**7.9**	**5.1**					0.20 U	NA	0.20 U	NA				
		3/21/2006	**8.0**	**9.2**	**7.9**	**5.1**					**0.21 F**	**0.059**	0.20 U	NA				
		9/28/2006	**7.4**	**8.5**	**8.6**	**5.5**			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		3/15/2007	**7.7**	**8.8**	**8.2**	**5.3**			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	**12**	**14**	**11**	**7.1**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**14**	**16**	**8.6**	**5.5**			0.30 U	NA	**0.21 F**	**0.059**	0.19 U	NA			0.23 U	NA

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		9/18/2008	**10**	**11**	**8.8**	**5.7**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	**9.3**	**11**	**7.0**	**4.5**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2009	**9.9**	**11**	**9.1**	**5.8**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	**9.0**	**10**	**7.0**	**4.5**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2010	**11**	**13**	**8.4**	**5.4**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	**7.2**	**8.3**	**5.8**	**3.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/6/2011	**9.8**	**11**	**7.3**	**4.7**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	CS-WB04-LGR-10	9/18/2003	**1.1 F**	**1.3**	**1.4**	**0.90**					0.20 U	NA	0.70 U	NA				
	Min - 57.26 (12/01/04)	10/16/2003	**1.0 F**	**1.1**	**1.1**	**0.71**					0.20 U	NA	0.70 U	NA				
	Max - 307.32 (12/19/06)	11/20/2003	0.70 U	NA	**0.56 F**	**0.36**					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.68 F**	**0.44**					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/23/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	**1.1**	**0.71**					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	**1.1**	**0.71**					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	**0.90**	**0.58**					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	**1.2**	**0.77**					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	**1.1 F**	**0.71**					0.20 U	NA	0.20 U	NA				
		12/1/2004	**0.80 F**	**0.92**	**1.4 F**	**0.90**					0.20 U	NA	0.20 U	NA				
		12/28/2004	**0.60 F**	**0.69**	**1.2 F**	**0.77**					0.20 U	NA	0.20 U	NA				
		1/26/2005	**0.78 F**	**0.89**	**0.98 F**	**0.63**					0.20 U	NA	0.20 U	NA				
		2/24/2005	**0.68 F**	**0.78**	**1.2 F**	**0.77**					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	**1.3 F**	**0.83**					0.20 U	NA	0.20 U	NA				
		5/25/2005	**0.72 F**	**0.83**	**1.2 F**	**0.77**					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	**0.74 F**	**0.48**					0.20 U	NA	0.20 U	NA				
		7/21/2005	**0.68 F**	**0.78**	**1.0 F**	**0.64**					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	**0.64 F**	**0.41**					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	**0.71 F**	**0.46**					0.20 U	NA	0.20 U	NA				
		3/21/2006	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		9/28/2006	**0.94 F**	**1.1**	**0.60 F**	**0.39**			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		3/15/2007	**0.47 F**	**0.54**	**0.48 F**	**0.31**			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	**0.82 F**	**0.94**	**1.2**	**0.77**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.74 F**	**0.85**	**0.64 F**	**0.41**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/18/2008	**0.91 F**	**1.0**	**0.68 F**	**0.44**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	**1.0 F**	**1.1**	**0.69 F**	**0.44**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2009	**1.2 F**	**1.4**	**0.93 F**	**0.60**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	**0.59 F**	**0.68**	**0.81 F**	**0.52**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2010	**0.78 F**	**0.89**	**0.76 F**	**0.49**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	**0.80 F**	**0.92**	**0.57 F**	**0.37**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/6/2011	**1.0 F**	**1.1**	**0.50 F**	**0.32**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	CS-WB04-LGR-11	9/18/2003	**1.1 F**	**1.3**	**1.2**	**0.77**					0.20 U	NA	0.70 U	NA				
	Min - 57.08 (12/01/04)	10/16/2003	0.70 U	NA	**0.66 F**	**0.42**					0.20 U	NA	0.70 U	NA				
	Max - 307.28 (12/19/06)	11/20/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.26 F**	**0.17**					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/23/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		3/21/2006	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		9/28/2006	**1.1 F**	**1.3**	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		3/15/2007	0.14 U	NA	0.10 U	NA			0.074 U	NA	0.098 U	NA	0.056 U	NA			0.078 U	NA
		10/3/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/19/2008	**0.87 F**	**1.0**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/18/2008	**3.5**	**4.0**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2009	**0.33 F**	**0.38**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2010	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		9/3/2010	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/6/2011	**0.24 F**	**0.28**	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
	CS-WB04-BS-01	9/18/2003	**1.0 F**	**1.1**	**1.0**	**0.64**					0.20 U	NA	0.70 U	NA				
	Min - 58.59 (12/01/04)	10/16/2003	**1.4 F**	**1.6**	**1.0**	**0.64**					0.20 U	NA	0.70 U	NA				
	Max - 307.05 (09/03/09)	11/20/2003	0.70 U	NA	**0.30 F**	**0.19**					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.53 F**	**0.34**					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/23/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^{3})†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^{3})††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/3/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	CS-WB04-BS-02	9/18/2003	0.70 U	NA	**0.74 F**	**0.48**					0.20 U	NA	0.70 U	NA				
	Min - 64.29 (12/01/04)	10/16/2003	**0.81 F**	**0.93**	**0.86 F**	**0.55**					0.20 U	NA	0.70 U	NA				
	Max - 289.46 (09/03/09)	11/20/2003	0.70 U	NA	**0.62 F**	**0.40**					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.53 F**	**0.34**					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/23/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/3/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	**0.25 F**	**0.070**	0.19 U	NA			0.23 U	NA
		3/10/2009	0.15 U	NA	**0.18 F**	**0.12**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	**0.15 F**	**0.042**	0.080 U	NA			0.080 U	NA
	CS-WB04-CC-01	9/18/2003	0.70 U	NA	**0.47 F**	**0.30**					0.20 U	NA	0.70 U	NA				
	Min - 62.11 (12/01/04)	10/16/2003	0.70 U	NA	**0.45 F**	**0.29**					0.20 U	NA	0.70 U	NA				
	Max - 318.81 (09/03/09)	11/20/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.34 F**	**0.22**					**0.35 F**	**0.098**	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					**0.34**	**0.096**	0.20 U	NA				
		3/23/2004	0.70 U	NA	0.70 U	NA					**0.25**	**0.070**	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					**0.30**	**0.084**	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					**0.26**	**0.073**	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	**0.61 F**	**0.39**					**0.51 F**	**0.14**	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					**0.31 F**	**0.087**	0.20 U	NA				
		1/26/2005	0.60 U	NA	0.60 U	NA					**0.26 F**	**0.073**	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					**0.23 F**	**0.065**	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					**0.43 F**	**0.12**	0.20 U	NA				

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^{3})†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^{3})††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^{3})†††**
		6/29/2005	0.60 U	NA	0.60 U	NA					**0.41 F**	**0.12**	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					**0.43 F**	**0.12**	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					**0.32 F**	**0.090**	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					**0.38 F**	**0.11**	0.20 U	NA				
		10/3/2007	0.15 U	NA	**0.19 F**	**0.12**			0.30 U	NA	**0.48 F**	**0.13**	0.19 U	NA			0.23 U	NA
		3/10/2009	0.15 U	NA	**0.22 F**	**0.14**			0.30 U	NA	**0.37 F**	**0.10**	0.19 U	NA			0.23 U	NA
		3/15/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	**0.41 F**	**0.12**	0.080 U	NA			0.080 U	NA
	CS-WB04-CC-02	9/18/2003	**1.3 F**	**1.5**	**0.81 F**	**0.52**					0.20 U	NA	0.70 U	NA				
	Min - 62.11 (12/01/04)	10/16/2003	**0.92 F**	**1.1**	**0.73 F**	**0.47**					0.20 U	NA	0.70 U	NA				
	Max - 320.01 (09/03/09)	11/20/2003	0.70 U	NA	**0.44 F**	**0.28**					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.49 F**	**0.31**					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/23/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	**0.63 F**	**0.72**	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/3/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	CS-WB04-CC-03	9/18/2003	0.70 U	NA	**0.49 F**	**0.31**					0.20 U	NA	0.70 U	NA				
	Min - 62.31 (12/01/04)	10/16/2003	0.70 U	NA	**0.52 F**	**0.33**					0.20 U	NA	0.70 U	NA				
	Max - 319.43 (09/03/09)	11/20/2003	0.70 U	NA	0.10 U	NA					0.20 U	NA	0.70 U	NA				
		12/18/2003	0.70 U	NA	**0.31 F**	**0.20**					0.20 U	NA	0.70 U	NA				
		1/22/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		2/25/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		3/23/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		4/28/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		5/26/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		6/21/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		7/27/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		9/3/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		10/7/2004	0.70 U	NA	0.70 U	NA					0.20 U	NA	0.20 U	NA				
		12/1/2004	**1.4 F**	**1.6**	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		12/28/2004	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		1/26/2005	**1.5 F**	**1.7**	0.60 U	NA					0.20 U	NA	0.20 U	NA				

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)†	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW* *(ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		2/24/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		4/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		5/25/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		6/29/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		7/21/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		8/30/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/20/2005	0.60 U	NA	0.60 U	NA					0.20 U	NA	0.20 U	NA				
		10/3/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/10/2009	0.15 U	NA	**0.20 F**	**0.13**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		3/15/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
Wells Downgrade South of AOC65																		
	LS-1	9/17/2001	**0.47 F**	**0.54**	**0.37 F**	**0.24**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	12/19/2001	**0.65 F**	**0.75**	**0.26 F**	**0.17**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/18/2002	**0.30 F**	**0.34**	**0.51 F**	**0.33**	**0.13 F**	**0.010**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/12/2002	**0.40 F**	**0.46**	**0.32 F**	**0.21**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/17/2002	**0.30 F**	**0.34**	**0.45 F**	**0.29**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/3/2002	**0.67 F**	**0.77**	**0.30 F**	**0.19**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	**0.46 F**	**0.53**	**0.12 F**	**0.077**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2003	**0.34 F**	**0.39**	**0.48 F**	**0.31**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/10/2003	**0.39 F**	**0.45**	**0.47 F**	**0.30**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/9/2003	**0.24 F**	**0.28**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/3/2003	**0.31 F**	**0.36**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2004	**0.28 F**	**0.32**	**0.20 F**	**0.13**			0.12 M	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2004	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/9/2004	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/5/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/5/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/4/2008	**0.62 F**	**0.71**	**0.20 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/5/2009	**0.86 F**	**0.99**	**0.32 F**	**0.21**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/4/2009	**0.85 F**	**0.98**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/4/2009	**0.76 F**	**0.87**	**0.20 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/1/2009	**0.64 F**	**0.73**	**0.18 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2009	**1.3 F**	**1.5**	**0.63 F**	**0.40**			0.12 U	NA	**2.5**	**0.70**	0.080 U	NA			0.080 U	NA
		3/1/2010	**0.35 F**	**0.40**	0.16 U	NA			0.30 U	NA	**0.36 F**	**0.10**	0.19 U	NA			0.23 U	NA
		6/3/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	**0.19 F**	**0.053**	0.080 U	NA			0.080 U	NA
		8/30/2010	**0.22 F**	**0.25**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	8/30/2010	**0.24 F**	**0.28**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/16/2010	**0.33 F**	**0.38**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/16/2010	**0.34 F**	**0.39**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2011	**0.28 F**	**0.32**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	**0.49 F**	**0.56**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	LS-2	8/1/2001	**3.1**	**3.6**	**0.26 F**	**0.17**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	8/30/2001	**1.4**	**1.6**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/27/2001	**4.6**	**5.3**	**0.17 F**	**0.11**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		10/4/2001	**3.2**	**3.7**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		11/14/2001	**2.7**	**3.1**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/19/2001	**3.5**	**4.0**	**0.20 F**	**0.13**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		1/16/2002	**4.8**	**5.5**	**0.20 F**	**0.13**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		2/13/2002	**2.9**	**3.3**	0.14 U	NA	**0.11 F**	**0.0088**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/18/2002	**2.9**	**3.3**	**0.29 F**	**0.19**	**0.12 F**	**0.0096**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		4/11/2002	0.80 U	NA	0.80 U	NA					0.20 U	NA	0.20 U	NA			0.10 U	NA

			Tetrachloroethene		**Trichloroethene**		**Dichloroethane, 1,2-**		**Dichloroethene, 1,1-**		**Dichloroethene, cis-1,2-**		**Dichloroethene, trans-1,2-**		**Trichloroethane, 1,1,1-**		**Vinyl Chloride**	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (μg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL ($\mu g/m^3$)[†]	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ $^{Air}RBEL_{Inh}$ ($\mu g/m^3$)[††]	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**	**Groundwater Conc (μg/L)**	**Indoor Air Conc ($\mu g/m^3$)[†††]**
		6/12/2002	**2.2**	**2.5**	**0.31 F**	**0.20**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/17/2002	**2.6**	**3.0**	**0.17 F**	**0.11**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/3/2002	**7.4**	**8.5**	**0.45 F**	**0.29**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	**4.2**	**4.8**	**0.30 F**	**0.19**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2003	**2.2**	**2.5**	**0.38 F**	**0.24**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/9/2003	**2.2**	**2.5**	**0.39 F**	**0.25**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	9/9/2003	**1.7**	**2.0**	**0.41 F**	**0.26**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/3/2003	**1.6**	**1.8**	**0.44 F**	**0.28**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2004	**0.98 F**	**1.1**	**0.11 F**	**0.071**			0.12 M	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2004	**1.5**	**1.7**	**0.26 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/21/2004	**1.4**	**1.6**	**0.26 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	9/21/2004	**1.4**	**1.6**	**0.26 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/14/2004	**1.6**	**1.8**	**0.43 F**	**0.28**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2005	**2.2**	**2.5**	**0.40 F**	**0.26**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/21/2005	**1.8**	**2.1**	**0.16 F**	**0.10**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2005	**1.5**	**1.7**	**0.55 F**	**0.35**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		3/23/2006	**1.4 F**	**1.6**	**0.36 F**	**0.23**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/21/2006	**1.7**	**2.0**	**0.58 F**	**0.37**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	LS-3	8/1/2001	**1.2 F**	**1.4**	**0.90 F**	**0.58**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	8/30/2001	**1.2 F**	**1.4**	**0.76 F**	**0.49**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/27/2001	**4.8**	**5.5**	**0.43 F**	**0.28**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		10/4/2001	**3.7**	**4.2**	**0.45 F**	**0.29**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		11/14/2001	**1.3 F**	**1.5**	**0.80 F**	**0.51**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/19/2001	**4.3**	**4.9**	**0.27 F**	**0.17**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		1/16/2002	**1.4 F**	**1.6**	**0.67 F**	**0.43**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		2/13/2002	**1.3 F**	**1.5**	**0.69 F**	**0.44**	**0.11 F**	**0.0088**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/18/2002	**1.3 F**	**1.5**	**0.63 F**	**0.40**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		4/11/2002	**1.5**	**1.7**	0.80 U	NA					0.20 U	NA	0.20 U	NA			0.10 U	NA
		6/12/2002	**1.1 F**	**1.3**	**0.20 F**	**0.13**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/17/2002	**2.9**	**3.3**	**0.21 F**	**0.13**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/3/2002	**4.4**	**5.0**	**0.34 F**	**0.22**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	**4.0**	**4.6**	**0.35 F**	**0.22**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2003	**2.2**	**2.5**	**0.51 F**	**0.33**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/9/2003	**1.4 F**	**1.6**	**0.14 F**	**0.090**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/3/2003	**1.0 F**	**1.1**	**0.11 F**	**0.071**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2004	**1.1 F**	**1.3**	**0.17 F**	**0.11**			0.12 M	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2004	**1.3 F**	**1.5**	**0.22 F**	**0.14**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/21/2004	**1.8**	**2.1**	**0.24 F**	**0.15**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/14/2004	**1.6**	**1.8**	**0.26 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2005	**1.7**	**2.0**	**0.19 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/21/2005	**1.4**	**1.6**	**0.37 F**	**0.24**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2005	**1.1 F**	**1.3**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/20/2005	**1.1 F**	**1.3**	**0.27 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2006	**0.92 F**	**1.1**	**0.20 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/21/2006	**0.92 F**	**1.1**	**0.34 F**	**0.22**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/19/2006	**0.99 F**	**1.1**	**0.54 F**	**0.35**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/12/2006	**0.93 F**	**1.1**	**0.61 F**	**0.39**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/21/2007	**1.1 F**	**1.3**	**0.66 F**	**0.42**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	LS-4	9/17/2001	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	12/19/2001	**0.23 F**	**0.26**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/18/2002	**0.17 F**	**0.20**	0.14 U	NA	**0.12 F**	**0.0096**	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (μg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (μg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (μg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** ***Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**	**Groundwater Conc (μg/L)**	**Indoor Air Conc (μg/m^3)†††**
		6/12/2002	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/17/2002	**0.19 F**	**0.22**	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/3/2002	**0.25 F**	**0.29**	0.050 U	NA	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	**0.25 F**	**0.29**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/10/2003	**0.20 F**	**0.23**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/9/2003	**0.12 F**	**0.14**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/3/2003	**0.12 F**	**0.14**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/3/2003	**0.12 F**	**0.14**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2004	0.060 U	NA	0.050 U	NA			0.12 M	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2004	**0.15 F**	**0.17**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/21/2004	**0.12 F**	**0.14**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/14/2004	**0.18 F**	**0.21**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2005	**0.18 F**	**0.21**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/21/2005	**0.15 F**	**0.17**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/21/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/20/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/21/2006	**0.090 F**	**0.10**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/19/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/12/2006	**0.090 F**	**0.10**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/21/2007	**0.22 F**	**0.25**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/5/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	6/5/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/5/2008	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/5/2008	**0.12 F**	**0.14**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/5/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/4/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/1/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/2/2009	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2010	**0.17 F**	**0.20**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/3/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/30/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/14/2010	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	LS-5	8/1/2001	**0.28 F**	**0.32**	**0.51 F**	**0.33**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	10/25/2001	**0.15 F**	**0.17**	**0.27 F**	**0.17**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/19/2001	0.11 U	NA	**0.32 F**	**0.21**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/20/2002	0.11 U	NA	**0.26 F**	**0.17**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/13/2002	0.11 U	NA	**0.16 F**	**0.10**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/18/2002	0.060 U	NA	**0.22 F**	**0.14**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/2/2002	**0.12 F**	**0.14**	**0.25 F**	**0.16**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	0.060 U	NA	**0.19 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/12/2003	**0.080 F**	**0.092**	**0.21 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2003	0.060 U	NA	**0.19 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/9/2003	0.060 U	NA	**0.20 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/4/2003	0.060 U	NA	**0.16 F**	**0.10**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2004	0.060 U	NA	**0.16 F**	**0.10**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/7/2004	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2004	0.060 U	NA	**0.16 F**	**0.10**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
		MCL (µg/L)	**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
		USEPA Indoor Air RSL (µg/m^3)[†]	**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
		TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)[††]	**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)[†††]**
		12/13/2004	0.060 U	NA	**0.19 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/23/2005	0.060 U	NA	**0.17 F**	**0.11**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/23/2005	0.060 U	NA	**0.21 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/20/2005	0.060 U	NA	**0.10 F**	**0.064**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/19/2005	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/21/2005	0.060 U	NA	**0.10 F**	**0.064**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2006	0.060 U	NA	**0.14 F**	**0.090**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/19/2006	0.060 U	NA	**0.090 F**	**0.058**			0.12 U	NA	0.070 M	NA	0.080 U	NA			0.080 U	NA
		9/18/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/11/2006	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/19/2007	0.060 U	NA	**0.15 F**	**0.096**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/11/2007	0.060 U	NA	**0.25 F**	**0.16**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/17/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
	Duplicate	9/17/2007	0.15 U	NA	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		12/3/2007	**0.12 F**	**0.14**	**0.39 F**	**0.25**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2008	0.060 U	NA	**0.85 F**	**0.55**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2008	**0.82 F**	**0.94**	**1.4**	**0.90**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/2/2008	**0.64 F**	**0.73**	**1.8**	**1.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/1/2008	**0.96 F**	**1.1**	**2.1**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2009	0.060 U	NA	**2.0**	**1.3**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2009	**0.80 F**	**0.92**	**2.6**	**1.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2009	**0.96 F**	**1.1**	**2.7**	**1.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		11/30/2009	**0.88 F**	**1.0**	**2.8**	**1.8**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2010	**1.1 F**	**1.3**	**2.7**	**1.7**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/1/2010	**0.98 F**	**1.1**	**2.2**	**1.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/30/2010	**0.82 F**	**0.94**	**2.7**	**1.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2010	**1.0 F**	**1.1**	**2.2**	**1.4**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2011	**1.1 F**	**1.3**	**2.6**	**1.7**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	**0.66 F**	**0.76**	**2.4**	**1.5**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	LS-6	8/1/2001	**6.0**	**6.9**	**0.31 F**	**0.20**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Min/Max - na	8/15/2001	**6.5**	**7.5**	**0.34 F**	**0.22**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		8/30/2001	**5.7**	**6.5**	**0.57 F**	**0.37**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/19/2001	**6.7**	**7.7**	**0.35 F**	**0.22**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Duplicate	9/19/2001	**7.2**	**8.3**	**0.39 F**	**0.25**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/27/2001	**10**	**11**	**0.19 F**	**0.12**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/18/2001	**2.0**	**2.3**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/18/2002	**2.7**	**3.1**	**0.20 F**	**0.13**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/13/2002	**2.5**	**2.9**	**0.25 F**	**0.16**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/16/2002	**1.6**	**1.8**	**0.10 F**	**0.064**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/2/2002	**6.9**	**7.9**	**0.40 F**	**0.26**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	**4.2**	**4.8**	**0.21 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2003	**2.7**	**3.1**	**0.23 F**	**0.15**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/11/2003	**2.5**	**2.9**	**0.38 F**	**0.24**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/4/2003	**4.1**	**4.7**	**0.50 F**	**0.32**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	12/4/2003	**4.0**	**4.6**	**0.47 F**	**0.30**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2004	**3.6**	**4.1**	**0.47 F**	**0.30**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/7/2004	**1.9**	**2.2**	**0.19 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2004	**2.1**	**2.4**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2004	**4.2**	**4.8**	**0.67 F**	**0.43**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/21/2005	**4.2**	**4.8**	**0.41 F**	**0.26**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/20/2005	**1.8**	**2.1**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		9/19/2005	**2.0**	**2.3**	**0.20 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/21/2005	**1.5**	**1.7**	**0.79 F**	**0.51**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2006	**1.2 F**	**1.4**	**0.69 F**	**0.44**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/19/2006	**0.95 F**	**1.1**	**0.95 F**	**0.61**			0.12 U	NA	0.070 M	NA	0.080 U	NA			0.080 U	NA
		9/18/2006	0.060 U	NA	**1.8**	**1.2**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/11/2006	**0.69 F**	**0.79**	**1.6**	**1.0**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/19/2007	**2.3**	**2.6**	**0.11 F**	**0.071**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	Duplicate	3/19/2007	**2.5**	**2.9**	**0.13 F**	**0.083**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/11/2007	**3.0**	**3.4**	**0.21 F**	**0.13**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/17/2007	**1.5**	**1.7**	**0.68 F**	**0.44**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		12/3/2007	**1.6**	**1.8**	**0.13 F**	**0.083**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2008	**1.3 F**	**1.5**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2008	**1.7**	**2.0**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/2/2008	**0.99 F**	**1.1**	**1.1**	**0.71**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/1/2008	**1.1 F**	**1.3**	**1.0**	**0.64**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2009	**1.1 F**	**1.3**	**0.53 F**	**0.34**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2009	**0.93 F**	**1.1**	**1.3**	**0.83**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2009	**0.99 F**	**1.1**	**1.5**	**0.96**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		11/30/2009	**1.2 F**	**1.4**	**1.4**	**0.90**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2010	**1.1 F**	**1.3**	**0.23 F**	**0.15**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/1/2010	**0.95 F**	**1.1**	**0.23 F**	**0.15**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/30/2010	**0.78 F**	**0.89**	**0.27 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2010	**0.86 F**	**0.99**	**0.48 F**	**0.31**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		2/28/2011	**0.76 F**	**0.87**	**0.85 F**	**0.55**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	**0.68 F**	**0.78**	**0.90 F**	**0.58**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
	LS-7	12/13/1999	**2.5**	**2.9**	**0.30 F**	**0.19**	0.067 U	NA	0.14 U	NA	0.14 U	NA	0.14 U	NA	0.049 U	NA	0.019 U	NA
	Min - 32.31 (12/02/04)	6/13/2000	**2.2**	**2.5**	**0.30 F**	**0.19**			0.025 U	NA	0.062 U	NA	0.077 U	NA			0.013 U	NA
	Max - 206.87 (12/08/03)	9/13/2000	**3.1**	**3.6**	**0.30 F**	**0.19**			0.025 U	NA	0.062 U	NA	0.077 U	NA			0.013 U	NA
		12/13/2000	**3.7**	**4.2**	**1.2**	**0.77**			0.025 U	NA	0.062 U	NA	0.077 U	NA			0.013 U	NA
		3/20/2001	**3.8**	**4.4**	**0.20 F**	**0.13**			0.025 U	NA	0.062 U	NA	0.077 U	NA			0.013 U	NA
		6/12/2001	**4.0**	**4.6**	**0.43 F**	**0.28**	0.20 U	NA	0.23 U	NA	0.25 U	NA	0.26 U	NA	0.15 U	NA	0.18 U	NA
		7/31/2001	**4.1**	**4.7**	**0.36 F**	**0.23**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Duplicate	7/31/2001	**4.1**	**4.7**	**0.33 F**	**0.21**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		8/8/2001	0.11 U	NA	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		8/30/2001	**1.1 F**	**1.3**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/19/2001	**4.5**	**5.2**	**0.81 F**	**0.52**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Duplicate	9/19/2001	**4.6**	**5.3**	**0.83 F**	**0.53**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/27/2001	**3.3**	**3.8**	**0.34 F**	**0.22**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		12/18/2001	**1.4**	**1.6**	0.14 U	NA	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		3/18/2002	**2.7**	**3.1**	**0.24 F**	**0.15**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		6/13/2002	**2.6**	**3.0**	**0.20 F**	**0.13**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
	Duplicate	6/13/2002	**2.7**	**3.1**	**0.22 F**	**0.14**	0.10 U	NA	0.16 U	NA	0.11 U	NA	0.14 U	NA	0.080 U	NA	0.27 U	NA
		9/16/2002	**2.4**	**2.8**	**0.34 F**	**0.22**	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		10/23/2002	0.060 U	NA	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA
		12/2/2002	**7.2**	**8.3**	**1.0**	**0.64**	0.050 U	NA			0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/10/2003	0.060 U	NA	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/12/2003	**4.0**	**4.6**	**0.41 F**	**0.26**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/9/2003	**3.6**	**4.1**	**0.38 F**	**0.24**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/11/2003	**3.5**	**4.0**	**0.34 F**	**0.22**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/4/2003	**3.3**	**3.8**	**0.34 F**	**0.22**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2004	**3.1**	**3.6**	**0.33 F**	**0.21**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID** *Min/Max Depth to GW (ft BTOC)*	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**
		6/7/2004	**2.4**	**2.8**	**0.19 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/20/2004	**2.8**	**3.2**	**0.26 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2004	**1.8**	**2.1**	**0.33 F**	**0.21**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/21/2005	**2.3**	**2.6**	**0.31 F**	**0.20**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		6/20/2005	**2.5**	**2.9**	**0.26 F**	**0.17**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/19/2005	**3.6**	**4.1**	**0.31 F**	**0.20**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 M	NA
		12/20/2005	**2.7**	**3.1**	**0.30 F**	**0.19**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/20/2006	**2.7**	**3.1**	**0.29 F**	**0.19**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/19/2006	**3.4**	**3.9**	**0.21 F**	**0.13**			0.12 U	NA	0.070 M	NA	0.080 U	NA			0.080 U	NA
		9/18/2006	**3.0**	**3.4**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/11/2006	**2.6**	**3.0**	**0.34 F**	**0.22**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/19/2007	**2.1**	**2.4**	**0.41 F**	**0.26**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/11/2007	**1.8**	**2.1**	**0.74 F**	**0.48**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/17/2007	**2.5**	**2.9**	0.16 U	NA			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		12/3/2007	**2.1**	**2.4**	**0.43 F**	**0.28**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/3/2008	**2.0**	**2.3**	**0.43 F**	**0.28**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/2/2008	**2.8**	**3.2**	0.050 U	NA			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		9/2/2008	**2.3**	**2.6**	**0.39 F**	**0.25**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/1/2008	**2.1**	**2.4**	**0.38 F**	**0.24**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/2/2009	**2.0**	**2.3**	**0.10 F**	**0.064**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		6/1/2009	**1.9**	**2.2**	**0.72 F**	**0.46**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/31/2009	**2.3**	**2.6**	**0.87 F**	**0.56**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		11/30/2009	**2.1**	**2.4**	**0.66 F**	**0.42**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		3/1/2010	**0.99 F**	**1.1**	**0.50 F**	**0.32**			0.30 U	NA	0.16 U	NA	0.19 U	NA			0.23 U	NA
		6/1/2010	**0.47 F**	**0.54**	**0.19 F**	**0.12**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		8/30/2010	**1.7**	**2.0**	**0.24 F**	**0.15**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		12/13/2010	**1.8**	**2.1**	**0.35 F**	**0.22**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		2/28/2011	**2.9**	**3.3**	**0.43 F**	**0.28**			0.12 U	NA	0.070 U	NA	0.080 U	NA			0.080 U	NA
		5/31/2011	**2.0**	**2.3**	0.050 U	NA	0.050 U	NA	0.12 U	NA	0.070 U	NA	0.080 U	NA	0.030 U	NA	0.080 U	NA

QA NOTES AND DATA QUALIFIERS:

(NO CODE) - Confirmed identification.

U - Analyte was not detected above the indicated Method Detection Limit (MDL).

F - Analyte was positively identified, but the quantitation is an estimation above the MDL and below the Reporting Limit (RL).

J - Analyte was positively identified, but the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

UJ - Analyte was not detected above the indicated RL; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

M = Concentration is estimated due to a matrix effect.

Concentrations shown in **BOLD** indicate detections above the MDL.

NOTES:

† USEPA (2011) RSLs for Indoor Air based on USEPA toxicity factors and TR = 1E-06.

†† TCEQ (2011) ^{Air}RBEL$_{Inh}$ based on TCEQ toxicity factors and TR = 1E-05.

††† Groundwater Concentrations were converted to Indoor Air concentrations using the formula:

Concentration in Indoor Air = Concentration in Soil Gas * Attenuation Factor 0.0015 (from USEPA 2010), where

Concentration in Soil Gas (µg/m3) = Concentration in Groundwater (µg/L) * Henry's Law Constant (unitless) * Conversion factor (1000 L/m3).

Henry's Law Constants from TCEQ Chemical/Physical Properties Table (updated May 24, 2011).

NA - Groundwater Concentration was Not Detected above the MDL so was not converted to Indoor Air Concentration.

na - Not available.

All samples were analyzed for Volatile Organic Compounds by Methods SW8260 and SW8260B.

			Tetrachloroethene		Trichloroethene		Dichloroethane, 1,2-		Dichloroethene, 1,1-		Dichloroethene, cis-1,2-		Dichloroethene, trans-1,2-		Trichloroethane, 1,1,1-		Vinyl Chloride	
			Action Levels		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*		*Action Levels*	
MCL (µg/L)			**5**		**5**		**5**		**7**		**70**		**100**		**200**		**2**	
USEPA Indoor Air RSL (µg/m^3)†			**0.41**		**1.2**		**0.094**		**210**		**na**		**63**		**5200**		**0.16**	
TCEQ ^{Air}RBEL$_{Inh}$ (µg/m^3)††			**64**		**12.2**		**0.94**		**355**		**63**		**63**		**5214**		**2.9**	
Area	**Well ID *Min/Max Depth to GW (ft BTOC)***	**Collected**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**	**Groundwater Conc (µg/L)**	**Indoor Air Conc (µg/m^3)†††**

Concentrations shown in the shaded box indicate the maximum concentration detected.

Indicates that the Groundwater Concentration exceeded the MCL.

Indicates that the Indoor Air Concentration exceeded the USEPA Indoor Air RSL.

Indicates that the Indoor Air Concentration exceeded the USEPA Indoor Air RSL and the TCEQ ^{Air}RBEL$_{Inh}$.

REFERENCES

Department of Defense. 2009. *DoD Vapor Intrusion Handbook.* Prepared by Tri-Service Environmental Risk Assessment Workgroup. Washington, D.C. January.

DTSC. 2005. Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air. Interim Final. California Environmental Protection Agency, Department of Toxic Substances Control. Revised February 2, 2005.

ITRC. 2007. Interstate Technology & Regulatory Council: *Vapor Intrusion Pathway: A Practical Guideline*. VI-1. Washington, D.C.: ITRC, Vapor Intrusion Team. January. www.itrcweb.org.

Parsons. 1998. Revised Background Information Report, Camp Stanley Storage Activity. March.

Parsons. 2002. AOC 65 Soil Gas Survey Results, Camp Stanley Storage Activity. January – February 2001.

Parsons. 2003a. Final AOC 65 Interim Removal Action Report, Camp Stanley Storage Activity. August.

Parsons. 2003b. Soil Vapor Extraction Operations & Maintenance Report. April 1, 2003.

Pearson, S. and B. Murphy. 2004. "A Case Study of Traditional and Alternative Monitoring Techniques for Solvent Contamination within Fractured Bedrock." Presented at the U.S. EPA/NGWA Fractured Rock Conference, Portland, ME. 13-14 September.

Red River Army Depot, Industrial Hygiene Office. 2002a. Occupational Health Exposure Assessments, Industrial Hygiene Survey Report No. CSSA-Z13-0202, Camp Stanley Storage Activity, 5 and 6 February.

Red River Army Depot, Industrial Hygiene Office. 2002b. Industrial Hygiene Survey, Camp Stanley Storage Activity. 30 October and 01 November.

TCEQ. 2008. Risk Levels, Hazard Indices, and Cumulative Adjustment. TCEQ Regulatory Guidance. Remediation Division. RG-366/TRRP-18. Revised October 2008.

TCEQ. 2011. TRRP Protective Concentration Levels. May 2011.

USEPA. 2002. *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. http://www.epa.gov/osw/hazard/correctiveaction/eis/vapor/complete.pdf. November 2002.

USEPA. 2010. U.S. EPA's Vapor Intrusion Database. Preliminary Evaluation of Attenuation Factors for Chlorinated VOCs in Residences. AEHS Presentation. Spring 2010. H. Dawson, USEPA. Online at: 05_Schuver_AEHS VI Database_AF_CVOCs_3-9-2010.pdf.

USEPA. 2011a. USEPA Regional Screening Levels. Regional Screening Level (RSL) Summary Table June 2011. http://www.epa.gov/region09/superfund/prg.

USEPA. 2011b. Regional Screening Table – User's Guide, Mid-Atlantic Risk Assessment, USEPA. May 2011. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm.

USEPA. 2011c. Drinking Water Contaminants, National Primary Drinking Water Regulations, List of Contaminants & their MCLs. http://water.epa.gov/drink/contaminants/index.cfm. Last updated August 29, 2011.

Attachment 1
AOC 65 Soil Gas Survey Results
January - February 2001

FINAL
Soil Gas Survey Technical Report

Camp Stanley Storage Activity
Boerne, Texas

DEPARTMENT OF THE ARMY ★ UNITED STATES OF AMERICA ★

1775

Prepared by

PARSONS

Contract Number F41689-96-D-0710
Delivery Order 5084

FEBRUARY 2002

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SECTION 1
OVERVIEW

A soil gas survey was performed at two adjacent AOCs located within the southwest quadrant of CSSA, as shown on **Figure 1.1**. AOC 57 is approximately 65 acres in size and AOC 65 is approximately 5 acres in size. AOC 65 consists of a potential VOC source area inside Building 90, and the study area extends approximately 100 feet from the building in all directions, whereas AOC 57 is long and narrow and extends over 3,600 feet North to South along the eastern edge of AOC 65. AOC 57 is an area where temporary buildings reportedly used for gun cleaning and maintenance operations were located. The initial survey grid covered approximately 70 acres. The primary objective of the soil gas effort was to determine whether releases of VOCs had occurred into the underlying soil of these two AOCs. Additional background information on the history and ongoing investigations for AOC 57 and AOC 65 are located in **Volume 3-2, Areas of Concern,** behind the **AOC 57** and **AOC 65** tabs.

The soil gas survey was established as one contiguous grid of sampling points that covered the entire survey area represented by AOC 65 and AOC 57. The survey plan was established on a 100-foot grid throughout AOC 57, and was tightened to a 50-foot grid in the vicinity of Building 90 (AOC 65) and to 25 feet adjacent to and inside Building 90. The combined sampling grids were expected to yield approximately 400 individual sample locations during the first phase of sample collection. An additional 200 samples were initially planned to tighten the grid in areas where higher levels of contamination was indicated. Few portions of the initial grid (450 points) exhibited detectable levels of contaminants such that the initial grid provided adequate coverage, with most contamination found near Building 90. The remaining 150 soil gas points were utilized at other SWMUs or AOCs as directed by CSSA to assess possible releases of VOCs from these areas, including the wastewater treatment plant, SWMU B-3, SWMU B-4, AOC 55, and AOC 63. Additional background information on the history and ongoing investigations for SWMU B-3, SWMU B-4, AOC 55, and AOC 63 are located in **Volume 3-1, Solid Waste Management Units,** behind the **SWMU B-3** and **SWMU B-4** tabs and in **Volume 3-2, Areas of Concern,** behind the **AOC 55** and **AOC 63** tabs.

Past soil gas work demonstrated that the soil/bedrock interface underlying the AOC 57 and AOC 65 sites is relatively shallow, and that the probes typically could not be driven consistently deeper than 4 feet below grade. A geoprobe rig was used to drive (hammer) the probes into the ground, and to retrieve the probes after the soil gas sample had been extracted. A pneumatic hammer and jack were used to drive and retrieve rods from sample locations inside Building 90. Samples were obtained in Tedlar® bags under vacuum as described in the SAP Addenda included in **Volume 1-4, Sampling and Analysis Plan, DO5084 Addendum**, and analyzed by an on-site mobile lab equipped with a gas chromatograph. The laboratory tested each sample for benzene, toluene, ethylbenzene, xylenes (BTEX), vinyl chloride, tetrachloroethene (PCE), trichloroethene (TCE), *trans*-1,2-dichloroethene (DCE), and *cis*-1,2-DCE. In accordance with the SAP addenda, each sample was also field screened for oxygen and explosive gases (lower explosive limit) using a direct read instrument, an HMX 271 explosimeter.

Each of the grid points was surveyed with a Trimble asset-grade Global Positioning System (GPS) receiver with one-meter accuracy. A Parsons and AFCEE chemist performed one on-site laboratory audit during the initial week of testing to evaluate the performance of the mobile laboratory. In addition, electronic data was managed on a daily basis during the active testing periods.

The soil gas survey grids were established at each site prior to beginning each site specific survey. The soil gas sampling grids were set up based on the shape and size of the AOCs. These grids were established at intervals of 50 to 100 feet, and the grid spacing was modified based on the results from previous days' samples in the area. Soil gas survey grids were established for all sites mentioned above for soil gas testing. Two larger grid areas were further divided into separate but contiguous grids. Three grids comprise AOC 57 and two comprise the AOC 65 survey area. The locations of the soil gas survey grids are presented on **Figure 1.1**. Detailed grid maps are provided in the specific soil gas survey discussions presented Section 2.

This report is organized into four sections including this overview. Soil gas sampling analytical methodology, and quality control procedures are discussed in Section 2. The soil gas survey results for each of the surveyed locations are presented in Section 3, and a summary of findings and recommendations for future RFI soil sampling based on the soil gas survey results are presented in Section 4. Analytical results from the soil gas survey are presented in Appendix A.

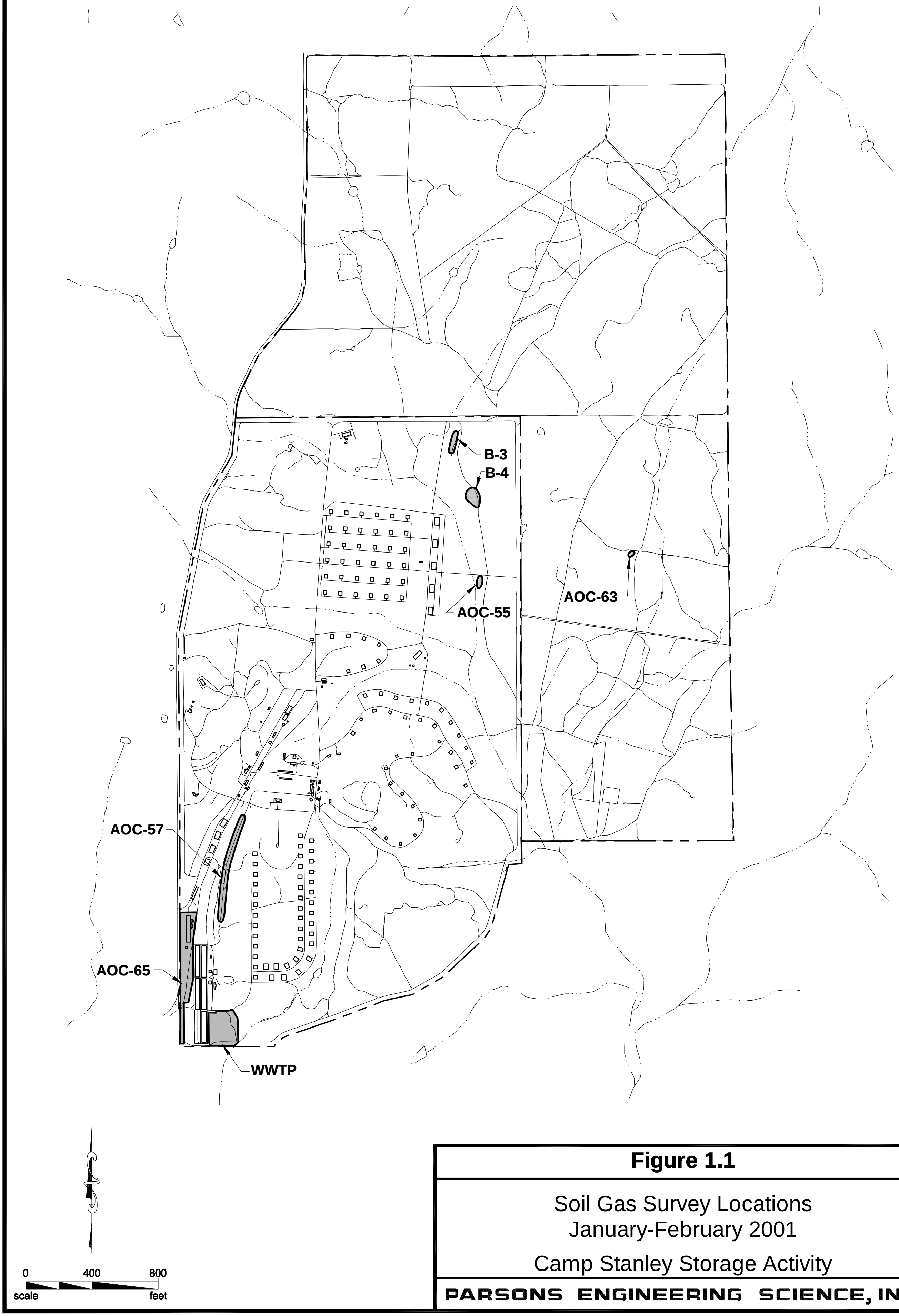

Figure 1.1

Soil Gas Survey Locations
January-February 2001

Camp Stanley Storage Activity

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SECTION 2
INVESTIGATION METHODOLOGY

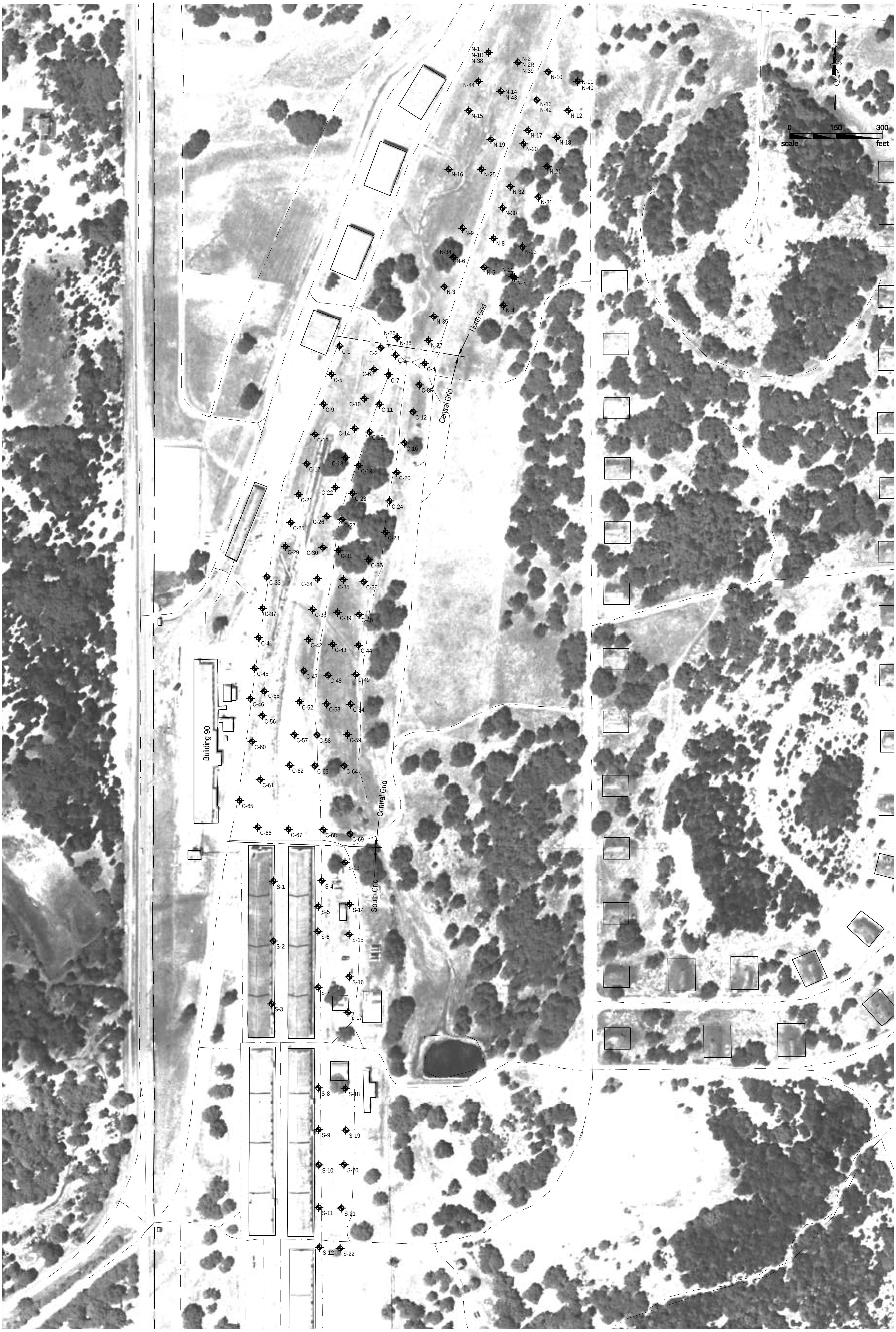
The purpose of this section is to summarize the activities performed during the soil gas survey completed at CSSA. The soil gas survey described in this report was conducted at CSSA from January 2 through February 23, 2001. A summary of the soil gas survey methods employed during the implementation of the soil gas survey is described below. The scope of these activities is described in the **Soil Gas Sampling and Analysis Plan Addenda (December 2000)** prepared for this soil gas survey and located in **Volume 1-4, Sampling and Analysis Plan, DO5084 Addendum**. Included in this discussion are how sample locations were determined, sample collection procedures, analytical methodology, and soil gas analytical quality control procedures.

2.1 DETERMINATION OF SAMPLING LOCATIONS

Grid locations at AOC 57 were set up based on historical maps that showed locations of temporary buildings in this area. A soil gas survey was performed to confirm that no VOC contamination existed in the vicinity of these buildings, which were reportedly used for gun cleaning and maintenance operations. One hundred twenty-nine (129) grid points were established in 100-foot intervals, which provided adequate coverage of the historical building location areas identified on the aerial photographs. The survey grid would have been tightened to 25-foot grids if any areas indicated contamination.

AOC 57 is long and narrow and extends approximately 4,000 feet from south to north along a 65-acre area. Because the locations of the buildings and topography did lie along a straight-line path, the AOC 57 grid was set up as a 3-part grid (designated North, Central, and South grids) to enable the grid points to provide adequate coverage and consistent spacing within each grid area around the former building locations. The layout of this grid is shown on **Figure 2.1**.

Grid locations at AOC 65 were placed inside and around Building 90. Two below grade vaults were located in Building 90. The first vault was located near the center of the building. This vault was backfilled with base material and capped with concrete prior to 1970. The second vault is located in the south central portion of the building. This vault housed a metal PCE/TCE tank that was used for gun cleaning purposes. Analysis of soil samples collected from beneath this tank in April 2000 found VOC contamination and suggested that a release of PCE/TCE has occurred. The former solvent vat used for weapons cleaning was removed in 1995 and replaced with a new cleaning process that utilizes citrus based material that does not contain VOCs. A 25-foot grid pattern was placed along the western side of the building while the grid attempted 25-foot spacing along the irregularly shaped East side of the building. The grid spacing was increased to 50-feet at locations farther from the building. A second grid was located South of Building 90 in an open field with 50-foot grid spacing to address possible contamination that may have migrated south from Building 90 toward the southern



LEGEND

- ✦ Sample Location
- — — Service Road
- — — Fence Line
- — — Creek

Figure 2.1

AOC 57 Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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738290 CSSA–57.DWG

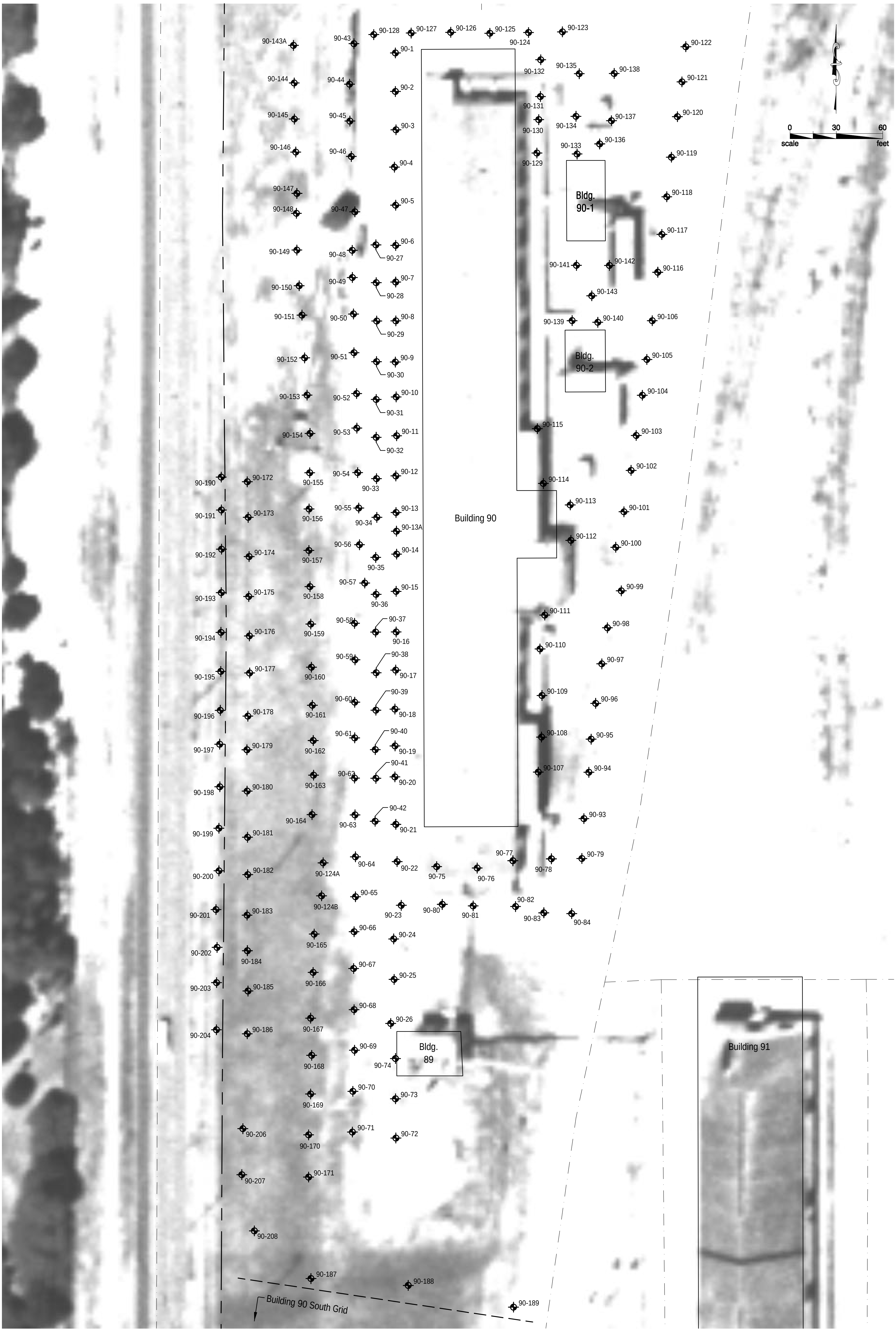
perimeter of the post. Three hundred and nineteen grid points were included in the AOC 65 grid, with 203 points located around Building 90, 40 points inside Building 90, and 76 points located in the Building 90 South grid area. The outer survey grid and the Building 90 South grid locations would have been tightened to 25-foot grids around any of the grid locations if contamination were indicated. The layout of the Building 90 and Building 90 South grids are shown on **Figure 2.2** and **Figure 2.3**, respectively.

Forty grid points were sampled inside Building 90 (AOC 65). Twenty-five-foot grid spacing was attempted to address potential contamination underlying the building's floor, primarily in the vicinity of the suspected contaminant source areas. The grid was modified to enable soil gas grid points to be located near the drain lines, subsurface metal solvent tanks, and along the centerline of the building. The grid layout inside Building 90 with structural features is presented in **Figure 2.4**.

Because the primary areas where contamination was encountered were inside Building 90 and within the 25-foot grid spacing outside, no grid tightening was necessary in any portion of AOC 57 or AOC 65. CSSA decided to utilize the approximately 150 remaining grid points at other SWMUs or AOCs to assess the potential extent of VOCs in these areas. CSSA designed simple grid layouts for these areas, which are described below.

The wastewater treatment plant area was selected for testing with the remaining grid points because it potentially could have received wastewater containing VOCs. The grid layout for the wastewater treatment plant included 45 grid points and extended approximately 500 feet to the east of the plant. **Figure 2.5** presents the grid layout relative to the wastewater treatment plant and surrounding topography. The treatment plant is located on the southwestern boundary of CSSA, south of AOC 65 and AOC 57. The grid points were spaced approximately 100 feet from each other. The layout was located down-slope of the plant and in the direction of the buried utility lines that transport wastewater to the facility. The grid layout should provide indications regarding potential releases of VOCs from the plant through surface spills or from buried utility lines.

SWMU B-3 is the location of extensive SVE treatability testing. SVE is an existing active treatment system operating at the SWMU. The SVE system was initially installed based on results from the soil gas survey preformed in June of 1995 (Phase I) and November/December of 1995 (Phase II). The 1995 soil gas survey grid covered all of the area reported in the current survey as well as the limestone outcrop to the east. Results from this report are located in the Environmental Encyclopedia **(Volume 3-1, SWMUs, Soil Gas Surveys, Technical Memorandum on Soil Gas Surveys, June 1996)**. High levels of chlorinated VOCs have been encountered in the trench at SWMU B-3, and continue to be removed by active SVE treatment. Most of the soil gas samples were collected at this SWMU to assess the relationship of VOC levels measured in the trench during the treatability study and subsequent operations and maintenance of SVE with levels measured using the soil gas survey techniques (maximum depth of 12 feet). They were also collected to investigate soil



L e g e n D

- ⌖ Sample Location
- ○ SVE System Wells
- — · — Service Road
- — - - — Fence Line

Figure 2.2

AOC 65, Outside Building 90, Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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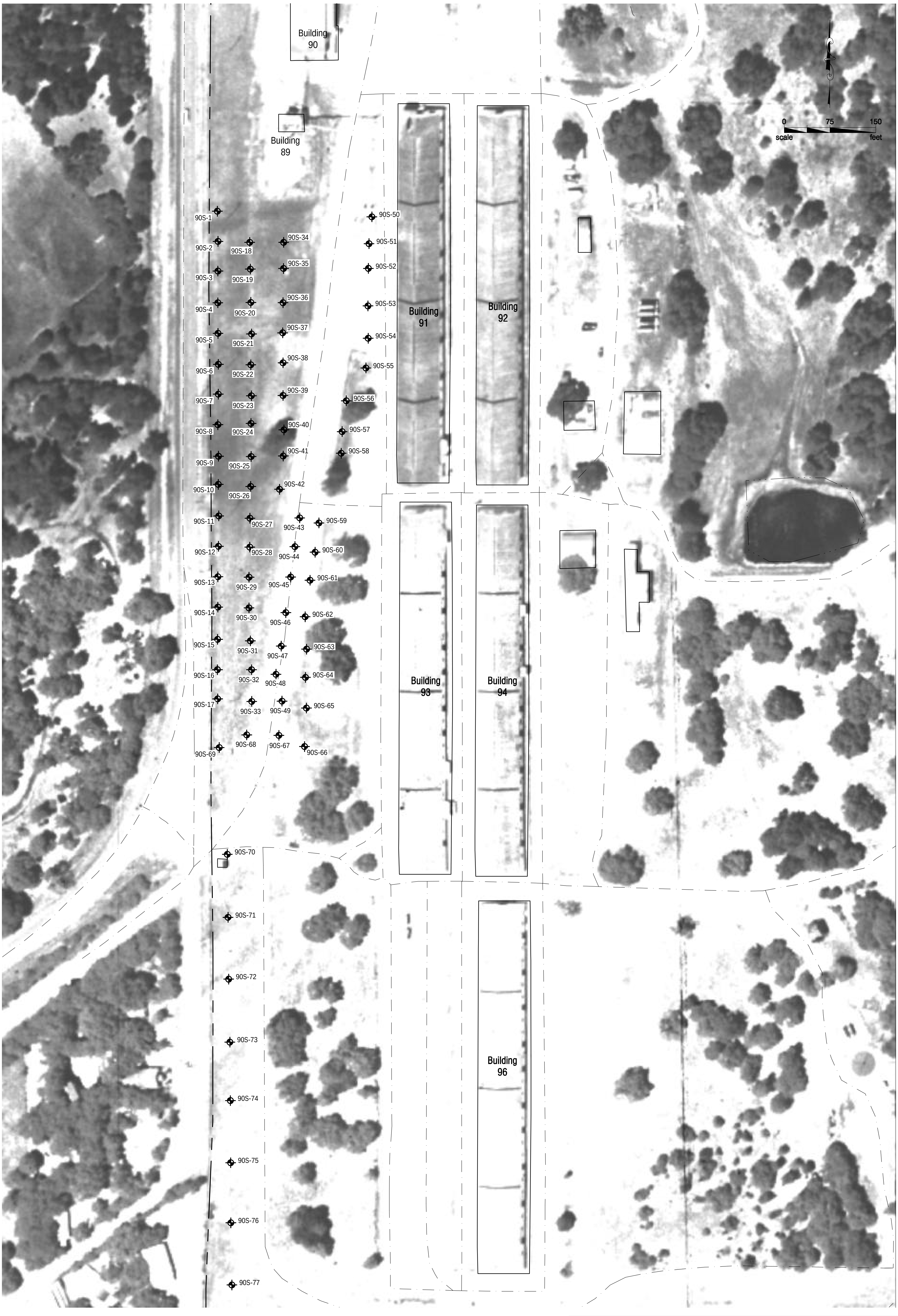

LegenD

⌖	Sample Location
— · —	Service Road
— — —	Fence Line
— ·· —	Creek

Figure 2.3

AOC 65, Building 90 South Grid, Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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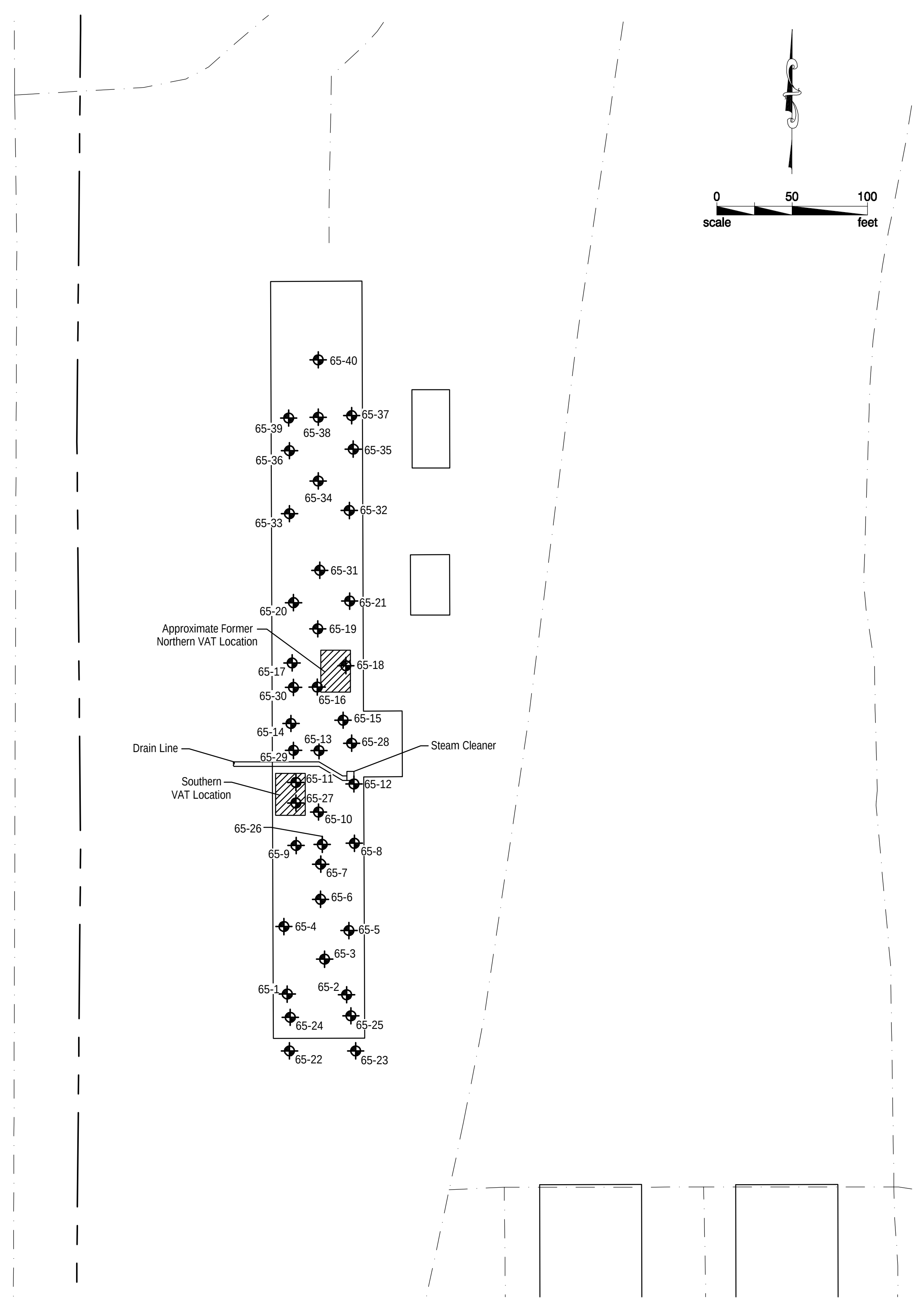

LEGEND

⌖ Sample Location

—— · —— Service Road

—— – – — Fence Line

Figure 2.4

AOC 65, Inside Building 90, Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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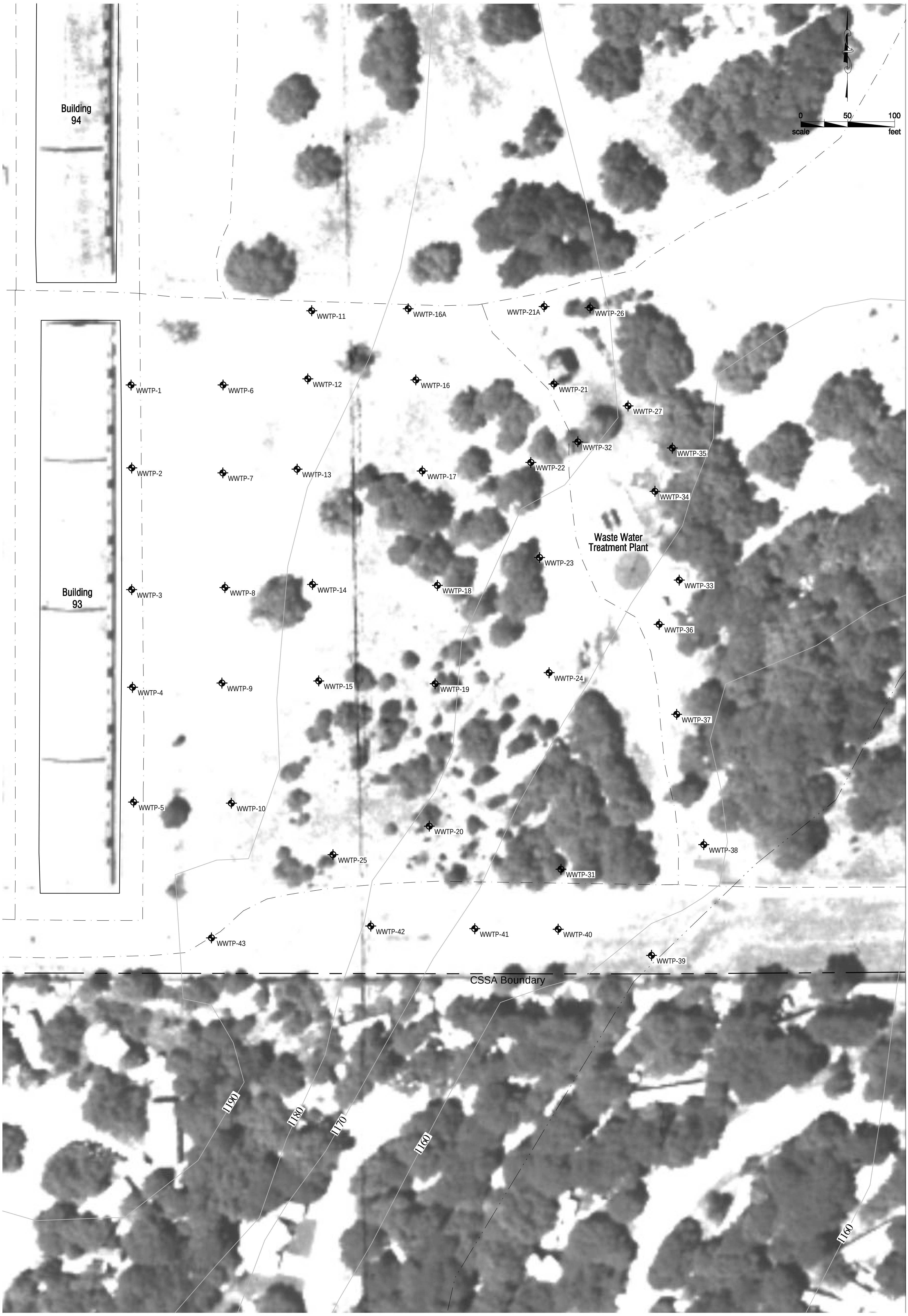

LegenD

- Sample Location
- Service Road
- Fence Line
- Creek
- 1160 Topographic Contour Lines in ft. asl.

Figure 2.5

WWTP Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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738290 CSSA—WWTP.DWG

gas levels present in other portions of the SWMU such as the east trench. The locations of these additional grid points provide current soil gas data for the SWMU B-3 trench located to the east of the main trench, and provide additional data for the soil gas points located along the eastern edge of the main trench in the vicinity of the existing SVE system. Sample B3-4 was actually collected from vapor extraction well 2 (VEW-2) of the SVE system. The SWMU B-3 grid layout is presented in **Figure 2.6**. This figure includes the existing SVE system layout relative to the sampled soil gas survey grid. A total of 29 additional soil gas samples were collected as part of the soil gas survey at SWMU B-3.

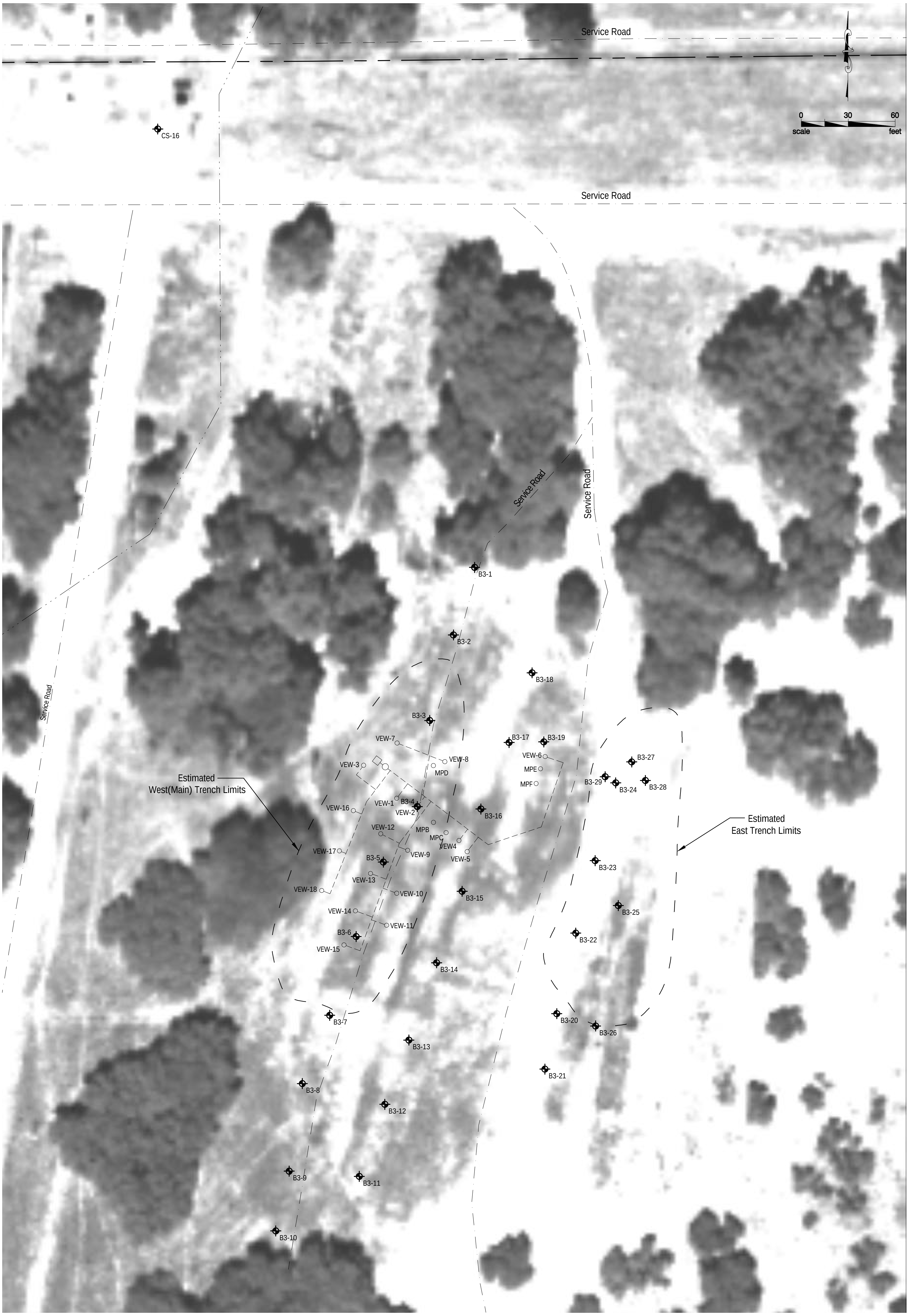
SWMU B-4 is located southeast of a former oxidation pond (SWMU O-1). It was selected for soil gas testing because it is located in the vicinity of SWMU B-3 and SWMU O-1. Like both of these units, SWMU B-4 was identified as a classified burn area, so the potential exists for some VOC contamination to be present. A total of 20 grid locations were sampled on a grid layout that extended over the estimated lateral extent of SWMU B-4. Grid spacing was approximately 25 feet east-west, and 50 feet north-south. The grid layout for SWMU B-4 is presented on **Figure 2.7.**

AOC 55 was used as a landfill and is located south of Tenburg Drive, east of Salado Creek, and south of SWMU B-4. AOC 55 was selected for soil gas testing to determine whether VOCs may be associated with this disposal area. A total of 54 grid locations were sampled on a grid layout that extended beyond the estimated lateral extent of the AOC. Grid spacing was approximately 100 feet on the north side of the road and 50 feet on the south side of the road for the 54 grid points. The grid layout for AOC 55 is presented on **Figure 2.8.**

AOC 63 consists of three metallic barrels that are partially filled with gravel and buried halfway in the ground. This AOC was selected for soil gas testing to determine whether subsurface VOC contamination is associated with these drums. The disposal history and past contents of the drums are unknown. Two points were selected between the drums approximately 25 feet apart, and within 5 feet of the nearest drum. The grid layout for AOC 63 is presented on **Figure 2.9.**

2.2 SOIL GAS SAMPLE COLLECTION METHODOLOGY

Prior to collection of any soil gas samples, all subsurface utilities and other man-made subsurface features, and surface obstacles (trees, buildings, roads, *etc*.), were identified and marked. The soil gas samples were collected at locations within the grid layouts for each of the investigated areas described in Section 2.1. The maximum depth of measured soil gas was approximately 12 feet, but most points were generally driven to less than 4 feet due to the thin soil layer overlying the limestone bedrock. Soil gas samples were collected by driving a decontaminated, 1-inch diameter hollow steel sampling probe into the ground using a Geoprobe hydraulic/pneumatic hammer rig. The probes were driven into the soil to a maximum depth of 6 feet or until refusal, except at SWMU B-3 where some points were



LEGEND

- Sample Location
- ○ SVE System Wells
- Service Road
- Fence Line
- Creek

Figure 2.6

SWMU B-3 Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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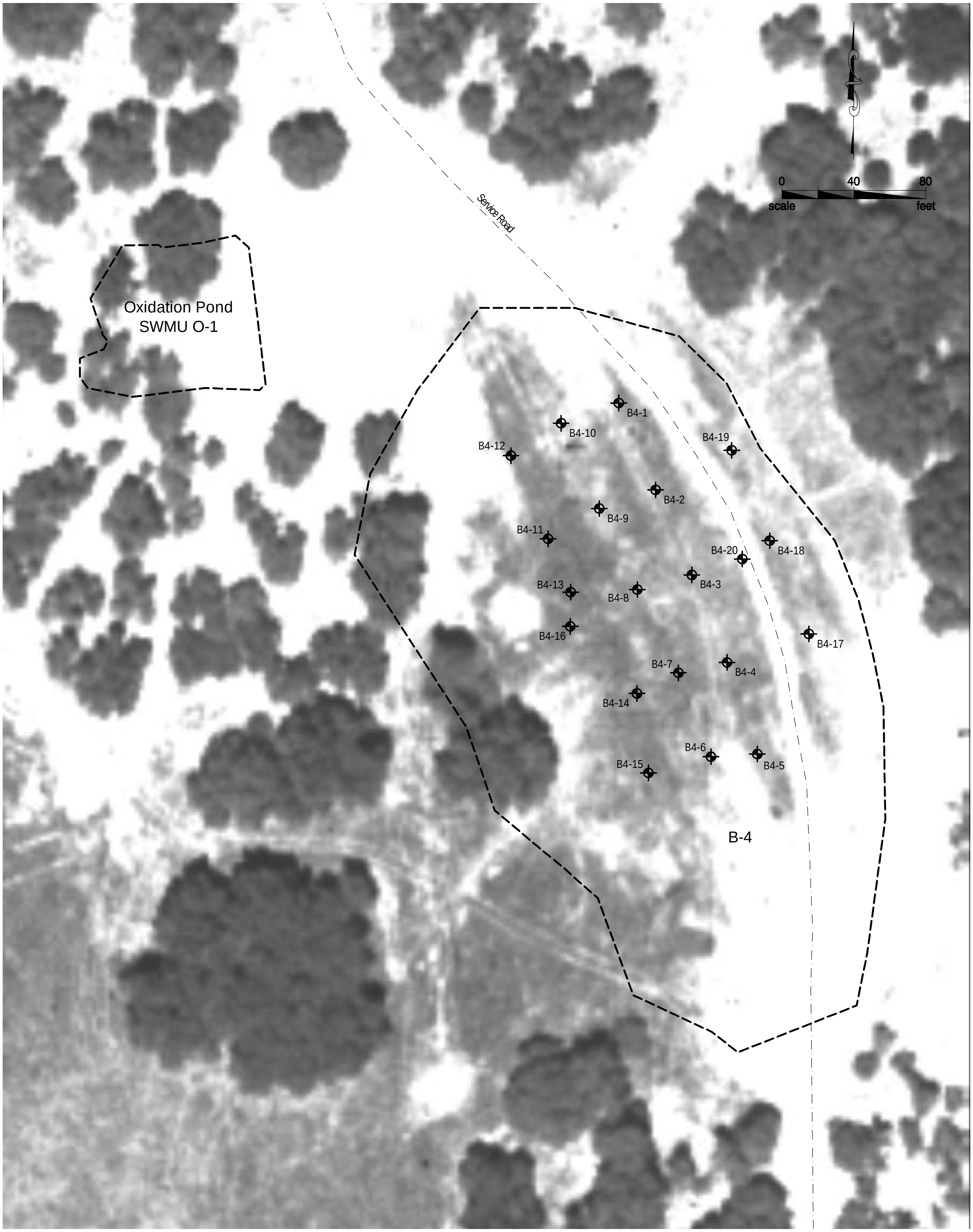

LEGEND

- ⌖ Sample Location
- —·—·— Service Road

Figure 2.7

SWMU B-4, Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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LEGEND

⌖	Sample Location
— · —	Service Road
— ·· —	Creek

Figure 2.8

AOC 55, Soil Gas Survey
Sample Location Map

Camp Stanley Storage Activity

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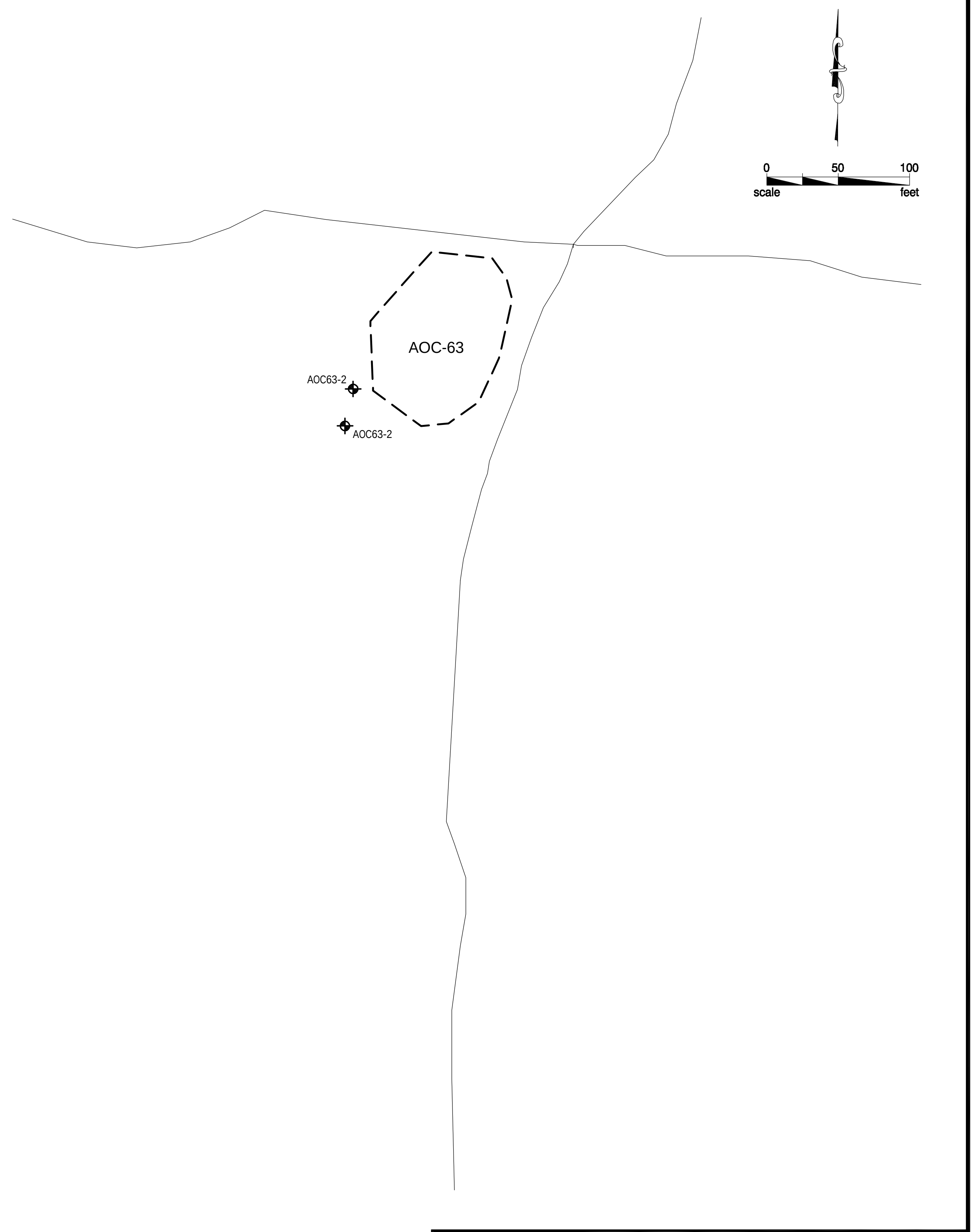

LEGEND

⌖ Sample Location

Figure 2.9

AOC 63
Sample Location Map

Camp Stanley Storage Activity

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738290 CSSA–AOC63.DWG

driven into the base of the trench up to 12 feet below grade. Soils up to 4.5 feet in thickness were encountered at each area investigated. The minimum thickness of soil encountered was less than 1-foot of overburden at AOC 57.

After reaching the desired sample depth, a four-step process was implemented to obtain the soil gas sample from the appropriate depth interval. First, the probes were pulled up slightly to detach the driving tip from the probe and to expose the open end of the hollow probe to surrounding soil gas from the sampling interval. Next, a sampling adapter was placed on top of the probe with a Tygon® tube run from the adapter to a vacuum pump. The vacuum pump was used to withdraw soil gases from the ground. For the third step in the process, the system was purged with 5 to 15 probe volumes prior to sampling to insure that a representative sample of soil gas was obtained. The variance in purging volumes was dependent upon the permeability of the soil being tested. In those areas where soils tended to exhibit greater permeability, an increased amount of soil gas could be purged prior to the actual collection of the sample.

Withdrawing the soil gas sample from the probe was the final step in the sample collection process. After purging was completed, a new Tedlar bag was connected to the tubing from the sampling probe inside the dessicator. A vacuum pump was then used to create a vacuum within the dessicator to withdraw soil gas from the ground. After a sample was collected, the valve on the Tedlar bag was closed and the bag was removed from the dessicator and transported to a mobile field laboratory for analysis. The vacuum pump was a 1 cubic feet per minute (cfm) rotary vane, oil-less, 1/6 horsepower model equipped with a vacuum regulator.

The samples were analyzed by a mobile laboratory field gas chromatograph (GC), operated by DHL Analytical, located at CSSA. Samples were analyzed within 24 hours of collection. After sampling, probes were decontaminated for use at another location. The resulting hole was plugged and abandoned with dry, powdered cement where appropriate.

An initial screening of each soil gas sample location was performed during the purging stage of the sampling process by scanning the exhaust from the vacuum pump with an explosimeter that reads oxygen and Lower Explosive Limits (LEL). An Industrial Scientific Corporation, Model HMX 271 explosimeter was used to measure the levels of oxygen and LEL. The explosimeter was calibrated daily for oxygen readings by setting the readout to 20.9 percent oxygen when held in ambient air. For oxygen measurements, the explosimeter had a stated accuracy of + 1.2 percent oxygen by volume in the range of 5 to 30 percent. If relatively lower levels of oxygen were indicated by the initial screening, then the field team would alert the mobile laboratory about possible high levels of organic contaminants present in the sample. VOCs are commonly encountered in lower oxygen soils at CSSA.

2.3 SOIL GAS ANALYTICAL METHODOLOGY

Within the mobile laboratory, soil gas samples were analyzed on a Shimadzu model 14A GC equipped with a Hall Electrolytic Conductivity Detector (HECD) and a photo ionization detector (PID) with a 10.2 electron volt (eV) light source. A Spectra-Physics model 4400 dual-channel integrator was used to plot the chromatograms, to measure the size of the peaks, and to compute compound concentrations.

The chromatographic column used for analysis was a 75-meter long, DB-624 (3µm), 0.53mm ID megabore column. This column was selected for its ability to separate the compounds targeted (PCE, TCE, *trans-, cis*-1,2-DCE, vinyl chloride, and BTEX) for analysis within a relatively short analysis time.

2.3.1 Target Compounds and Standard Preparation

Ten compounds were targeted for calibration and analysis. These compounds were the fuel components benzene, toluene, ethylbenzene, and xylene (BTEX); tetrachloroethene (PCE); trichloroethene (TCE); *trans*-1,2-dichloroethene (*trans*-1,2-DCE); *cis*-1,2-dichloroethene (*cis*-1,2-DCE); and vinyl chloride.

Calibration standards used to calibrate the PID and the HECD were prepared in a two-step procedure for all compounds except vinyl chloride. First, a primary gaseous standard was prepared by injecting a mixed neat liquid standard, obtained from Chem Services, into a pre-cleaned 1-liter glass dilution bottle. The primary standard was allowed to equilibrate in a 40^0C oven for a period of at least 1 hour. In the second step, two working standards were prepared by injecting a fixed volume of the primary gaseous standard into two 1-liter glass dilution bottles to which vinyl chloride had been added. Vinyl chloride was added to the clean, 1-liter glass dilution bottles from a certified gaseous vinyl chloride standard, obtained from Scott Specialty Gases, using a gas-tight syringe. The working standards were allowed to equilibrate in a 40^0C oven for a period of not less than 5 minutes.

The calculation of the primary standard concentration in a 1-liter glass dilution bottle and the calculation specifically for 1,2-Dichloroethene (1,2-DCE) in a 1-liter glass dilution bottle were performed as follows:

Equation 1:
Step 1 – Preparation of Primary Gaseous Standard

$$(V\ \mu L)(D\ mg/\mu L)(1000\mu g\ /1mg)\ /\ V_T = C\ \mu g/L$$

V = Volume of mixed standard injected in micro liters (µL)

D = Density of compound in grams per cubic centimeter (mg/µL)

V_T = Total Volume Injected (L)

C = Concentration of compound in micrograms per liter (μg/L)

Example – 1,2-DCE

$$(80\ \mu L)(1.2565\ mg/\mu L)(1000 \mu g/1 mg) / (0.000857 L) = 117{,}293{,}000 \mu g/L$$

Step 2 – Preparation of Working Standard #1

$$(C\ \mu g/L)(Vs\ \mu L)(1L/10^6\ \mu L) = C_w\ \mu g/L$$

C = Concentration of compound in primary standard (μg/L)

Vs = Volume of primary standard injected (μL)

C_W = Concentration of working standard (μg/L)

Example – 1,2-DCE

$$(117{,}293{,}000 \mu g/L)(8.6\ \mu L)(1L/10^6\ \mu L) = 1000\ \mu g/L$$

2.3.2 Preparation of Calibration Standard

A fixed volume of one standard was then injected into the GC for each calibration point. The concentrations of all standards were in micrograms per liter. The concentrations of the calibration standards were within the linear range of the detector. The standards were analyzed immediately upon removal from the oven. An example of the calculation of the concentration of TCE in the mid-point calibration standard is as follows:

Equation 2:

$$(C\ \mu g/L)(Vs\ \mu L)(1/L)(1L/\ 10^6\ \mu L) = \mu g/L$$

C = Concentration of compound in working standard (μg/L)

Vs = Volume of working standard injected into GC (μL)

Example - TCE

$$(20\ \mu g/L)\ (1000\ \mu L)\ (1/L)\ \ (1L/\ 10^6\ \mu L) = 20\ \mu g/L$$

Concentrations of the calibration points ranged from 0.51μg/L to 51.0μg/L for vinyl chloride and from 0.2μg/L to 20.0μg/L for all other compounds.

2.3.3 Conversion of Data from μg/L to Parts Per Billion by Volume (ppbv)

All data obtained during this soil gas survey were reported in micrograms per liter. Data reported in μg/L can be converted to ppbv by the following formula:

Equation 3:

μg/L = (C/24,450) x (MW) and

C = (μg/L x 24,450)/MW

where: C = concentration in ppbv

MW = molecular weight of the compound (g/mole)

24,450 = Conversion factor for standard temperature and pressure

The ppbv number calculated above represents the compound concentration on a volume basis at standard temperature and pressure.

2.3.4 Target Compound Calibration, Identification and Quantification

A calibration verification standard was run at the beginning of each day to determine the retention time for each of the target compounds and to confirm that the system was operating within limits. A calibration verification standard was also analyzed at the end of the analytical batch, or after every 20 samples, whichever was more frequent. The calibration verification standards were injected directly into the gas chromatograph in the same manner as the soil gas samples.

Soil gas samples were analyzed after the GC had been calibrated, the calibration verification sample run, and an ambient air (blank) sample had been analyzed. The quantity of a target compound in each soil gas sample was determined by dividing the area of the peak registered on the chromatogram by the injection volume and inserting the calculated value into the linear equation generated by the calibration curve. All compounds were quantified and identified using the PID. The presence of the halogenated compounds (all compounds except BTEX) was confirmed using the HECD. If the PID did not detect a halogenated compound or if the compound was not confirmed by (i.e., detected by) the HECD, the result was reported as non-detectable.

Identification of the target compounds in soil gas samples was based on a single column analysis and determined by a peak on the chromatogram being within the retention time window established for a particular compound. If the concentration of target compounds in a soil gas sample was above the linear initial calibration (ICAL) range, the injection volume was decreased or the sample diluted to bring the sample concentration within the linear response range of the detector.

2.3.5 Method Detection Limits

Method detection limits (MDLs) for target compounds in soil gas samples can vary depending on the volume injected and chromatographic interferences from adjacent peaks. MDLs are defined as the minimum discernible peak divided by the typical injection volume and the response factor for the particular compound of interest.

Typically, a 10mL volume of each soil gas sample was injected into the GC giving MDLs that ranged from 0.02µg/L for benzene to 0.9 µg/L for vinyl chloride.

2.4 QUALITY CONTROL PROCEDURES

A number of QC procedures were followed to insure that acceptable and usable data were obtained during sample collection and analysis, as detailed in **Attachment 1 of the Soil Gas Survey Sampling and Analysis Plan Addenda** located in **Volume 1-4, Sampling and Analysis Plan, DO5084 Addendum.**

Decontamination Procedures

Probes were decontaminated with an Alconox and tap water wash, rinsed with clean water, and air dried before use at each sample point. Syringes used to analyze samples were cleaned prior to each use by flushing the syringe with zero (clean) air a minimum of three times.

Soil Gas Analytical Quality Control Procedures

All analytical QC procedures were specified in the laboratory SOP included as an attachment to the SAP addenda for the soil gas survey. The QC requirements for the soil gas survey analytical results were reviewed and considered acceptable within the context for which the data are to be used.

The QC analyses included analyzing calibration verification samples, analytical duplicates, and blank samples. Calibration verification samples were analyzed at the beginning of every batch, after 20 samples, or at the end of every daily batch. Analytical duplicates were performed at a frequency of one pair per analytical batch. Analytical duplicates were performed by selecting one sample per batch and analyzing that sample in duplicate. Blank samples (i.e., analysis of clean air) were run at the rate of one per analytical batch. Blank samples were analyzed prior to the analysis of any sample to show the entire chromatographic system was free of contamination.

Accuracy and precision were demonstrated by the internal consistency of the analytical system. Internal consistency is demonstrated in two ways: (1) the consistent response of the PID over the course of the day as shown by the results of the calibration verification samples (accuracy); and (2) consistent duplicate analyses of a soil gas sample as demonstrated by the results for duplicate analyses of the same sample having a relative percent difference (precision) of less than 30 percent.

2.4.1 Determination of Linear Response Range

Five-point curves were constructed to demonstrate the linear response range of the PID and electron capture detector HECD. A measure of the linear response of the detector is the correlation coefficient. The closer the correlation coefficient is to 1 the more linear the detector response. The PID was used as the primary detector for all compounds. The calibration curves for all compounds were required to have a correlation coefficient (r^2) of 0.995 or greater for the PID.

Single point calibration verification was performed on a daily basis during the course of the soil gas survey. These verifications were performed at a concentration equal to the mid-point of the calibration curve.

2.4.2 Results of Duplicate Sample Analyses

Duplicate sample results with a relative percent difference of 30 percent or less are considered within the normal range of analytical precision. The relative percent difference (RPD) was calculated using the following equation:

Equation 4:

$$RPD = \frac{|R_s - R_D|}{\left(\frac{R_s + R_D}{2}\right)} \times 100$$

Where:

R_S = Sample result

R_D = Duplicate result

Results from all laboratory duplicate samples were within the QC Criteria of 30 percent and met the necessary analytical precision requirement. Laboratory duplicates were analyzed to meet DHL's internal QC requirements. Laboratory duplicate data are not included in this technical report.

2.5 RESULTS OF AIR SAMPLE BLANK ANALYSES

Each day, immediately following the analysis of the initial calibration verification standard, a method blank was analyzed. The method blank consisted of zero air (clean air) injected using the same procedure as the samples. The method blank was analyzed to identify any contamination present in the laboratory, chromatographic system, or glassware used. All method blanks analyzed for this project were free of target analytes at the MDL.

SECTION 3
SOIL GAS SURVEY RESULTS

The distribution and concentrations for the compounds detected are addressed below in the sections for each AOC. Minor amounts of benzene, toluene, and xylene were detected in soil gas samples throughout the soil gas survey. The detection of these compounds is attributed to artifact contamination from the gas generator used to power the vacuum pump and/or the combustion engine of the geoprobe truck. The frequency of detectable BTEX compounds decreased substantially after the gas generator was moved to the front of the geoprobe rig, and the rig was shut down during sample collection. The BTEX concentrations detected during the soil gas survey are presented in the data tables associated with each AOC, but are not discussed in the soil gas findings. The complete laboratory reports, from the soil gas survey for all sites are presented in Appendix A with the data quality evaluation summary report. Plume maps for each AOC surveyed are presented with the respective data table and discussion for each area surveyed.

3.1 SOIL GAS SURVEY RESULTS FOR AOC 57

AOC 57 North

A total of 38 samples and two resamples were collected at AOC 57 North. The sampling locations are shown on **Figure 2.1**. Sampling depths varied from 0.5 to 4.5 feet and depended on refusal. The field team did not observe disturbed soil that would be associated with a landfill environment or concrete footings that would suggest the presence of old buildings. Laboratory-detected constituents are provided in Table 3.1. Plume maps for this AOC are not included because target VOC compounds were not detected.

AOC 57 Central

A total of 67 samples were collected in the AOC 57 Central area. The sampling locations are shown on **Figure 2.1**. Sampling depths ranged from 0.5 to 4.5 feet and depended on refusal. The field team did not observe disturbed soil that would be associated with a landfill environment or concrete footings that would suggest the presence of old buildings. PCE was the only contaminant detected in this portion of the grid, and was reported at a low level in sample location AOC57C-65. This point is located directly east of Building 90 just across the road and is presented on the contour maps associated with the discussion of the AOC 65 results (Section 3.3). Detected constituents are provided in Table 3.2.

AOC 57 South

Twenty-two samples were collected at AOC 57 South. The sampling locations are shown on **Figure 2.1**. Sampling depths ranged from 0.5 to 5 feet and depended on refusal. The field team did not observe disturbed soil that would be associated with a landfill environment. However, building pads associated with temporary structures were visible in the vicinity west of Building 92. Detected constituents are provided in Table 3.3. No figure is included in this section depicting the plume maps because target VOC compounds were not detected at this AOC.

3.2 SOIL GAS SURVEY RESULTS FOR (AOC 65) AREAS AROUND BUILDING 90

A total of 203 samples were collected around the exterior of Building 90. Sampling depths ranged from 0.5 to 4.5 feet with depth determined by refusal. Compounds detected outside Building 90 included *trans*-1,2-DCE, *cis*-1,2-DCE, TCE, and PCE. **Figure 3.1** presents the concentration contour map for TCE detected, and **Figure 3.2** presents the concentration contour map for PCE detected during the soil gas survey. No figure was prepared for *cis*- and *trans*-1,2-DCE, which were only detected in samples collected from grid location BLDG90-15 and BLDG90-16. *Trans*-1,2-DCE was detected in samples 15 and 16 with concentration of 0.77 and 0.05 μg/L respectively. *Cis*-1,2-DCE was detected in samples 15 and 16 also, with concentration of 0.88 μg/L and 0.08 μg/L, respectively. Both TCE and PCE were detected in the samples collected from both these grid locations. Detected constituents are provided in Table 3.4. The PCE detected in sample AOC57C-65 collected from AOC 57 is also presented in **Figure 3.2.**

TCE was detected in five samples (BLDG90-8, BLDG90-15, BLDG90-16, BLDG90-17, and BLDG90-37) located along the outer western wall of Building 90, as shown on **Figure 3.1**. TCE concentrations ranged from 0.04 to 8.56 μg/L, with the highest concentrations detected from sample BLDG90-15. PCE was detected in 67 samples at concentrations ranging from 0.08 to 1590.00 μg/L. The highest detected concentration (1590.00 μg/L) was detected at sample location BLDG90-15. The highest readings measured outside Building 90 correlate with the highest PCE levels measured inside the building in the vicinity of the former southern solvent vat (shown on **Figure 3.2**). The plume map on **Figure 3.2** also demonstrates the extent of the PCE plume migration to the southeast from Building 90. Sample BLDG90-8 was the only other grid location where PCE levels exceeded 5 μg/L. Sample BLDG90-8 is located along the outer western wall in the northern portion of Building 90. The identification of the PCE plume extending to the northeast and southeast of Building 90 plus the detection at sample BLDG90-8, suggests that PCE is present in the air-filled porosity of the fill material underlying the entire building, and that PCE has likely spread from the building into underlying soil, rock, and groundwater.

3.3 SOIL GAS SURVEY RESULTS FOR BUILDING 90 SOUTH

A total of 77 samples were collected south of Building 90 at locations presented on **Figure 2.3**. Sampling depths ranged from 1 to 4 feet, with depth determined by refusal. No target VOC compounds were detected in this portion of the site. Detected constituents are provided in Table 3.5. A contaminant plume figure is not included in this section because target compounds were not detected in this portion of the AOC 65 grid.

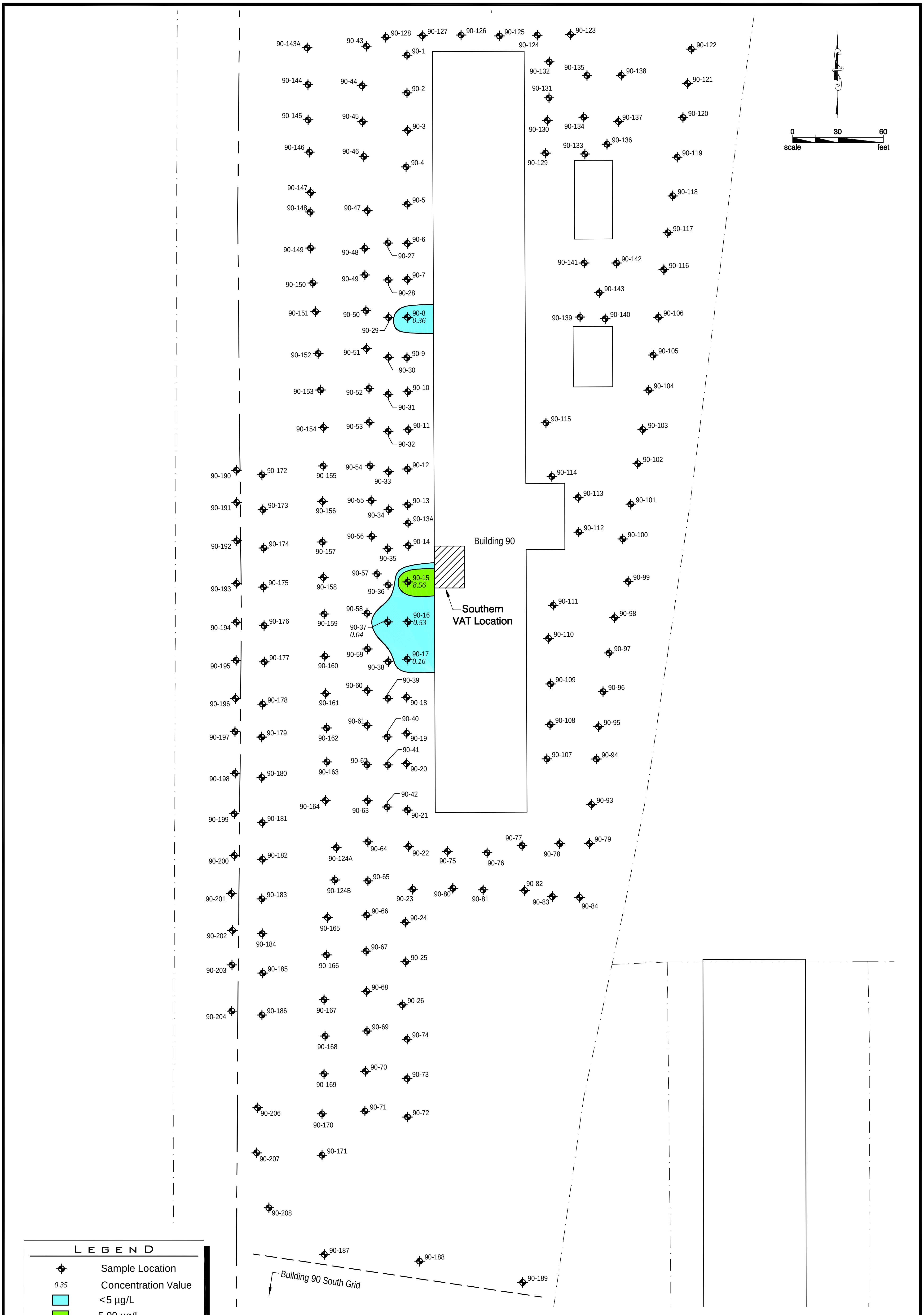

Figure 3.1

AOC-65 Outside Building 90, Soil Gas Survey
TCE Concentration Contour Map

Camp Stanley Storage Activity

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738290 CSSA-B90-TCE.DWG

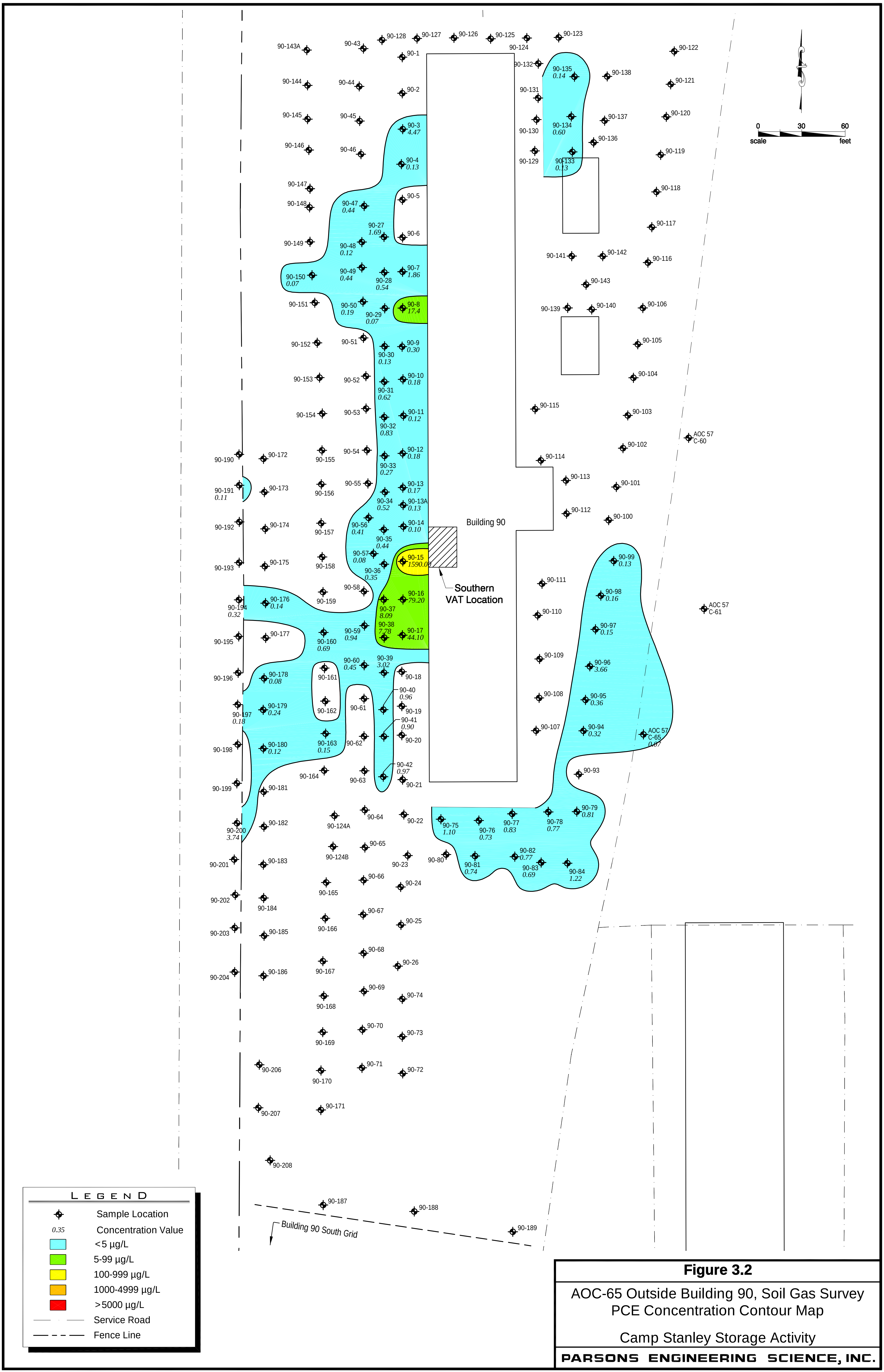


Figure 3.2

AOC-65 Outside Building 90, Soil Gas Survey
PCE Concentration Contour Map

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

738290 CSSA–B90–PCE.DWG

3.4 SOIL GAS SURVEY RESULTS FOR AOC 65 (INSIDE BUILDING 90)

A total of 40 samples were collected inside Building 90. Soil gas samples were collected at depths of 1.0 to 2.5 feet with the depth of sampling determined by refusal. TCE and PCE were both detected inside the building. Detected constituents for samples collected inside Building 90 are presented in Table 3.6. The sampling grid concentrated around the former metal solvent vault, the metal tank areas, and associated drainage lines. TCE was detected in samples AOC65-6, AOC65-7, AOC65-8, AOC65-9, and AOC65-10 at concentrations ranging from 0.14 to 0.44 µg/L, as shown on **Figure 3.3**. Of interest was the absence of TCE from samples AOC65-26 and AOC65-27, which are located in the immediate vicinity of the former southern solvent vat. AOC 65-26 has an elevated detection limit for TCE of 200 µg/L due to interference caused by the high levels of PCE encountered in the same sample.

Confirming the conclusion that PCE is present in soil gas underlying the entire building, PCE was detected in every sample at concentrations ranging from 1.77-24,820 µg/L with maximum results concentrated around sample locations AOC65-8, AOC65-11, and AOC65-27, which were located in the vicinity of the former metal solvent tank located in the southern portion of the building. The PCE concentration contour inside Building 90 is presented on **Figure 3.4.** Detected constituents are provided in Table 3.6. The PCE plume highest levels inside matches the locations of the plume area identified outside Building 90, particularly in the outside grid points (90-15, 90-16, and 90-17) closest to the building near the southern solvent vat location. PCE results measured near the inactive northern solvent vat location suggest the potential for releases from this area were unlikely and that the fill material underlying this portion of the building contains similar levels of PCE as other non-impacted areas of the building.

3.5 SOIL GAS SURVEY RESULTS FOR WASTE WATER TREATMENT PLANT

A total of 42 samples were collected at the WWTP at locations presented on **Figure 2.5.** Sampling depths ranged from 1 to 4 feet, with depth determined by refusal. Detected constituents at the WWTP survey area included benzene, toluene, ethylbenzene, and xylenes (BTEX). A summary of these BTEX detections is included in Table 3.7. No figure is included in this report depicting a contaminant plume in this grid layout because target VOC compounds were not detected from any of the sampled grid points.

3.6 SOIL GAS SURVEY RESULTS FOR SWMU B-3

A total of 29 soil gas samples were collected at SWMU B-3. Vinyl chloride, trans-1,2-DCE, cis-1,2-DCE, TCE, and PCE, were detected in soil gas samples collected from SWMU B-3 during this soil gas survey. Soil gas sampling depths varied from 2 feet to 12 feet and sampling depths were generally determined by refusal. A previous soil gas survey was performed at SWMU B-3 in 1995. This survey covered the current survey area and the area to the east. Results from this report are located in the Environmental Encyclopedia

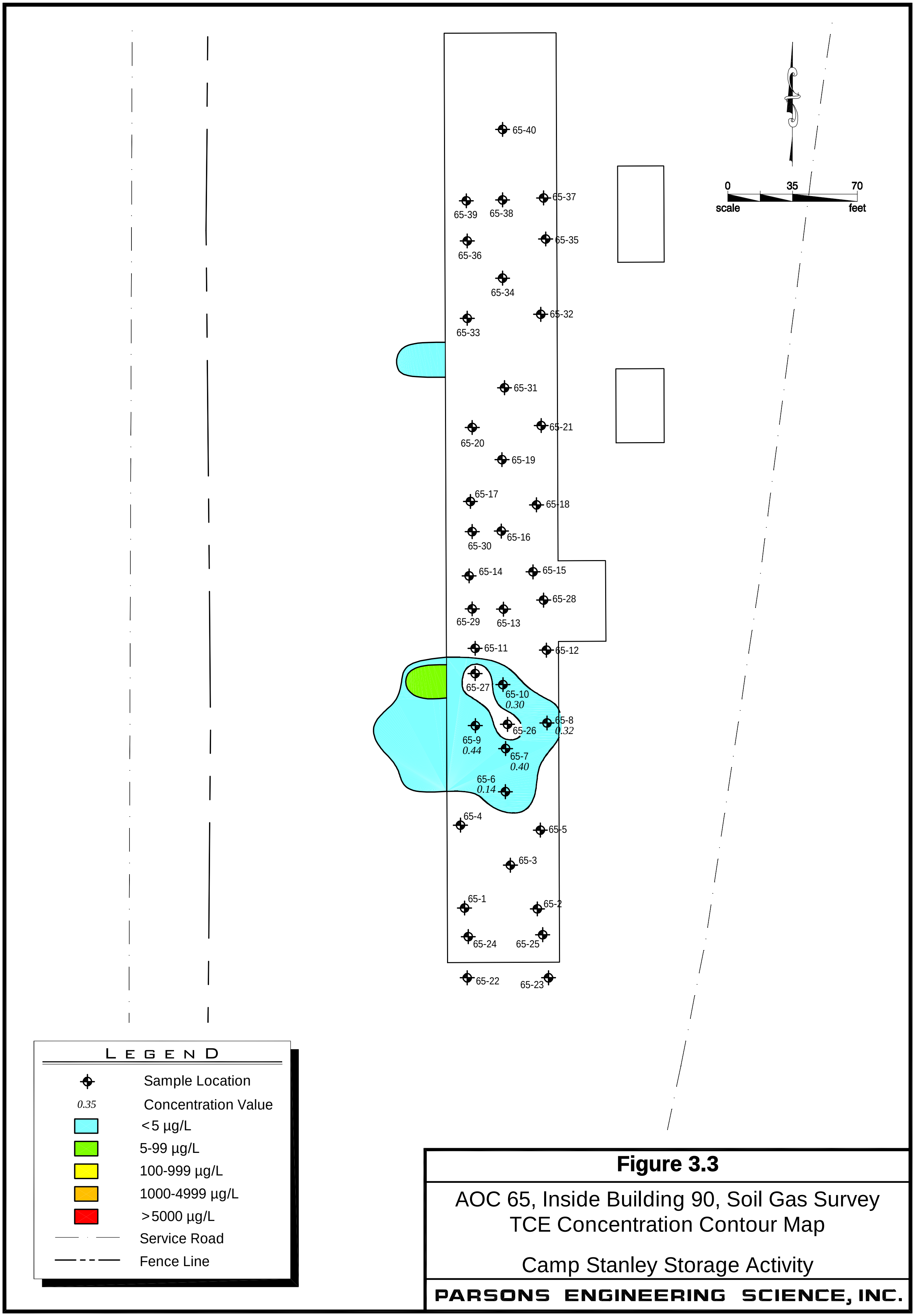


Figure 3.3

AOC 65, Inside Building 90, Soil Gas Survey
TCE Concentration Contour Map

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

Figure 3.4

AOC 65, Inside Building 90, Soil Gas Survey
PCE Concentration Contour Map

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

(Volume 3-1, SWMUs, Soil Gas Surveys, Technical Memorandum on Soil Gas Surveys, June 1996). SWMU B-3 has an 18-well SVE system that has been in operation since 1997. The purpose of additional soil gas surveying at this site was to determine if VOCs are contaminants of concern that must be addressed within the landfill trench adjacent to, but across the road from, the western (main) trench that currently contains the operating SVE system. No vapor extraction wells were placed in the eastern trench, and little intrusive investigations have been conducted to determine the lateral extent of thickness of this second trench. A secondary objective was to compare the results from this soil gas survey to the results of sampling used for the treatability study and the results from operations and maintenance of the SVE system.

The soil gas samples collected reveal that TCE and PCE contamination is still persisting in the SWMU B-3 main trench despite over four years of mostly continuous operation. Detected constituents for samples collected from SWMU B-3 are presented in Table 3.8. Concentration contour maps for TCE and PCE are presented in **Figure 3.5** and **Figure 3.6**, respectively. Although the levels appear to have decreased from past soil gas and SVE testing results, the lower levels from this soil gas survey could be caused by different sampling intervals, particularly comparing the lengths or surface areas of the screened intervals of the VEWs to those of the soil gas survey probes. Another factor that could be responsible for lower contaminant levels reported in the current soil gas survey is the high soil moisture conditions in the subsurface soils. Higher moisture caused by a wetter than average winter suppresses volatilization from the subsurface soil, especially if the water table within the trench rises above the depth intervals containing the most contamination. The soil gas data does suggest that the contamination within the western (main) trench at SWMU B-3 extends further south than the existing treatment system's southern-most VEWs.

Data from the eastern trench at SWMU B-3 on the east side of the road also demonstrated elevated levels of TCE and PCE greater than the levels encountered in the western (main) trench. Refusal was encountered at much shallower depths in the eastern trench, generally at depths of two feet bgs, but as deep as 11 feet bgs. The limestone immediately underlying the SWMU B-3 area appears to dip to the west, so that the eastern trench is more readily drained than the down-dip western trench. The higher levels encountered could be associated with better drained soils. The data provide definite indicators that additional areas of VOC contamination exists within this second trench. It also strongly suggests that PCE is the primary contaminant of concern associated with the eastern trench, and confirmed that TCE is the primary VOC associated with the western (main) trench. PCE concentrations detected during the current soil gas survey indicate significantly higher levels of PCE in the eastern trench than were measured in November 1995.

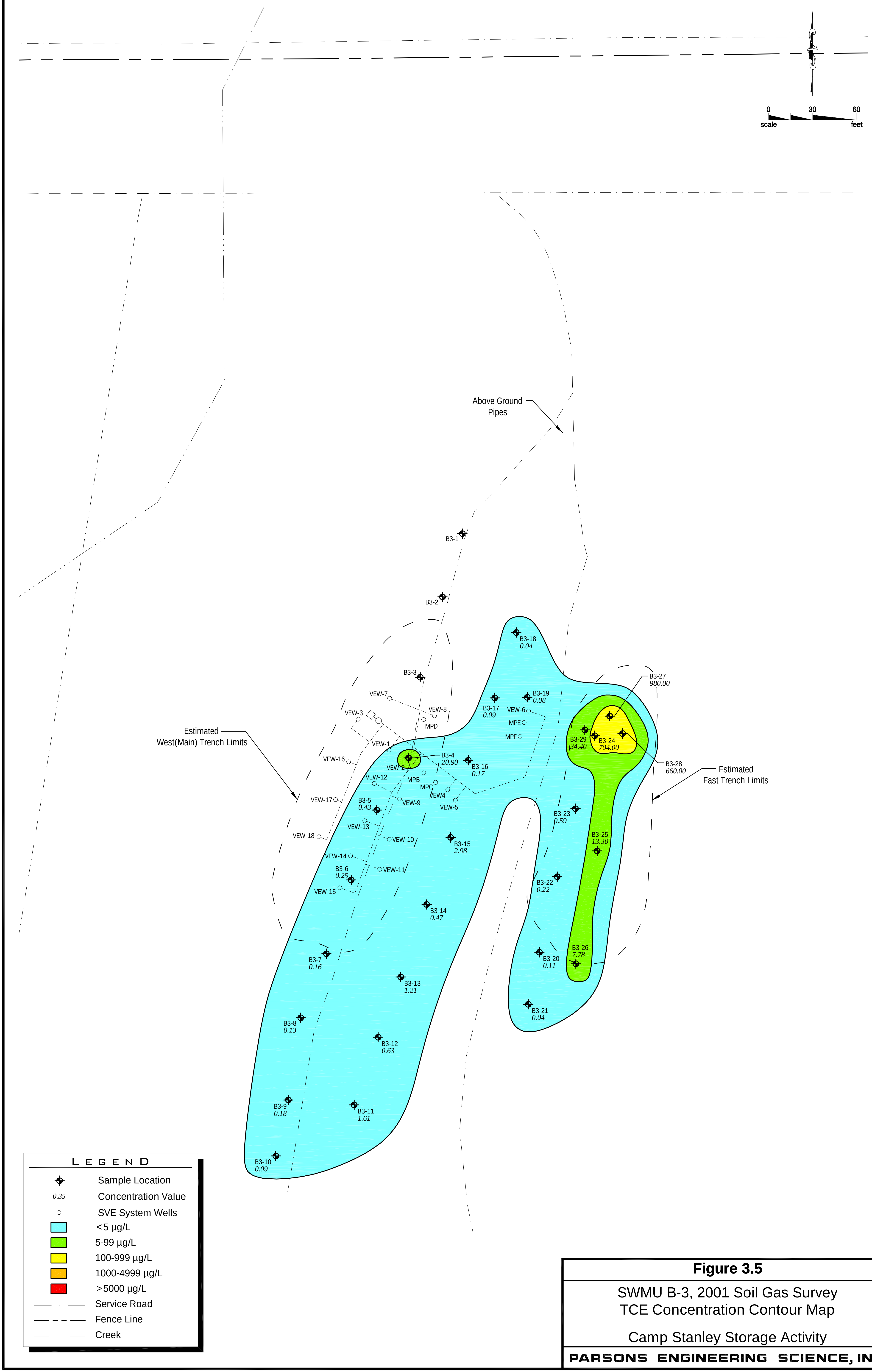


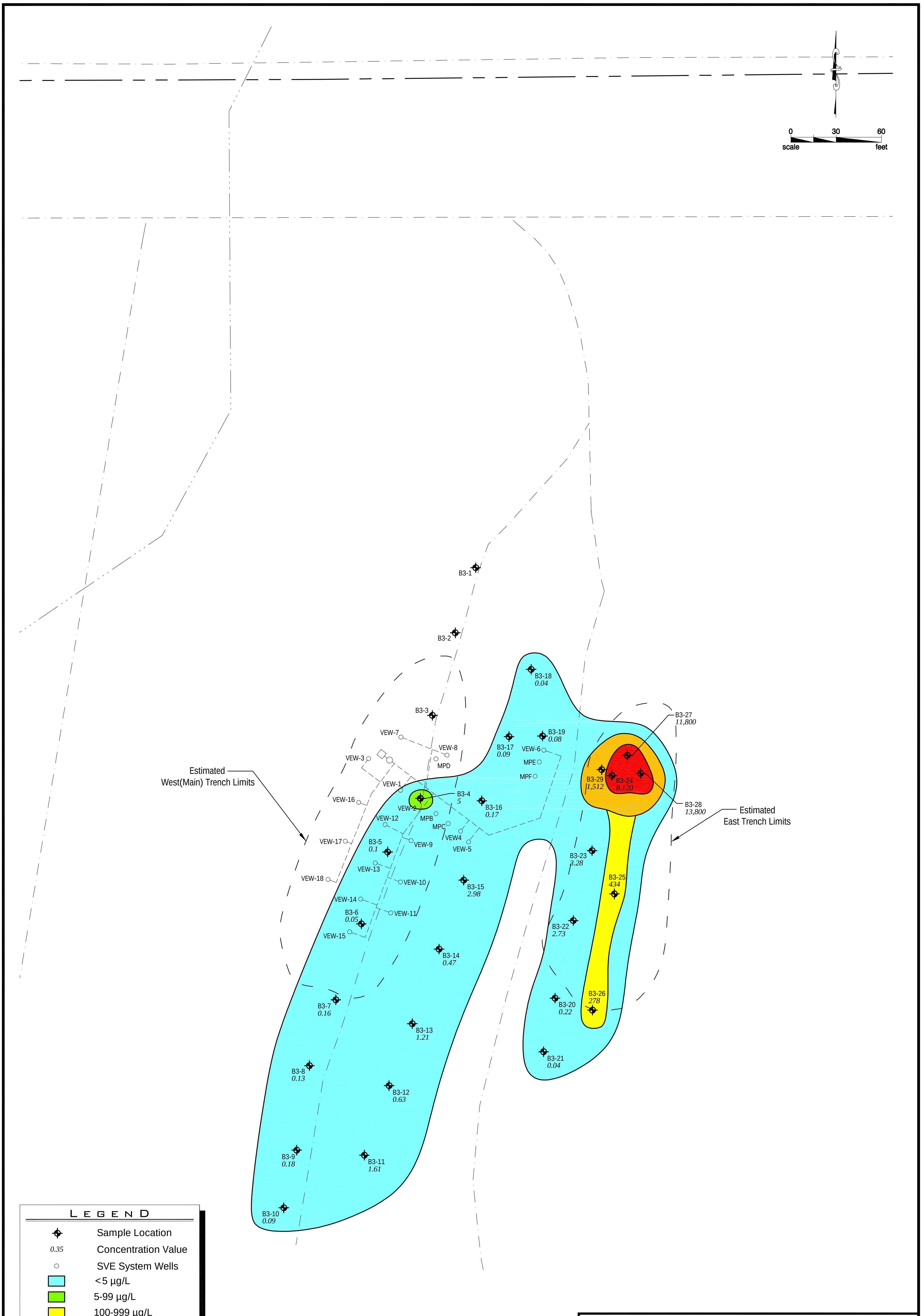
Figure 3.5

SWMU B-3, 2001 Soil Gas Survey
TCE Concentration Contour Map

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

738290 CSSA–B3–TCE.DWG



LEGEND

✜ Sample Location
0.35 Concentration Value
○ SVE System Wells
🟦 <5 µg/L
🟩 5-99 µg/L
🟨 100-999 µg/L
🟧 1000-4999 µg/L
🟥 >5000 µg/L
Service Road
Fence Line
Creek

Figure 3.6

SWMU B-3, 2001 Soil Gas Survey
PCE Concentration Contour Map

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

738290 CSSA–B3–PCE.DWG

3.7 SOIL GAS SURVEY RESULTS FOR SWMU B-4

A total of 20 soil gas samples were collected at SWMU B-4 at locations presented on **Figure 2.7**. Benzene was detected at sampling point B4-1 at a concentration of 0.02 μg/L. Detected constituents are provided in Table 3.9. No figure is included in this report depicting a contaminant plume in this grid layout because the target compound benzene that was detected at a concentration of 0.02 μg/L is attributed to the geoprobe rig and gas generated exhaust. No other target VOC compounds were detected. Soil gas sampling depths varied from 2 feet to 10 feet, and were usually determined by refusal. Within SWMU B-4 there appears to be three landfill cells associated with past waste disposal activities. Historical data suggest that this area was used to dispose of small caliber ordnance.

3.8 SOIL GAS SURVEY RESULTS FOR AOC 55

A total of 54 soil gas samples were collected at AOC 55 at locations presented on **Figure 2.8**. PCE was detected in three sample locations (AOC55-17, AOC55-18, and AOC55-27) at concentrations ranging from 0.08-0.11μg/L. The highest detectable level was measured in sample AOC55-27. Upon review of the data, it was discovered that high levels of PCE were detected in the samples collected from SWMU B-3 analyzed immediately prior to testing these three samples, so that PCE detected at AOC 55 may have resulted from cross-contamination within the dessicator, the vacuum pump, rods, or from the laboratory. Based on the results from the remaining sample locations at AOC 55 and the samples preceding these three grid points, the possibility that cross-contamination is the source of the detectable PCE is likely. Because this review occurred after completing the field work, there was not an opportunity to re-sample the locations to verify that PCE does not actually exists in the AOC 55 soil gas.

Detected constituents are provided in Table 3.10. No figure is included in this report depicting a contaminant plume in this grid layout because target VOC compounds detected resulted from cross contamination as discussed above. Low levels of benzene in four samples and toluene in one sample are attributed to the geoprobe rig and/or gas generator exhaust. Target VOC compounds detected at this site are not a result of the contaminant plume. Sampling depths varied from 1 foot to 8 feet below grade and were usually determined by refusal. AOC 55 appears to be a landfill. The field team observed numerous horseshoes and assorted metal debris.

3.9 SOIL GAS SURVEY RESULTS FOR AOC 63

Two soil gas samples were collected at AOC 63 at locations presented on **Figure 2.9**. This site was chosen as an area of concern because of the presence of three 55-gallon drums partially buried in the ground. Two samples were taken between these drums at a sampling depth of four feet. Laboratory results are provided in Attachment A. No figure is included in this report depicting a contaminant plume in this grid layout because no target VOC compounds were detected from the sampled grid points. The data suggest that these drums are not a source of VOC contamination.

Table 3.1 AOC 57 North Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
AOC57-1	01/03/01	~ **0.09**	< 0.03	< 0.04	< 0.06	< 0.07	= 0.55	< 0.03	< 0.09	~ **0.09**	< 0.06
AOC57-1R	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-2	01/03/01	~ **0.17**	< 0.03	< 0.04	< 0.06	< 0.07	= 1.31	< 0.03	< 0.09	~ **0.17**	~ **0.07**
AOC57-2R	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-3	01/03/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	~ **0.11**	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-4	01/03/01	~ **0.02**	< 0.03	< 0.04	< 0.06	< 0.07	~ **0.18**	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-5	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-6	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.11	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-7	01/04/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	= 0.09	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-8	01/03/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	~ **0.12**	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-9	01/04/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.22	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-10	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-11	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-12	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-13	01/04/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	= 0.51	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-14	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-15	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.19	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-16	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.09	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-17	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.09	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-18	01/04/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.1	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-19	01/04/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	= 0.1	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-20	01/04/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.05	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-21	01/05/01	= 0.05	< 0.03	< 0.04	< 0.06	< 0.07	= 0.11	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-22	01/05/01	= 0.11	< 0.03	< 0.04	< 0.06	< 0.07	= 0.22	< 0.03	< 0.09	~ **0.08**	< 0.06
AOC57-23	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-25	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.08	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-26	01/05/01	= 0.11	< 0.03	< 0.04	< 0.06	< 0.07	= 0.28	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-27	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-30	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-31	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.08	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-32	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.05	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-34	01/05/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.12	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-35	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-36	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-38	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-39	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-40	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.1	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-42	01/05/01	= 0.06	< 0.03	< 0.04	< 0.06	< 0.07	= 0.17	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-43	01/05/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57-44	01/05/01	= 0.05	< 0.03	< 0.04	< 0.06	< 0.07	= 0.2	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in UG/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.2 AOC 57 Central Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans 1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o-
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
AOC57C-2	01/06/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.08	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-3	01/07/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.05	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-4	01/08/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-6	01/06/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-7	01/07/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-8	01/08/01	= 0.26	< 0.03	< 0.04	< 0.06	< 0.07	= 0.48	< 0.03	< 0.09	= 0.08	< 0.06
AOC57C-8R	01/08/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.05	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-11	01/07/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-12	01/08/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-15	01/07/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.09	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-20	01/08/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-23	01/07/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-27	01/07/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-29	01/09/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-33	01/09/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-35	01/07/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	= 0.08	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-42	01/06/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.05	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-44	01/08/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-46	01/09/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-47	01/06/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-55	01/09/01	= 0.05	< 0.03	< 0.04	< 0.06	< 0.07	= 0.07	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-60	01/09/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-65	01/17/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC57C-66	01/17/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.3 AOC 57 South Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis 1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
AOC57S-9	01/18/01	= 0.13	< 0.03	< 0.04	< 0.06	< 0.07	= 0.2	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.4 Detected Constituents in Areas Around Building 90

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
BLDG90-1	01/24/01	= 0.06	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-2	01/24/01	= 0.05	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-3	01/24/01	= 0.03	< 0.03	< 0.04	< 0.06	= 4.47	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-4	01/24/01	= 0.04	< 0.03	< 0.04	< 0.06	= 0.13	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-5	01/24/01	= 0.07	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-6	01/24/01	= 0.04	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-7	01/24/01	= 0.06	< 0.03	< 0.04	< 0.06	= 1.86	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-8	01/24/01	= 0.03	< 0.03	< 0.04	< 0.06	= 17.4	< 0.04	= 0.36	< 0.09	< 0.06	< 0.06
BLDG90-9	01/24/01	= 0.06	< 0.03	< 0.04	< 0.06	= 0.3	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-10	01/24/01	= 0.04	< 0.03	< 0.04	< 0.06	= 0.18	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-11	01/24/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.12	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-12	01/24/01	= 0.08	< 0.03	< 0.04	< 0.06	= 0.18	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-13	01/24/01	= 0.09	< 0.03	< 0.04	< 0.06	= 0.17	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-13A	01/24/01	= 0.06	< 0.03	< 0.04	< 0.06	= 0.13	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-14	01/24/01	= 0.07	< 0.03	< 0.04	< 0.06	= 0.1	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-15	01/24/01	= 0.03	= 0.88	= 0.77	< 0.06	= 1590	< 0.04	= 8.56	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(100)	(1)	(1)	(1)	(1)	(1)
BLDG90-16	01/24/01	= 0.05	= 0.08	= 0.05	< 0.06	= 79.2	< 0.04	= 0.53	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(20)	(1)	(1)	(1)	(1)	(1)

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.4 Detected Constituents in Areas Around Building 90 *(continued)*

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
BLDG90-17	01/24/01	= 0.07	< 0.03	< 0.04	< 0.06	= 44.1	< 0.04	= 0.16	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(10)	(1)	(1)	(1)	(1)	(1)
BLDG90-18	01/24/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-19	01/24/01	= 0.06	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-20	01/24/01	= 0.07	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-21	01/24/01	= 0.04	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-22	01/24/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-23	01/24/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-24	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-25	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-27	01/25/01	= 0.06	< 0.03	< 0.04	< 0.06	= 1.69	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-28	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.54	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-29	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.6	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-30	01/25/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.13	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-31	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.62	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-32	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.83	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-33	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.27	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-34	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.52	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-35	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.44	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-36	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.35	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-37	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 8.09	< 0.04	= 0.04	< 0.09	< 0.06	< 0.06
BLDG90-38	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 7.78	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-39	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 3.02	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-40	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.96	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX hits are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with hits are highlighted.

All samples with a J flag are in bold.

All samples are reported in UG/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.4 Detected Constituents in Areas Around Building 90 *(continued)*

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
BLDG90-41	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.9	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-42	01/25/01	= 0.05	< 0.03	< 0.04	< 0.06	= 0.97	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-43	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-44	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-45	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-46	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-47	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.44	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-48	01/22/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.12	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-49	01/22/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.44	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-50	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.19	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-51	01/22/01	= 0.11	< 0.03	< 0.04	< 0.06	< 0.07	= 0.14	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-52	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-53	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-54	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-55	01/22/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-56	01/22/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.41	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-57	01/22/01	= 0.04	< 0.03	< 0.04	< 0.06	= 0.08	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-58	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-59	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.94	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-60	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.45	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-61	01/23/01	= 0.04	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-62	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-63	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-64	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-65	01/23/01	= 0.04	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-66	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-67	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-68	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-69	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-70	01/23/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.4 Detected Constituents in Areas Around Building 90 *(continued)*

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
BLDG90-71	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-72	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-73	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-74	01/23/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-75	01/25/01	= 0.04	< 0.03	< 0.04	< 0.06	= 1.1	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-76	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.73	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-77	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.83	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-78	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.77	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-79	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.81	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-81	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.74	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-82	01/25/01	= 0.03	< 0.03	< 0.04	< 0.06	= 0.77	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-83	01/25/01	= 0.02	< 0.03	< 0.04	< 0.06	= 0.69	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-84	01/25/01	= 0.04	< 0.03	< 0.04	< 0.06	= 1.22	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-94	01/26/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.32	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-95	01/26/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.36	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-96	01/26/01	< 0.02	< 0.03	< 0.04	< 0.06	= 3.66	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-97	01/26/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.15	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-98	01/26/01	= 0.04	< 0.03	< 0.04	< 0.06	= 0.16	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-99	01/26/01	= 0.04	< 0.03	< 0.04	< 0.06	= 0.13	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-102	01/26/01	= 0.04	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-104	01/26/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-117	01/29/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.08	< 0.03	< 0.09	= 0.16	= 0.07
BLDG90-125	01/29/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-126	01/29/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-133	01/30/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.13	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-134	01/30/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.6	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-135	01/30/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.14	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-150	01/31/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-159	01/31/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-160	01/31/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.69	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-163	01/31/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.15	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-167	02/01/01	< 0.02	< 0.03	< 0.04	= 0.13	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-168	02/01/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	= 0.09
BLDG90-176	02/01/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.14	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-178	02/01/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.08	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-179	02/01/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.24	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-180	02/01/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.12	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-191	02/08/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.11	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-194	02/08/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.32	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-197	02/08/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.18	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90-200	02/08/01	< 0.02	< 0.03	< 0.04	< 0.06	= 3.74	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.5 Building 90 South Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o-
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
BLDG90S-46	02/08/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	= 0.05	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90S-50	02/12/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90S-63	02/12/01	< 0.02	< 0.03	< 0.04	= 0.18	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
BLDG90S-74	02/13/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.6 AOC 65 (Inside Building) Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o-
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
AOC65-1	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 1.77	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
AOC65-2	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 1.05	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC65-3	02/06/01	= 0.02	< 0.03	< 0.04	< 0.06	= 1.59	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC65-4	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 21.5	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)
AOC65-5	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 2.41	= 0.06	< 0.03	< 0.09	< 0.06	< 0.06
AOC65-6	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 193	< 0.04	= 0.14	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(10)	(1)	(1)	(1)	(1)	(1)
AOC65-7	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 2150	< 0.04	= 0.4	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(200)	(1)	(1)	(1)	(1)	(1)
AOC65-8	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 3720	< 0.04	= 0.32	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(200)	(1)	(1)	(1)	(1)	(1)
AOC65-9	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 2580	< 0.04	= 0.44	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(500)	(1)	(1)	(1)	(1)	(1)
AOC65-10	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 630	= 0.04	= 0.3	< 0.09	< 0.06	< 0.06
		(1)	(1)	(1)	(1)	(200)	(1)	(1)	(1)	(1)	(1)
AOC65-11	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 8350	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(1000)	(200)	(200)	(200)	(200)	(200)
AOC65-12	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 2520	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-13	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 1640	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-14	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 1160	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-15	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 592	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-16	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 368	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-17	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 214	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-18	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 235	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)
AOC65-19	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 86.5	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)
AOC65-20	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 93.4	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
AOC65-21	02/06/01	< 0.02	< 0.03	< 0.04	< 0.06	= 84.8	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
AOC65-22	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 15.7	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
AOC65-23	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 13.8	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
AOC65-24	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 15.2	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
AOC65-25	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 12.5	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
AOC65-26	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 1120	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(2)	(2)	(2)	(2)	(1000)	(2)	(2)	(2)	(2)	(2)
AOC65-27	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 24800	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(2000)	(200)	(200)	(200)	(200)	(200)

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.6 AOC 65 (Inside Building) Detected Constituents *(Continued)*

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o-
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
AOC65-28	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 1070	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)
AOC65-29	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 1880	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-30	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 706	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-31	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 334	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
AOC65-32	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 421	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-33	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 325	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-34	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 272	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-35	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 173	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-36	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 426	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-37	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 179	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-38	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 150	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-39	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 167	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
AOC65-40	02/07/01	< 0.02	< 0.03	< 0.04	< 0.06	= 121	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.7 Waste Water Treatment Plant Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans 1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o-
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
WWTP-5	01/18/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
WWTP-7	01/18/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
WWTP-15	01/18/01	= 0.04	< 0.03	< 0.04	< 0.06	< 0.07	= 0.05	< 0.03	< 0.09	< 0.06	< 0.06
WWTP-26	02/02/01	< 0.02	< 0.03	< 0.04	= 0.14	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
WWTP-36	02/13/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	= 0.07
WWTP-43	02/13/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.8 B-3 Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o-
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
B3-4	02/14/01	< 0.02 (2)	= 21.1 (2)	< 0.04 (2)	< 0.06 (2)	= 5 (2)	< 0.04 (2)	= 20.9 (2)	< 0.09 (2)	< 0.06 (2)	< 0.06 (2)
B3-5	02/14/01	< 0.02	= 0.24	< 0.04	< 0.06	= 0.1	< 0.04	= 0.43	< 0.09	< 0.06	< 0.06
B3-6	02/14/01	< 0.02	= 0.18	< 0.04	< 0.06	= 0.08	< 0.04	= 0.25	< 0.09	< 0.06	< 0.06
B3-7	02/14/01	< 0.02	= 0.14	< 0.04	< 0.06	< 0.07	< 0.04	= 0.16	< 0.09	< 0.06	< 0.06
B3-8	02/14/01	< 0.02	= 0.1	< 0.04	< 0.06	< 0.07	< 0.04	= 0.13	< 0.09	< 0.06	< 0.06
B3-9	02/14/01	< 0.02	= 0.14	< 0.04	< 0.06	< 0.07	< 0.04	= 0.18	< 0.09	< 0.06	< 0.06
B3-10	02/14/01	< 0.02	= 0.07	< 0.04	< 0.06	< 0.07	< 0.04	= 0.09	< 0.09	< 0.06	< 0.06
B3-11	02/14/01	< 0.02	= 0.11	< 0.04	< 0.06	= 0.44	< 0.04	= 1.61	< 0.09	< 0.06	< 0.06
B3-12	02/14/01	< 0.02	= 0.13	< 0.04	< 0.06	= 0.15	< 0.04	= 0.63	< 0.09	< 0.06	< 0.06
B3-13	02/14/01	< 0.02	= 0.06	< 0.04	< 0.06	= 0.2	< 0.04	= 1.21	< 0.09	< 0.06	< 0.06
B3-14	02/14/01	< 0.02	= 0.05	< 0.04	< 0.06	< 0.07	< 0.04	= 0.47	< 0.09	< 0.06	< 0.06
B3-15	02/14/01	< 0.02	= 0.83	= 0.06	< 0.06	< 0.07	< 0.04	= 2.98	< 0.09	< 0.06	< 0.06
B3-16	02/14/01	< 0.02	= 0.05	< 0.04	< 0.06	< 0.07	< 0.04	= 0.17	< 0.09	< 0.06	< 0.06
B3-17	02/14/01	< 0.02	= 0.04	< 0.04	< 0.06	< 0.07	< 0.04	= 0.09	< 0.09	< 0.06	< 0.06
B3-18	02/14/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	= 0.04	< 0.09	< 0.06	< 0.06
B3-19	02/14/01	< 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	= 0.08	< 0.09	< 0.06	< 0.06
B3-20	02/14/01	< 0.02	= 0.07	< 0.04	< 0.06	= 0.22	< 0.04	= 0.11	= 0.45	< 0.06	< 0.06
B3-21	02/14/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.1	< 0.04	= 0.04	< 0.09	< 0.06	< 0.06
B3-22	02/14/01	< 0.02	< 0.03	< 0.04	< 0.06	= 2.73	< 0.04	= 0.22	< 0.09	< 0.06	< 0.06
B3-23	02/14/01	= 0.02	< 0.03	< 0.04	< 0.06	= 3.28	< 0.04	= 0.59	< 0.09	< 0.06	< 0.06
B3-24	02/14/01	= 0.51	= 256 (200)	= 2.8	< 0.06	= 8120 (2000)	= 0.05	= 704 (200)	= 0.38	< 0.06	< 0.06
B3-25	02/14/01	< 0.02	= 3.53	< 0.04	< 0.06	= 434 (200)	< 0.04	= 13.3	< 0.09	< 0.06	< 0.06
B3-26	02/14/01	< 0.02	= 1.82	< 0.04	< 0.06	= 278 (200)	< 0.04	= 7.78	< 0.09	< 0.06	< 0.06
B3-27	02/20/01	< 0.02 (2000)	< 0.03 (2000)	< 0.04 (2000)	< 0.06 (2000)	= 11800 (2000)	< 0.04 (2000)	= 980 (2000)	< 0.09 (2000)	< 0.06 (2000)	< 0.06 (2000)
B3-28	02/20/01	< 0.02 (2000)	< 0.03 (2000)	< 0.04 (2000)	< 0.06 (2000)	= 13800 (2000)	< 0.04 (2000)	= 660 (2000)	< 0.09 (2000)	< 0.06 (2000)	< 0.06 (2000)
B3-29	02/20/01	< 0.02	= 1.4	< 0.04	= 0.12	= 1512 (200)	< 0.04	= 34.4	< 0.09	= 0.16	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.9 B-4 Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
B4-1	02/19/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

MDL	Method Detection Limit
RL	Reporting Limit

Table 3.10 AOC 55 Detected Constituents

Sample ID	Sample Date	Benzene	DCE, cis-1,2-	DCE, trans-1,2-	Ethylbenzene	PCE	Toluene	TCE	Vinyl chloride	Xylene, m,p-	Xylene, o-
	MDL	0.02	0.03	0.04	0.06	0.07	0.04	0.03	0.09	0.06	0.06
	RL	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.20	0.20
AOC55-7	02/19/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC55-9	02/15/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	= 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC55-17R	02/20/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.09	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC55-18R	02/20/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.08	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC55-23	02/20/01	= 0.02	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC55-27	02/20/01	< 0.02	< 0.03	< 0.04	< 0.06	= 0.11	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06
AOC55-34	02/20/01	= 0.03	< 0.03	< 0.04	< 0.06	< 0.07	< 0.04	< 0.03	< 0.09	< 0.06	< 0.06

Notes:

BTEX detections are attributed to geoprobe rig and gas generator exhaust.

In the soil comparison criteria, the lab MDL and RL are based on a Dilution Factor of 1.

All results are based on a dilution factor of 1 unless otherwise noted in parenthesis below result value.

All samples with detections above the MDL are highlighted.

All samples with a J flag are in bold.

All samples are reported in ug/L

Acronyms and Abbreviations:

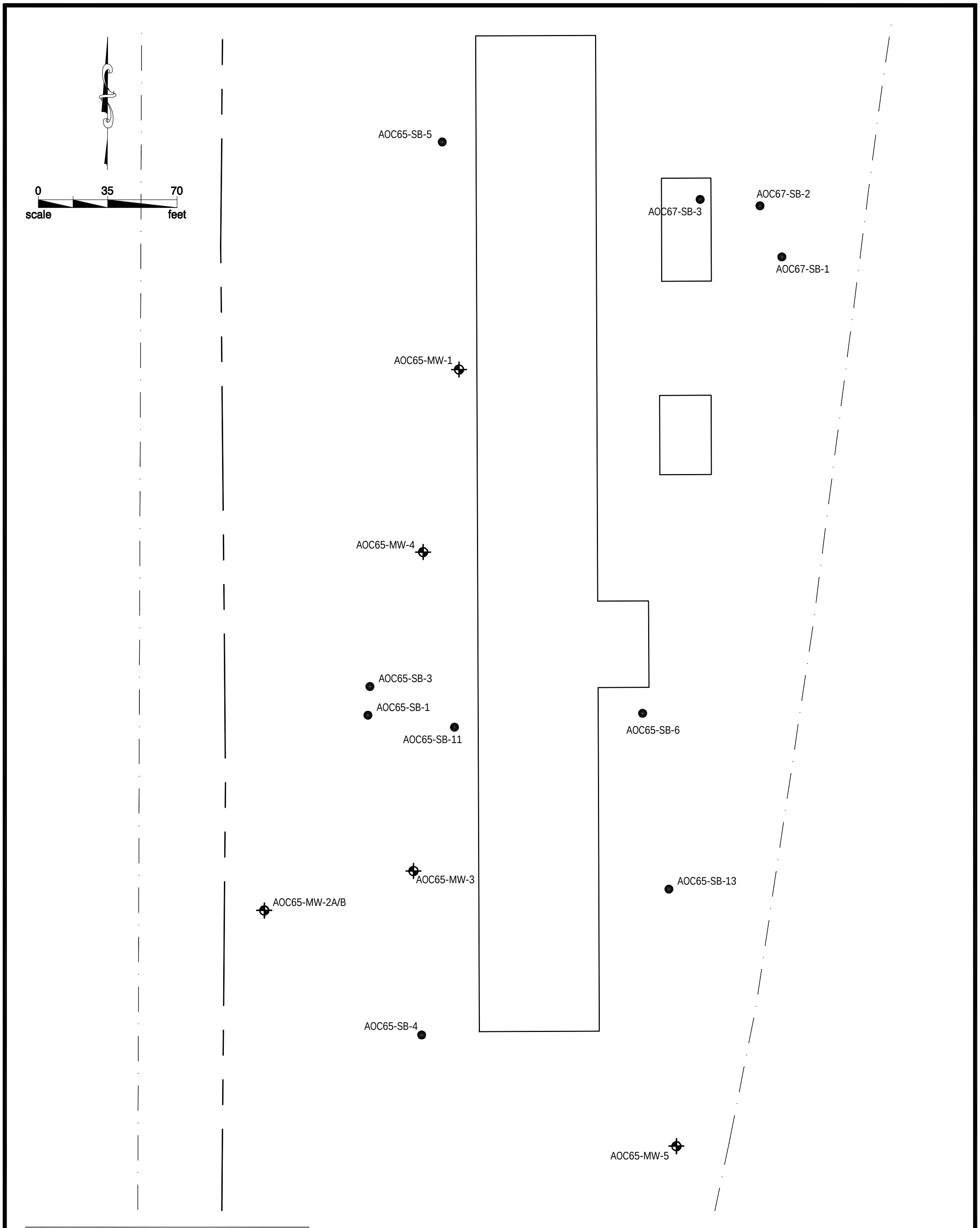
MDL	Method Detection Limit
RL	Reporting Limit

SECTION 4
SUMMARY OF FINDINGS AND RECOMMENDATIONS

The most significant finding of the soil gas survey was the detection of a PCE contaminant plume underlying Building 90 and extending primarily to the west and southwest from the building. The detection of TCE and *cis*-1,2-DCE and *trans*-1,2-DCE at significantly lower levels than PCE suggest that some natural degradation of the PCE has already begun near the southern solvent vat, which has been identified as the most likely source area for the VOC contamination. PCE levels exceeded 24,000 μg/L inside the building near the former solvent vat, decreased to 1,590 μg/L in sample BLDG90-15 approximately 25 feet from the building, and were not detected above 5 μg/L in any of the grid points located more than 50 feet from the building. Based on this result, it appears that the lateral extent of the PCE plume in the soil gas is generally confined to the immediate vicinity of Building 90. Additional investigation of the soil and groundwater around Building 90 are required to determine the extent and primary direction of PCE migration from the source areas and the potential impacted media.

Soil borings have been completed for the **AOC 65** and **AOC 67 RFI** in and around Building 90 to further investigate the extent and contamination levels of TCE and PCE migrating from beneath the building. The soil boring locations are presented in **Figure 4.1**. Details of the soil borings and monitoring well data around Building 90 are presented in the **AOC 65** and **AOC 67 RCRA Facility Investigation Reports** (**Parsons, November 2001**) located in **Volume 3-2, Areas of Concern** behind the **AOC 65** and **AOC 67** tabs. The completed monitoring wells are being sampled as part of ongoing RFI activities. Source removal of readily accessible contaminated soil or installation of a SVE system will be considered as an interim measure if high levels of contamination are indicated in the soil borings near the building to minimize potential exposure to VOCs accumulating in the building, and possibly migrating vertically to underlying groundwater through the fractured limestone.

From the soil gas survey results, it appears that no significant VOC contamination has been released to, or is present in, the soil and groundwater underlying AOC 57, the WWTP, SWMU B-4, AOC 55, and AOC 63. The soil gas data at SWMU B-3 re-affirmed the presence of VOCs within the western trench and identified a potential additional source area of PCE contamination within the eastern trench. No additional investigation activities are proposed at any of the SWMUs with regard to VOC contamination, with the exception of SWMU B-3. The SVE system currently operating at SWMU B-3 will be continued while additional investigations or remedial actions are planned. The data indicate that additional investigations and/or remedial actions are necessary to address PCE levels detected in the eastern trench at SWMU B-3. Additional data required to expand the SVE system or to implement different remediation approaches at SWMU B-3 are discussed in the **SVE Treatability Study Report** and the **SVE Operations and Maintenance Assessment Report,** located in **Volume 4, Treatability Studies**.



LEGEND

⊕	Monitoring Well Location
●	Soil Sample Location
— · —	Service Road
— - - —	Fence Line

Figure 4.1

AOC 65 Soil Gas Survey
Soil Borings and Well Locations

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

APPENDIX A

ANALYTICAL RESULTS

Attachment 2
Industrial Hygiene Survey Report
April 2002

Safety

MCXI-DPM-RRIH (Z13) 02 April 2002

MEMORANDUM FOR Commander, Camp Stanley Storage Activity, ATTN: Mr. John Ferguson

SUBJECT: Industrial Hygiene Survey Report No (Z13) CSSA-Z13-0202, Occupational Health Exposure Assessment, Camp Stanley Storage Activity

1. A copy of subject report is enclosed.

2. FINDINGS:

(a). The sampling data indicates that exposure levels for chlorinated hydrocarbon compounds in building 90 did not exceed either the Occupational Safety and Health Administration (OSHA) Time Weighted Average (TWA) or TWA as set by the American Conference of Governmental Industrial Hygienists (ACGIH).

(b). The sampling data indicates that exposure levels for VM Naphtha (Mineral Spirits) in building 90 did not exceed TWA as set by the ACGIH; OSHA does not have a TWA for VM Naphtha.

(c). The sampling data indicates that exposure levels for cadmium in building 90, firing range, did not exceed either the OSHA TWA or TWA as set by the ACGIH.

(d). The sampling data indicates that exposure levels for Nickel in building 90, firing range, did not exceed either the OSHA TWA or TWA as set by the ACGIH.

(e). Eye protection is required while using electric saws, drilling, pneumatic tools, nailing, strapping, banding and while operating machinery. Eye protection is required while test firing weapons. In addition, while working in the battery area, an acid splash shield is required.

(f). Industrial Hygiene recommends that employees in Cost Center's S1C00, S1E00, S1F00, S1G00, and S1L00 wear single hearing protection (earplugs or muffs) when:

- operating power tools (e.g. air wrench, saws, drills and grinders)
- working near air compressors
- working near or operating vehicles with running engines

(g). Industrial Hygiene recommends that employees in Cost Center's S1E00 wear double hearing protection (earplugs and muffs) when firing weapons.

(h). Material Safety Data Sheets (MSDS) were readily available at every operation. However, outdated MSDS's and/or MSDS's that were for a material that is no longer in use were found in almost all locations.

3. Recommendations resultant from findings can be found in survey report.

Charles G. Gardner
CHARLES G. GARDNER
Industrial Hygiene Program Manager
Industrial Hygiene Office, RRAD

Encl

Occupational Health Exposure Assessments
Industrial Hygiene Survey Report No. CSSA-Z13-0202
Camp Stanley Storage Activity (CSSA)
5 & 6 February, 2002

1-1 References:

a. AR 40-5, Medical Services, Preventive Medicine, Headquarters, Department of the Army, Washington D.C., 15 October 1990.

b. DA Pam 40-503, Medical Services, Industrial Hygiene Program, Headquarters, Department of the Army, Washington, DC, 30 October 2000.

1-2 Purpose of Visit: To provide CSSA as much comprehensive industrial hygiene services as deemed possible considering the time limit and operations accessible.

1-3 Survey Goals

1) Perform qualitative and quantitative occupational exposure assessments.

2) Perform noise surveys.

3) Update medical surveillance for CSSA employees.

4) Evaluate the status of the Hazard Communication Program (HAZCOM); Material Safety Data Sheets (MSDS).

1-4 Discussion

a. Personnel from the Industrial Hygiene Office stationed at Red River Army Depot (RRAD) Charles G. Gardner and Dwight C. House conducted this survey.

b. Additionally, the Industrial Hygienists supported RRAD's Asbestos Control Officer, Roger K. Simmons in asbestos removable in building 98.

SURVEY GOALS: DISCUSSIONS AND FINDINGS

2-1 Exposure Assessments for Medical Surveillance - Bldg. 90

2-1-1 Chemical Vats, Building 90

a. Exposure Assessment Sampling Strategy for Perchloroethylene (PCE) and other chlorinated hydrocarbon compounds:

(1) Six organic vapor monitors (3-M Model # 3500) were placed around vats number 2, 3 and the Hazardous Chemical Waste Station South of vat #6 in building 90.

(2) Laboratory analysis was requested for PCE and the following chlorinated hydrocarbon compounds on each monitor. These are the potential by-products that could arise as break down chemicals from PCE.

(3) The target compounds, along with their Occupational Exposure Limits (OELs), and highest concentration detected for each are tabulated below:

Vat # 2 (Northeast corner of vat) - sample CSSA-Z13-08

Compound	CAS #	TLV	PEL	Concentration Detected
Perchloroethylene	127-18-4	25 ppm	100 ppm	< 0.2 ppm
1,1-Dichloroethane	75-34-3	100 ppm	100 ppm	< 0.2 ppm
1,2-Dichloroethylene	540-59-0	200 ppm	200 ppm	< 0.2 ppm
1,1,1-Trichloroethane	71-55-6	350 ppm	350 ppm	< 0.2 ppm
Vinylidene Chloride	75-35-4	5 ppm	NA	< 0.2 ppm

Vat # 2 (East of vat by eyewash) - sample CSSA-Z13-09

Compound	CAS #	TLV	PEL	Concentration Detected
Perchloroethylene	127-18-4	25 ppm	100 ppm	< 0.1 ppm
1,1-Dichloroethane	75-34-3	100 ppm	100 ppm	< 0.2 ppm
1,2-Dichloroethylene	540-59-0	200 ppm	200 ppm	< 0.2 ppm
1,1,1-Trichloroethane	71-55-6	350 ppm	350 ppm	< 0.1 ppm
Vinylidene Chloride	75-35-4	5 ppm	NA	< 0.2 ppm

Vat # 2 & 3 (Between vats 2 & 3) - sample CSSA-Z13-10

Compound	CAS #	TLV	PEL	Concentration Detected
Perchloroethylene	127-18-4	25 ppm	100 ppm	< 0.1 ppm
1,1-Dichloroethane	75-34-3	100 ppm	100 ppm	< 0.2 ppm
1,2-Dichloroethylene	540-59-0	200 ppm	200 ppm	< 0.2 ppm
1,1,1-Trichloroethane	71-55-6	350 ppm	350 ppm	< 0.1 ppm
Vinylidene Chloride	75-35-4	5 ppm	NA	< 0.2 ppm

Vat # 3 (South of vat 3) - sample CSSA-Z13-11

Compound	CAS #	TLV	PEL	Concentration Detected
Perchloroethylene	127-18-4	25 ppm	100 ppm	< 0.1 ppm
1,1-Dichloroethane	75-34-3	100 ppm	100 ppm	< 0.2 ppm
1,2-Dichloroethylene	540-59-0	200 ppm	200 ppm	< 0.2 ppm
1,1,1-Trichloroethane	71-55-6	350 ppm	350 ppm	< 0.1 ppm
Vinylidene Chloride	75-35-4	5 ppm	NA	< 0.2 ppm

Vat # 3 (Southeast of vat 3) - sample CSSA-Z13-12

Compound	CAS #	TLV	PEL	Concentration Detected
Perchloroethylene	127-18-4	25 ppm	100 ppm	< 0.1 ppm
1,1-Dichloroethane	75-34-3	100 ppm	100 ppm	< 0.2 ppm
1,2-Dichloroethylene	540-59-0	200 ppm	200 ppm	< 0.2 ppm
1,1,1-Trichloroethane	71-55-6	350 ppm	350 ppm	< 0.1 ppm
Vinylidene Chloride	75-35-4	5 ppm	NA	< 0.2 ppm

Hazardous Chemical Waste (South of vat #6) - sample CSSA-Z13-15

Compound	CAS #	TLV	PEL	Concentration Detected
Perchloroethylene	127-18-4	25 ppm	100 ppm	< 0.1 ppm
1,1-Dichloroethane	75-34-3	100 ppm	100 ppm	< 0.2 ppm
1,2-Dichloroethylene	540-59-0	200 ppm	200 ppm	< 0.2 ppm
1,1,1-Trichloroethane	71-55-6	350 ppm	350 ppm	< 0.1 ppm
Vinylidene Chloride	75-35-4	5 ppm	NA	< 0.2 ppm

(4) Findings: The laboratory "Results of Analysis" sheet is furnished as enclosure 1. All measurements for vats number 2, 3 and the Hazardous Chemical Waste Station South of vat #6 in building 90 were below analytical sensitivity.

(5) Conclusion:

- Airborne concentrations of Perchloroethylene (PCE) and the other chlorinated hydrocarbon compounds did not exceed the TLV or PEL.
- Respiratory protection is not required.

b. Exposure Assessment Sampling Strategy for VM Naphtha (Mineral Spirits):

(1) Laboratory analysis was requested for VM Naphtha (CAS #8032-32-4). [NOTE: Material Safety Data Sheet lists Mineral Spirits and this CAS No. is the same CAS No. for VM Naphtha].

(2) Five organic vapor monitors (3-M Model # 3500) were placed around vats number 5, 6, 7, workstation East of Vat #7 and North of Vat #7 in building 90.

(3) The target compound, along with it's OELs, and highest concentration detected for each are tabulated below:

VM Naphtha ACGIH TLV = 1370 mg/m^3;

Sample Number	Results	Location
CSSA-Z13-13	1.6 mg/m^3	Vat # 5
CSSA-Z13-14	1.8 mg/m^3	Vat # 6
CSSA-Z13-16	2.3 mg/m^3	Vat # 7
CSSA-Z13-17	1.8 mg/m^3	workstation East of Vat #7
CSSA-Z13-18	1.4 mg/m^3	North of Vat #7

(4) Findings: The laboratory Results of Analysis Sheet is furnished as enclosure 2. All measurements were compared to the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV); Occupational Safety and Health Administration (OSHA) doesn't have an OEL for VM Naphtha.

(5) Conclusion:

- Airborne concentrations of VM Naphtha did not exceed the TLV.
- Respiratory protection is not required.

2-1-2 Exposure Assessments, Firing Range - Bldg. 90

a. Exposure Assessment Sampling Strategy:

(1) The firing range operation consisted of firing the M16. Mr. Lopez stated that this was a normal firing day.

(2)Sampling strategy consist of one personal breathing zone sample and four area samples. Measurements were compared to the OSHA Permissible Exposure Limits (PEL). The PEL's shown below are all eight-hour time weighted averages (8-hr TWA).

(3) The following tables summarize the airborne metal concentrations found for the firing range operation, Bldg. 90. The laboratory "Results of Analysis" is enclosure 3.

Cadmium OSHA PEL = 5.0µg/m³, 8-hr.TWA

Sample Number	Results µg/m³	Location
CSSA-Z13-01	< 0.9	Johnny Lopez
CSSA-Z13-02	< 0.9	West of firing pit
CSSA-Z13-03	< 0.9	East of firing pit
CSSA-Z13-04	< 0.9	Northeast of firing pit
CSSA-Z13-05	< 0.9	North of firing pit

Nickel OSHA PEL = 1000µg/m³, 8-hr.TWA

Sample Number	Results µg/m³	Location
CSSA-Z13-01	< 0.9	Johnny Lopez
CSSA-Z13-02	< 0.9	West of firing pit
CSSA-Z13-03	< 0.9	East of firing pit
CSSA-Z13-04	< 0.9	Northeast of firing pit
CSSA-Z13-05	< 0.9	North of firing pit

(4) Findings:

- All samples for Cadmium were below the detection limit of 0.9µg/m³ and well below OSHA's PEL of 5.0µg/m³, 8-hr. TWA.

- All samples for Nickel were below the detection limit of 0.9µg/m³ and well below OSHA's PEL of 1000µg/m³, 8-hr. TWA.

- Based on the sampling data obtained during this survey, none of the employees were in danger of being overexposed to the contaminants associated with this operation.

(5) Recommendations:

- Employees are not required to wear respirators while firing the weapons.

- When heavy firing (exp. 10,000 rounds being fired) is performed, Industrial Hygiene recommends that employees use respiratory protection until such time that additional air monitoring can be conducted. A half mask respirator with HEPA filters will be adequate.

2-1-3 Welding Operations, Building 90

Welding in building 90 was not being performed during this survey. Medical Surveillance for these employees will remain the same until such time as exposure assessments can be conducted.

3-1 Noise Surveys (Discussion), by Dwight C. House

a. Exposure to high intensity noise is recognized as causing permanent loss of hearing, affecting job performance and quality of life. Occupational noise induced hearing loss is a compensate physical disability. Noise induced hearing loss is painless, progressive, permanent and most importantly, preventable. Prevention of noise induced hearing loss must be given priority by supervisors at all levels.

b. Noise Level Standards & Guidelines

OSHA's regulation on noise (29 CFR 1910.95) states :

(1) Employees shall not be exposed to sound levels of 90 dBA over an 8-hour time weighted average (8-hr TWA).

(2) Employees shall be entered into a hearing conservation program at 85 dBA 8-hr TWA, which includes audiometric testing paid for by the employer.

U.S. Army Regulations (Technical Guide 181) states:

(1) Employees are enrolled in the hearing conservation program at 85 dBA 8-hr TWA.

(2) Personnel must wear single hearing protection (earplugs or earmuffs), to be provided by the employer for noise levels greater than 85 dBA, regardless of duration, to 103 dBA. *The requirement to wear hearing protection may be waived only if the TWA is well below 85 dBA, for example 82 dBA.*

(3) Noise levels above 103 dBA up to 108 dBA, employees must wear double hearing protection (ear plugs and ear muffs)

(4) Noise levels above 108 dBA 8-hr TWA, will have time limits established.

(5) 8-hr TWA above 129 dBA are not permitted.

3-2 Noise Level Measurements

Noise levels were monitored using noise dosimetry, which integrates noise levels over a period of hours, not instantaneous readings. Quest noise dosimeters were placed on employees (Near the hearing area) for the determination of noise hazardous operations. The dosimeters were also placed in general area locations for the determination of noise hazardous areas.

a. *Buildings 4,45,90,93,200 & DPW Noise Hazards Findings*

Cost Centers: S1C00, S1E00, S1F00, S1G00 and S1L00.

SAMPLE	READING 8-hr TWA	EMPLOYEES	LOCATIONS & REMARKS
Personal	75.0 dBA,s	R. Douglas	Bldg. 4 – Motor Pool
Personal	83.5 dBA's	R.Rodriguez	Bldg. 45 – Ammo Supply
Personal	No data	E.Revilla	Dosimeter malfunctioned (Bldg. 45)
Personal	107.1 dBA's	J. Lopez III	Bldg. 90 – Fireing Range
Personal	72.3 dBA's	D. Grasham	Bldg. 90 – Cleaning Table
Personal	78.2 dBA's	J. James	Bldg. 90 – Cleaning Table
Personal	87.5 dBA's	K.Culak	Bldg. 93 – Carpenter Shop
Personal	84.4 dBA's	A.Garcia	Bldg. 200 – Ammo
Personal	No data	G.Valadez	Dosimeter malfunctioned (Bldg. 200)
Personal	70.3 dBA's	R. Hofauer	DPW – Tractor Driver

(1) Findings: Regarding Noise Hazards - Motor Pool (Bldg. 4), Ammo Supply (Bldg. 45), Small Arms (Bldg. 90), Carpenter Shop (Bldg. 93), Ammo (Bldg. 200) and DPW.

(a) Some operations are noise hazardous and require hearing protection.(See recommendations below)

(2) Recommendations: Regarding Noise Hazards

(a) Industrial Hygiene recommends that employees in Cost Center's S1C00, S1E00, S1F00, S1G00, and S1L00 wear single hearing protection (ear plugs or muffs) when:

- operating power tools (e.g. air wrench, saws, drills and grinders)
- working near air compressors
- working near or operating vehicles with running engines

(b) Industrial Hygiene recommends that employees in Cost Center's S1E00 wear double hearing protection (earplugs and muffs) when working in the firing range.

(b) Many employees find it more comfortable to alternate between earplugs and the earmuffs.

(3) Recommendations: Regarding Eye Hazards

(a) Eye protection is required while using electric saws, drilling, pneumatic tools, nailing, strapping, banding and while operating machinery. Eye protection is required while test firing weapons. In addition while working in the battery area acid splash shield is required.

4-1 Medical Surveillance for CSSA Employees

a. Measurements for all organic solvents and metals were found to be below their applicable action level.

b. Medical Surveillance is required for eye and noise hazard employees in cost centers S1C00, S1E00, S1F00, S1G00, and S1L00.

c. Pesticide employee(s) should be evaluated on annual bases.

d. Note: All employees previously enrolled in asbestos medical surveillance program should continue to have the required medical surveillance.

5-1 Evaluate Present Status of the Hazard Communication Program (HAZCOM), & Material Safety Data Sheets (MSDS)

a. Discussion

OSHA states in the Code of Federal Regulations (29 CFR 1910.1200) that an employer will have a hazard communication program (HAZCOM), often referred to as the "Right To Know" standard. This incorporates employee training and material safety data sheets (MSDS).

b. Findings:

(1) At every operation Industrial Hygiene visited, MSDS's were readily available.

(2) Outdated MSDS's or MSDS's that were for material that are no longer in use were found in almost all locations.

c. Recommendations:

(1) It is recommended that employees and supervisors continue to update the MSDS's at their respective operations by incorporating new product information and **discarding old MSDS's.**

6-1 Laboratory Services

Analytical services for this survey were provided by Gemini Analytical Services, INC., 3425 Twin River Blvd., Corpus Christi, TX 78410, ATTN: Dr. Lalitha Burra. The TEM and PLM for asbestos analyses were sub-contracted to a NVLAP accredited and Texas Department of Health licensed laboratory. A copy of the laboratory request is furnished as enclosure 7.

7-1 Technical Assistance

Consultation concerning the contents of this report may be obtained by contacting the undersigned at the Industrial Hygiene Office, Red River Army Depot, Texarkana, TX. 75507-5000, Phone (903) 334-2075/2965.

Dwight C. House

DWIGHT C. HOUSE
Industrial Hygiene Technician
Red River Army Depot

Charles G Gard

CHARLES G. GARDNER
Industrial Hygiene Program Manager
Red River Army Depot

Encl.

Gemini Laboratories, Inc.

Mr. Ronnie Evans, CIH
Industrial Hygiene, Bldg 458
Red River Army Depot
Texarkana, Texas 75507-5000

P.O.#: DAAE32-01-P-0322
Gemini Log #: 2020491
Date Collected: 02/5/02
Date Received: 02/14/02

RESULTS OF ANALYSIS

Gemini #	Sample Identification	Sample Time (min)	ug/sample	mg/m3	ppm
2020491	CSSA-Z13-08	340			
	Perchloroethylene		< 10	< 1.0	< 0.2
	1,1 Dichloroethane		< 10	< 0.9	< 0.2
	1,2-Dichloroethylene		< 10	< 0.8	< 0.2
	1,1,1 Trichloroethane		< 10	< 1	< 0.2
	Vinylidene Chloride		< 10	< 0.8	< 0.2
2020492	CSSA-Z13-09	401			
	Perchloroethylene		< 10	< 0.9	< 0.1
	1,1 Dichloroethane		< 10	< 0.8	< 0.2
	1,2-Dichloroethylene		< 10	< 0.7	< 0.2
	1,1,1 Trichloroethane		< 10	< 0.8	< 0.1
	Vinylidene Chloride		< 10	< 0.7	< 0.2
2020493	CSSA-Z13-10	401			
	Perchloroethylene		< 10	< 0.9	< 0.1
	1,1 Dichloroethane		< 10	< 0.8	< 0.2
	1,2-Dichloroethylene		< 10	< 0.7	< 0.2
	1,1,1 Trichloroethane		< 10	< 0.8	< 0.1
	Vinylidene Chloride		< 10	< 0.7	< 0.2
2020494	CSSA-Z13-11	399			
	Perchloroethylene		< 10	< 0.9	< 0.1
	1,1 Dichloroethane		< 10	< 0.8	< 0.2
	1,2-Dichloroethylene		< 10	< 0.7	< 0.2
	1,1,1 Trichloroethane		< 10	< 0.8	< 0.1
	Vinylidene Chloride		< 10	< 0.7	< 0.2

NA: Not Applicable

QUALITY CONTROL INFORMATION:

Compound:	*Date Analyzed*	*Sampling Media*	*Spike rec %*	*Method Reference*	*Det. Limit (ug/sample)*
Perchloroethylene	3/29/2002	3M	95	GC-FID	10
1,1 Dichloroethane	3/29/2002	3M	94	GC-FID	10
1,2-Dichloroethylene	3/29/2002	3M	94	GC-FID	10
1,1,1 Trichloroethane	3/29/2002	3M	95	GC-FID	10
Vinylidene Chloride	3/29/2002	3M	105	GC-FID	10

Lalitha Burra
Lalitha Burra, Ph.D, CIH
Laboratory Director

AIHA Certificate No: 536
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Enclosure 1-1

Gemini Laboratories, Inc.

Mr. Ronnie Evans, CIH
Industrial Hygiene, Bldg 458
Red River Army Depot
Texarkana, Texas 75507-5000

P.O.#: DAAE32-01-P-0322
Gemini Log #: 2020491
Date Collected: 02/5/02
Date Received: 02/14/02

RESULTS OF ANALYSIS

Gemini #	Sample Identification	Sample Time (min)	ug/sample	mg/m3	ppm
2020485	CSSA-Z13-12	399			
	Perchloroethylene		< 10	< 0.9	< 0.1
	1,1 Dichloroethane		< 10	< 0.8	< 0.2
	1,2-Dichloroethylene		< 10	< 0.7	< 0.2
	1,1,1 Trichloroethane		< 10	< 0.8	< 0.1
	Vinylidene Chloride		< 10	< 0.7	< 0.2
2020496	CSSA-Z13-15	398			
	Perchloroethylene		< 10	< 0.9	< 0.1
	1,1 Dichloroethane		< 10	< 0.8	< 0.2
	1,2-Dichloroethylene		< 10	< 0.7	< 0.2
	1,1,1 Trichloroethane		< 10	< 0.8	< 0.1
	Vinylidene Chloride		< 10	< 0.7	< 0.2
2020497	CSSA-Z13-19	Field Blank			
	Perchloroethylene		< 10	NA	NA
	1,1 Dichloroethane		< 10	NA	NA
	1,2-Dichloroethylene		< 10	NA	NA
	1,1,1 Trichloroethane		< 10	NA	NA
	Vinylidene Chloride		< 10	NA	NA

NA: Not Applicable

QUALITY CONTROL INFORMATION:

Compound:	*Date Analyzed*	*Sampling Media*	*Spike rec %*	*Method Reference*	*Det. Limit (ug/sample)*
Perchloroethylene	3/29/2002	3M	95	GC-FID	10
1,1 Dichloroethane	3/29/2002	3M	94	GC-FID	10
1,2-Dichloroethylene	3/29/2002	3M	94	GC-FID	10
1,1,1 Trichloroethane	3/29/2002	3M	95	GC-FID	10
Vinylidene Chloride	3/29/2002	3M	105	GC-FID	10

Lalitha Burra
Lalitha Burra, Ph.D, CIH
Laboratory Director

AIHA Certificate No: 536
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Enclosure 1-2

Gemini Laboratories, Inc.

Mr. Ronnie Evans, CIH
Industrial Hygiene, Bldg 458
Red River Army Depot
Texarkana, Texas 75507-5000

P.O.#:	DAAE32-01-P-0322
Gemini Log #:	2020498
Date Collected:	02/05/02
Date Received:	02/14/02

RESULTS OF ANALYSIS

Gemini #	Sample Identification	Sampling Time(min)	µg/sample Front	µg/sample Back	mg/m3	ppm
2020498	CSSA-Z13-13 VMP Napththa	340	18	< 10	1.6	NA
2020499	CSSA-Z13-14 VMP Napththa	401	24	< 10	1.8	NA
2020500	CSSA-Z13-16 VMP Napththa	401	30	< 10	2.3	NA
2020501	CSSA-Z13-17 VMP Napththa	399	24	< 10	1.8	NA
2020502	CSSA-Z13-18 VMP Napththa	399	18	< 10	1.4	NA
2020503	CSSA-Z13-20 VMP Napththa	Field Blank	< 10	< 10	NA	NA

NA: Not Applicable
ppm: Calculated based upon actual sample Volume/Time provided by client
Results corrected for Blank
QUALITY CONTROL INFORMATION:

Compound:	*Date Analyzed*	*Sampling Media*	*Method Reference*	*Det. Limit (ug/sample)*
VMP Napththa	3/26/2002	3M 3520	GC-FID	10

Lalitha Burra

Lalitha Burra, Ph.D, CIH
Laboratory Director

AIHA Certificate No: 536

Enclosure 2

Gemini Laboratories, Inc.

Mr. Ronnie J. Evans, C.I.H.
Industrial Hygiene, Bldg 458
Red River Army Depot
Texarkana, Texas 75507-5000

P O #:	DAAE32-01-P-0322
Gemini Log #:	2020484
Date Received:	02/14/02
Date Reported:	03/08/02

RESULTS OF ANALYSIS

Gemini #	Sample Identification	Sample Vol (L)	ug/sample	ug/m3
2020488	CSSA-Z13-05	597		
	Cadmium		< 0.5	< 0.9
	Nickel		< 0.5	< 0.9
2020489	CSSA-Z13-06	Field Blank		
	Cadmium		< 0.5	NA
	Nickel		< 0.5	NA
2020490	CSSA-Z13-07	Field Blank		
	Cadmium		< 0.5	NA
	Nickel		< 0.5	NA

Results not corrected for blank.
NA: Not Applicable
Samples received in acceptable condition.
QUALITY CONTROL INFORMATION:

Compound	*Date Analyzed*	*Sampling Media*	*Method Reference:*	*Spike Rec.(%)*	*Det. Limit (ug/sample)*
Cadmium	2/28/2002	MCE Filter	NIOSH 7048	108	0.5
Nickel	2/20/2002	MCE Filter	NIOSH 7300m	111	0.5

Lalitha Burra
Lalitha Burra, Ph.D.CIH
Laboratory Director

AIHA Certificate No. 536

Enclosure 3-2

Attachment 3
Industrial Hygiene Survey Report

Industrial Hygiene Survey

30 October – 01 November 2002

Camp Stanley Storage Activity

This survey was partial in scope and did not constitute a comprehensive safety inspection or industrial hygiene survey of the facility. As such, this survey was not intended to identify all potentially hazardous conditions. This report and its findings are designed to assist management in meeting its occupational safety and health responsibilities but conformance with the recommendations contained herein should not be considered a warranty that accidents or losses will be prevented or that all applicable local, state, and Federal regulations are satisfied.

Overall Findings

A series of comprehensive air monitoring was conducted at Camp Stanley Storage Activity (CSSA). Sampling parameters included bioaerosols, organic and inorganic compounds. Comprehensive indoor air monitoring for chlorinated volatile organic compounds (VOCs) was conducted in Building 90. Compounds measured included tetrachloroethylene (PCE), and trichloroethylene (TCE). All sample results were well below Occupational Safety and Health and Administration (OSHA) permissible exposure limits (PEL) and National Institute of Occupational Safety and Health (NIOSH) recommended exposure limits (REL). Most sample results were less than the laboratory's limit of detection.

Bioaerosol samples were collected in Buildings 36, 90 and 91. Sample results were comparable to outdoor levels and within acceptable limits with the exception of the locker room in Bldg 36. Total fungal counts in the locker room were two times higher than outdoors and had very low levels of *Aspergillus versicolor* present. The source of the high fungal counts and *aspergillus* can be attributed to poor housekeeping (specifically leaves and organic material on the floor) in the room.

Lead in air samples were collected during test firing in Bldg 90. All area samples were less than the limit of detection (LOD). Of the two personal samples, one was <LOD and the other had a concentration of 12 micrograms per cubic meter (ug/m3) equivalent to 2.45 ug/m3 for an 8 hour time weighted average (TWA). The OSHA PEL is 50 ug/m3 based on an 8 hour TWA. Sample time was based on activity for that day. Future results can differ based on duration and caliber of weapons being tested.

Respirable dust samples were collected in Bldg 90 during test firing into an indoor bullet trap consisting of sand. All area and personal results were less than the limit of detection. Had the samples come back above the limit of detection, the lab was instructed to determine silica concentration using x-ray diffraction.

I. Background

At the request of higher headquarters this survey was conducted at CSSA, in Buildings 36, 90, and 91, during the period of 30 October through 01 November, 2002. The primary purpose of this survey was to assess any employee exposures to mold and fungal contamination. Sampling in Building 90 was conducted in order to assess employee exposures to PCE or other VOC vapors, lead and silica in air from indoor test firing of weapons.

VOCs

Decades ago, industrial operations in Building 90 required the use of chlorinated solvents for degreasing. A storage vat was originally housed in the central portion of the building foundation. The vat has since been removed. Environmental testing conducted in the last six years first revealed elevated levels of PCE in groundwater. Subsequent testing revealed PCE soil contamination underneath and around the foundation probably due to chronic underground leakage of the vat solvents. Subsurface soil gas testing identified various levels of PCE mostly concentrated in the former vicinity of the vat.

Many chlorinated solvents are known or suspect carcinogens. NIOSH recommends that PCE be handled as a potential carcinogen and that workplace levels be as low as possible. Volatilization of VOCs, from subsurface soils or groundwater contamination into indoor spaces, can present a potential worker inhalation hazard. Consequently, indoor air levels of PCE and VOCs were measured to determine presence and whether concentrations exceed permissible exposure limits (PELs) for workers in the building.

Bioaerosols

Samples were collected in Buildings 36 and 91 to quantify airborne concentrations of mold and fungi from water damaged ceiling tiles. Indoor chemical and microbiological organism exposures can be related to a number and variety of health problems. Less is known when attempting to extrapolate health effects from exposures to microbiological organisms than exposures to potentially toxic chemicals. A very important aspect to the interpretation of bioaerosol sampling and protocols is that there are no regulatory standards for safe or acceptable levels. Health officials rely upon useful guidelines based upon baseline data and absolute values, specifically comparison between affected and non-affected or indoor versus outdoor concentrations.

Lead and Respirable Dust

Employees routinely test fire weapons in Building 90. Bullets are fired through a porthole into a sand trap in the next room. Personal and area samples were collected to assess any worker exposure to airborne lead from ammunition and respirable particulates, primarily silica, from the sand. The room with the sand trap has exhaust ventilation into a baghouse that maintains negative pressure with respect to the test firing room.

The only active exhaust ventilation in the test firing room is a wall-mounted fan in close proximity to the employee. Depending on the number of weapons to be tested or the caliber of the ammunition smoke can quickly build up in the room. A new, partially enclosed, test firing booth is scheduled to be installed in early 2003. The booth will have an independent air handling system.

II. Monitoring Activities and Observations

In order to obtain the best representative sample, VOC monitoring was conducted several hours a day over two consecutive days during routine operations within Building 90. Airborne concentrations of halogenated organic compounds; specifically PCE, TCE, were measured. Sample media consisted of SKC®-brand small coconut charcoal sorbent tubes. Area samples were taken throughout the building, including floor level (near concrete cracks/ expansion joints).

Bioaerosol samples were obtained utilizing an Andersen® single stage sampler. The Andersen sampler was calibrated to a flow rate of 28.3 liters per minute (LPM). Five-minute samples were collected using malt extract agar (MEA) and cellulose Czapek agar (CCA). Samples were kept refrigerated and were submitted immediately to an AIHA accredited laboratory conforming to the Environmental Microbiology Proficiency Analytical Testing (EMPAT) protocols.

Lead in air samples were collected on mixed cellulose ester filters (MCEF). Area and personal samples were collected during indoor test firing. Sample time was representative of normal activity for that day.

Respirable dust samples were collected with an SKC® cyclone (model 225-01-01) onto a polyvinyl chloride (PVC) pre-weighed filter. Respirable particles are less than 5 micrometers (um) in size. They are especially hazardous since they are capable of being deposited in the deepest regions of the lungs. Area and personal samples were collected during indoor test firing. Sample time was representative of normal activity for that day. Any results above the limit of detection would have been analyzed for silica using x-ray diffraction.

Samples were obtained utilizing Gilian air samplers (model number LFS-113D). Gilian air samplers were calibrated (using mini-Buck calibrator), with sampling media in-line,

before and after use according to the specified flow rates for each respective analyses. Samples were submitted to an American Industrial Hygiene Association (AIHA) accredited laboratory for analyses.

Results

Detailed sample locations can be found in diagram form in Section VI, Figures.

µg/L

VOCs: Indoor Air Profile*
30 – 31 October 2002

Location Sample #	Avg Flow Rate (LPM)	Duration (mins)	Volume (L)	PCE (ppm) ppb	TCE (ppm)	Other Compounds Detected (ppm)
1	-	-	-	-	-	Blank Sample
2	0.166	230	38.18	0.02	ND	p-Dichlorobenzene 0.02
3	0.183	230	42.09	0.03	ND	p-Dichlorobenzene 0.02
4	0.152	230	34.96	0.03	ND	p-Dichlorobenzene 0.03
5	0.150	229	34.35	0.03	ND	p-Dichlorobenzene 0.02
6	0.166	394	65.40	0.01	ND	p-Dichlorobenzene 0.01 Methyl Chloroform 0.02
7	0.184	398	73.23	0.02	ND	p-Dichlorobenzene 0.02 Methyl Chloroform 0.01
8	0.154	400	61.60	0.02	ND	p-Dichlorobenzene 0.02 Methyl Chloroform 0.01
9	0.150	402	60.30	0.02	ND	p-Dichlorobenzene 0.01 Methyl Chloroform 0.02

ND non-detectable/below limit of detection; Analysis Method OSHA 7

*compounds screened: chloroform, methyl chloroform, benzene, carbon tetrachloride, trichloroethylene (TCE), toluene, tetrachloroethylene (PCE), ethyl benzene, styrene, xylems, p-dichlorobenzene.

Only PCE, p-dichlorobenzene, and methyl chloroform were detected during the sampling period. All sample results for these compounds were well below their respective PEL or REL.

Compound	OSHA PEL (ppm)	NIOSH REL (ppm)
PCE	100	0.4
p-Dichlorobenzene	200	100
Methyl chloroform	350	350

Lead in Air

01 November 2002

Location Sample #	Average Flow Rate (LPM)	Duration (mins)	Volume (L)	Results (ug/m3)
10	-	-	-	Blank
11, personal	2.11	98	206.8	12
12, area	2.06	103	212.2	<QL
13, personal	2.12	75	159.0	<QL
14, area	2.04	145	295.8	<QL

QL = limit of quantitation or limit of detection

OSHA PEL = 50 ug/m3 TWA and 30 ug/m3 action level; Analysis Method NIOSH 7082

Respirable Dust

01 November 2002

Location Sample #	Average Flow Rate (LPM)	Duration (mins)	Volume (L)	Results (ppm)
15	-	-	-	Blank

16, personal	2.05	98	200.9	ND
17, area	2.02	103	208.1	ND
18, personal	2.06	75	154.5	ND
19, area	2.02	145	292.9	ND

OSHA PEL = 5 mg/m3; Analysis Method NIOSH 0600

Mold and Fungal Sampling- 31 Oct 2002
(see laboratory data sheets for genera/ species identified)

Sample ID Number	Location	Sample Type/ Media	Sample Analysis	Unit of Measurement
1	Bldg 90, Outside	Air/ MEA	537	CFU/m3
2	Bldg 90, Inside, north end	Air/ MEA	353	CFU/m3
3	Bldg 90, Inside, south end	Air/ MEA	21	CFU/m3
4	Bldg 36, Kitchen	Air/ MEA	834	CFU/m3
5	Bldg 36, Ops Center	Air/ MEA	410	CFU/m3
6	Bldg 36, Locker Room	Air/ MEA	1364*	CFU/m3
7	Bldg 91, South end	Air/ MEA	134	CFU/m3
8	Bldg 91, North end	Air/ MEA	226	CFU/m3
9	Bldg 91, Center	Air/ MEA	191	CFU/m3
10	Bldg 91, Outside	Air/ MEA	622	CFU/m3
1A	Bldg 90, Outside	Air/CCA	Absent	-
2A	Bldg 90, Inside	Air/CCA	Absent	-
3A	Bldg 36, Kitchen	Air/CCA	Absent	-
4A	Bldg 36, Ops Center	Air/CCA	Absent	-
5A	Bldg 91, South end	Air/CCA	Absent	-
6A	Bldg 91, North end	Air/CCA	Absent	-
7A	Bldg 91, Outside	Air/CCA	Absent	-

**Aspergillus versicolor* isolated in the sample analysis

MEA – malt extract agar
CCA – cellulose Czapek agar
CFU/m3 - colony forming units per cubic Meter

IV. Discussion

VOCs

Building 90 sampling primarily consisted of an indoor air pollution screen to identify presence and quantify concentrations of chlorinated solvents. Survey results did not identify any significant concentrations that would pose a health hazard to workers. All sample results were well below their respective OSHA permissible exposure limits and NIOSH recommended exposure limits. Most sample results were actually non-detectable. PCE sample results were less than the NIOSH REL of 0.4 ppm, the lowest feasible concentration.

A vapor extraction system is being installed in Building 90. The system is designed to actively remove PCE vapors from the soil beneath the foundation. Consequently, PCE levels should diminish to less than the limit of detection.

Bioaerosols

There are no established regulatory exposure limits for bioaerosols. When assessing indoor levels of mold and fungal contamination, it is important to obtain samples from outdoors for reference. Health officials rely upon useful guidelines based upon baseline data and absolute values- specifically comparison between affected and non-affected or indoor versus outdoor concentrations. Comparisons are relative, looking for presence of toxigenic fungi and amplification of fungi indoors. Many factors influence the presence of bioaerosols indoors. Factors include the types of activities occurring in the space, fungal content, and the rate of penetration of outdoor air. Furthermore, bioaerosol concentrations will vary by time and location, geographically, even within a single room.

During the survey, outdoors bioaerosol sampling results were not uncommon for concentration levels and makeup. *Cladosporium* and *Alternaria* genera were the most predominant bioaerosols. In fact, they are very common, and account for the majority of fungal spores found worldwide. Concerns arise when amplification of these spora occur indoors, or when different genera and species flourish.

Sample results from Buildings 36, 90 and 91 were comparable to outdoor levels and within acceptable limits with the exception of the locker room in Bldg 36. Total fungal counts in the locker room were two times higher than outdoors and had very low levels of *Aspergillus versicolor* present. An inspection of the room did not reveal any visible mold or evidence of water damage. The source of the high fungal counts and *Aspergillus* is most likely attributed to poor housekeeping (specifically leaves and organic material on the floor) in the room. An inspection of the kitchen in Building 36 did reveal water damaged ceiling tile. Evidently, the source is a chronic roof leak. If left unabated, the roof leak will lead to significant mold growth and become problematic for building occupants from a health and safety standpoint.

Building 91 had water damaged ceiling tiles. The source of the moisture is condensation on a heating, ventilation and air conditioning (HVAC) duct that runs through the warehouse space. The duct is not insulated permitting cold surface contact with humid ambient air. The resulting condensation dripped onto the ceiling tiles. Only the portion in closest proximity to the mechanical room has the condensation problem. At the time of this survey, there was no moisture observed on the duct. However, the problem will continue to persist during the hot humid summer season when the air conditioning is operating. Moisture problems and their solutions will differ based on geographic climate and seasons. In this case, controlling moisture can be achieved by preventing moisture condensation and / or reducing indoor humidity.

Lead and Respirable Dust

Area sample results for lead in air samples were all < LOD. Only one personal sample was above the LOD. The concentration was 12 micrograms per cubic meter (ug/m3) which is equivalent to 2.45 ug/m3 for an 8 hour TWA. The OSHA PEL is 50 ug/m3 based on an 8 hour TWA. Sample time was based on activity for that day. Future results can differ based on duration and caliber of weapons being tested. During this sample period only smaller caliber rounds were test fired. Additionally, copper-jacketed bullets were used, which have been shown to reduce airborne lead fumes. Nevertheless, a longer test period coupled with larger caliber or unjacketed rounds will exceed the exhaust capability of the existing fan in the room. Installation of a new test firing booth will enhance the exhaust ventilation around the breathing zone and minimize worker exposures.

Respirable dust samples were collected to assess if there was any generation of particulates resulting from test firing into a bullet trap consisting of sand. All area and personal results were less than the limit of detection. Had the samples come back above the limit of detection, the lab was instructed to determine silica concentration using x-ray diffraction.

V. Recommendations

Continue periodic indoor air monitoring for PCE and TCE compounds in Building 90, especially after the vapor extraction system is activated.
Control the moisture condensation on the HVAC duct in Building 91. Consult facilities maintenance for solutions which could include insulating the duct, or improving air flow in the ceiling plenum. Replace all water damaged ceiling tiles in the warehouse area. Dry inactive mold on the duct can be cleaned with water and detergent.
Repair the roof leak in Building 36 and replace all water damaged ceiling tiles. Improve the housekeeping in the Locker room.

VI. Figures

See Attached Diagram (provided under separate cover) for detailed sample locations.

Air Toxics LTD.
Laboratory Services Since 1989

4/5/2010
Ms. Cynthia Clark
APPL, Inc.
908 North Temperance Ave

Clovis CA 93611

Project Name:
Project #: 747144.02000
Workorder #: 1003158R1

Dear Ms. Cynthia Clark

The following report includes the data for the above referenced project for sample(s) received on 3/6/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori
Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1003158R1

Work Order Summary

CLIENT:
Ms. Cynthia Clark
APPL, Inc.
908 North Temperance Ave
Clovis, CA 93611

BILL TO:
Ms. Cynthia Clark
APPL, Inc.
908 North Temperance Ave
Clovis, CA 93611

PHONE: 559-275-2175
FAX: 559-275-4422
DATE RECEIVED: 03/06/2010
DATE COMPLETED: 03/18/2010
DATE REISSUED: 04/05/2010

P.O. #
PROJECT # 747144.02000
CONTACT: Kyle Vagadori

FRACTION #	**NAME**	**TEST**	**RECEIPT VAC./PRES.**	**FINAL PRESSURE**
01A	VIP-AOC65-01	Modified TO-15	8"hg	5 psi
02A	VIP-AOC65-02	Modified TO-15	2.2"hg	5 psi
03A	VIP-AOC65-03	Modified TO-15	2.2"hg	5 psi
04A	VIP-AOC65-04	Modified TO-15	2.4"hg	5 psi
05A	VIP-AOC65-05	Modified TO-15	2.2"hg	5 psi
06A	VIP-AOC65-06	Modified TO-15	2.0"hg	5 psi
07A	VIP-AOC65-07 (33943)	Modified TO-15	2.8"hg	5 psi
08A	VIP-AOC65-07 (34218)	Modified TO-15	3.2"hg	5 psi
09A	VIP-AOC65-08	Modified TO-15	2.6"hg	5 psi
09AA	VIP-AOC65-08 Lab Duplicate	Modified TO-15	2.6"hg	5 psi
10A	VIP-AOC65-09	Modified TO-15	2.6"hg	5 psi
11A	VIP-AOC65-10	Modified TO-15	2.2"hg	5 psi
12A	VIP-AOC65-11	Modified TO-15	2.2"hg	5 psi
13A	Lab Blank	Modified TO-15	NA	NA
14A	CCV	Modified TO-15	NA	NA
15A	LCS	Modified TO-15	NA	NA

CERTIFIED BY: Linda L. Freeman DATE: 04/05/10

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
APPL, Inc.
Workorder# 1003158R1

Twelve 6 Liter Summa Canister samples were received on March 06, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	*TO-15*	*ATL Modifications*
Daily CCV	</= 30% Difference	</= 30% Difference; Compounds exceeding this criterion and associated data are flagged and narrated.
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

Sample identifications on the Chain of Custody (COC) were not unique for samples VIP-AOC65-07 (33943) and VIP-AOC65-07 (34218). The canister numbers were added to each of the sample identifications to ensure uniqueness.

The Chain of Custody (COC) was not relinquished properly. An incomplete date was provided by the field sampler.

Analytical Notes

All Quality Control Limit exceedences and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

The recovery of 1,2-Dichloroethane-d4 in sample VIP-AOC65-08 Duplicate was outside control limits due to matrix interference. All results duplicate between the original sample and its duplicate. There is no effect on data quality.

THE WORK ORDER WAS RE-ISSUED ON APRIL 5, 2010 TO REPORT ESTIMATED VALUES FOR TARGET COMPOUND HITS THAT ARE BELOW THE REPORTING LIMIT BUT GREATER THAN THE METHOD DETECTION LIMIT. CONCENTRATIONS THAT ARE BELOW THE LEVEL AT WHICH THE CANISTER WAS CERTIFIED MAY BE FALSE POSITIVES.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction no performed).

J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS

Client Sample ID: VIP-AOC65-01

Lab ID#: 1003158R1-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.92	1.2	6.2	7.8
Benzene	0.92	1.1	2.9	3.7
Toluene	0.92	2.6	3.4	9.9

Client Sample ID: VIP-AOC65-02

Lab ID#: 1003158R1-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.72	0.60 F	4.9	4.1 F
Benzene	0.72	0.90	2.3	2.9
Toluene	0.72	1.6	2.7	6.1

Client Sample ID: VIP-AOC65-03

Lab ID#: 1003158R1-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2-Dichloroethane	0.72	1.9 J	2.9	7.8 J
1,1,1-Trichloroethane	0.72	1.6	4.0	9.0
Trichloroethene	0.72	2.2	3.9	12
Tetrachloroethene	0.72	1.4	4.9	9.7
Benzene	0.72	1.6	2.3	5.3
Toluene	0.72	0.60 F	2.7	2.2 F

Client Sample ID: VIP-AOC65-04

Lab ID#: 1003158R1-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.73	0.52 F	5.0	3.6 F
Benzene	0.73	2.0	2.3	6.6
Toluene	0.73	0.65 F	2.8	2.5 F

Client Sample ID: VIP-AOC65-05

Lab ID#: 1003158R1-05A

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS

Client Sample ID: VIP-AOC65-05

Lab ID#: 1003158R1-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.72	1.7	4.9	12
Benzene	0.72	3.3	2.3	10
Toluene	0.72	1.2	2.7	4.6

Client Sample ID: VIP-AOC65-06

Lab ID#: 1003158R1-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	0.72	0.32 F	3.9	1.8 F
Trichloroethene	0.72	0.58 F	3.9	3.1 F
Tetrachloroethene	0.72	0.89	4.9	6.1
Benzene	0.72	3.7	2.3	12
Toluene	0.72	1.3	2.7	4.9

Client Sample ID: VIP-AOC65-07 (33943)

Lab ID#: 1003158R1-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.74	1.2	5.0	7.8
Benzene	0.74	1.4	2.4	4.6
Toluene	0.74	0.63 F	2.8	2.4 F

Client Sample ID: VIP-AOC65-07 (34218)

Lab ID#: 1003158R1-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.75	1.1	5.1	7.7
Benzene	0.75	0.83	2.4	2.6
Toluene	0.75	0.38 F	2.8	1.4 F

Client Sample ID: VIP-AOC65-08

Lab ID#: 1003158R1-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS

Client Sample ID: VIP-AOC65-08

Lab ID#: 1003158R1-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.74	0.73 F	2.3	2.3 F
Toluene	0.74	0.23 F	2.8	0.87 F

Client Sample ID: VIP-AOC65-08 Lab Duplicate

Lab ID#: 1003158R1-09AA

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.74	0.74	2.3	2.4
Toluene	0.74	0.23 F	2.8	0.85 F

Client Sample ID: VIP-AOC65-09

Lab ID#: 1003158R1-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.74	0.36 F	5.0	2.4 F
Benzene	0.74	1.0	2.3	3.4
Toluene	0.74	0.44 F	2.8	1.7 F

Client Sample ID: VIP-AOC65-10

Lab ID#: 1003158R1-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.72	0.81	2.3	2.6
Toluene	0.72	0.21 F	2.7	0.81 F

Client Sample ID: VIP-AOC65-11

Lab ID#: 1003158R1-12A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.72	1.4	2.3	4.5
Toluene	0.72	0.52 F	2.7	1.9 F

Client Sample ID: VIP-AOC65-01

Lab ID#: 1003158R1-01A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031135r1**	**Date of Collection:**	**3/4/10 10:45:00 AM**
Dil. Factor:	**1.83**	**Date of Analysis:**	**3/11/10 10:48 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.92	Not Detected U	2.3	Not Detected U
1,2-Dichloroethane	0.92	Not Detected U	3.7	Not Detected U
1,1-Dichloroethene	0.92	Not Detected U	3.6	Not Detected U
1,1,1-Trichloroethane	0.92	Not Detected U	5.0	Not Detected U
cis-1,2-Dichloroethene	0.92	Not Detected U	3.6	Not Detected U
Methylene Chloride	0.92	Not Detected U	3.2	Not Detected U
Trichloroethene	0.92	Not Detected U	4.9	Not Detected U
Tetrachloroethene	0.92	1.2	6.2	7.8
trans-1,2-Dichloroethene	0.92	Not Detected U	3.6	Not Detected U
Benzene	0.92	1.1	2.9	3.7
Toluene	0.92	2.6	3.4	9.9

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	128	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	95	70-130

Client Sample ID: VIP-AOC65-02

Lab ID#: 1003158R1-02A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031136r1**	**Date of Collection: 3/4/10 11:10:00 AM**
Dil. Factor:	**1.45**	**Date of Analysis: 3/11/10 11:28 PM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Vinyl Chloride	0.72	Not Detected U	1.8	Not Detected U
1,2-Dichloroethane	0.72	Not Detected U	2.9	Not Detected U
1,1-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.72	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.72	Not Detected U	2.5	Not Detected U
Trichloroethene	0.72	Not Detected U	3.9	Not Detected U
Tetrachloroethene	0.72	0.60 F	4.9	4.1 F
trans-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Benzene	0.72	0.90	2.3	2.9
Toluene	0.72	1.6	2.7	6.1

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.
Container Type: 6 Liter Summa Canister

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	125	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	94	70-130

Client Sample ID: VIP-AOC65-03

Lab ID#: 1003158R1-03A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031137r1**	**Date of Collection: 3/4/10 1:30:00 PM**
Dil. Factor:	**1.45**	**Date of Analysis: 3/12/10 07:37 AM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Vinyl Chloride	0.72	Not Detected U	1.8	Not Detected U
1,2-Dichloroethane	0.72	1.9 J	2.9	7.8 J
1,1-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.72	1.6	4.0	9.0
cis-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.72	Not Detected U	2.5	Not Detected U
Trichloroethene	0.72	2.2	3.9	12
Tetrachloroethene	0.72	1.4	4.9	9.7
trans-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Benzene	0.72	1.6	2.3	5.3
Toluene	0.72	0.60 F	2.7	2.2 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
J = Estimated value.
F = The analyte was postively identified but the associated numerical value is below the RL.
Container Type: 6 Liter Summa Canister

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	127	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	90	70-130

Client Sample ID: VIP-AOC65-04

Lab ID#: 1003158R1-04A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031138r1**	**Date of Collection: 3/4/10 3:00:00 PM**
Dil. Factor:	**1.46**	**Date of Analysis: 3/12/10 07:56 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.73	Not Detected U	1.9	Not Detected U
1,2-Dichloroethane	0.73	Not Detected U	3.0	Not Detected U
1,1-Dichloroethene	0.73	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.73	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.73	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.73	Not Detected U	2.5	Not Detected U
Trichloroethene	0.73	Not Detected U	3.9	Not Detected U
Tetrachloroethene	0.73	0.52 F	5.0	3.6 F
trans-1,2-Dichloroethene	0.73	Not Detected U	2.9	Not Detected U
Benzene	0.73	2.0	2.3	6.6
Toluene	0.73	0.65 F	2.8	2.5 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.
Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	126	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: VIP-AOC65-05

Lab ID#: 1003158R1-05A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031139r1**	**Date of Collection: 3/4/10 3:15:00 PM**
Dil. Factor:	**1.45**	**Date of Analysis: 3/12/10 08:19 AM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Vinyl Chloride	0.72	Not Detected U	1.8	Not Detected U
1,2-Dichloroethane	0.72	Not Detected U	2.9	Not Detected U
1,1-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.72	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.72	Not Detected U	2.5	Not Detected U
Trichloroethene	0.72	Not Detected U	3.9	Not Detected U
Tetrachloroethene	0.72	1.7	4.9	12
trans-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Benzene	0.72	3.3	2.3	10
Toluene	0.72	1.2	2.7	4.6

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.

Container Type: 6 Liter Summa Canister

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	126	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: VIP-AOC65-06

Lab ID#: 1003158R1-06A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031140r1**	**Date of Collection: 3/4/10 3:30:00 PM**
Dil. Factor:	**1.44**	**Date of Analysis: 3/12/10 08:39 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.72	Not Detected U	1.8	Not Detected U
1,2-Dichloroethane	0.72	Not Detected U	2.9	Not Detected U
1,1-Dichloroethene	0.72	Not Detected U	2.8	Not Detected U
1,1,1-Trichloroethane	0.72	0.32 F	3.9	1.8 F
cis-1,2-Dichloroethene	0.72	Not Detected U	2.8	Not Detected U
Methylene Chloride	0.72	Not Detected U	2.5	Not Detected U
Trichloroethene	0.72	0.58 F	3.9	3.1 F
Tetrachloroethene	0.72	0.89	4.9	6.1
trans-1,2-Dichloroethene	0.72	Not Detected U	2.8	Not Detected U
Benzene	0.72	3.7	2.3	12
Toluene	0.72	1.3	2.7	4.9

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.
Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	125	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	95	70-130

Client Sample ID: VIP-AOC65-07 (33943)

Lab ID#: 1003158R1-07A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031141r1**	**Date of Collection: 3/4/10 3:45:00 PM**
Dil. Factor:	**1.48**	**Date of Analysis: 3/12/10 09:01 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.74	Not Detected U	1.9	Not Detected U
1,2-Dichloroethane	0.74	Not Detected U	3.0	Not Detected U
1,1-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.74	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.74	Not Detected U	2.6	Not Detected U
Trichloroethene	0.74	Not Detected U	4.0	Not Detected U
Tetrachloroethene	0.74	1.2	5.0	7.8
trans-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Benzene	0.74	1.4	2.4	4.6
Toluene	0.74	0.63 F	2.8	2.4 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	125	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: VIP-AOC65-07 (34218)

Lab ID#: 1003158R1-08A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031142r1**	**Date of Collection: 3/4/10 3:45:00 PM**
Dil. Factor:	**1.50**	**Date of Analysis: 3/12/10 09:20 AM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Vinyl Chloride	0.75	Not Detected U	1.9	Not Detected U
1,2-Dichloroethane	0.75	Not Detected U	3.0	Not Detected U
1,1-Dichloroethene	0.75	Not Detected U	3.0	Not Detected U
1,1,1-Trichloroethane	0.75	Not Detected U	4.1	Not Detected U
cis-1,2-Dichloroethene	0.75	Not Detected U	3.0	Not Detected U
Methylene Chloride	0.75	Not Detected U	2.6	Not Detected U
Trichloroethene	0.75	Not Detected U	4.0	Not Detected U
Tetrachloroethene	0.75	1.1	5.1	7.7
trans-1,2-Dichloroethene	0.75	Not Detected U	3.0	Not Detected U
Benzene	0.75	0.83	2.4	2.6
Toluene	0.75	0.38 F	2.8	1.4 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.

Container Type: 6 Liter Summa Canister

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	125	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	94	70-130

Client Sample ID: VIP-AOC65-08

Lab ID#: 1003158R1-09A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031143r1**	**Date of Collection: 3/4/10 4:00:00 PM**
Dil. Factor:	**1.47**	**Date of Analysis: 3/12/10 09:40 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.74	Not Detected U	1.9	Not Detected U
1,2-Dichloroethane	0.74	Not Detected U	3.0	Not Detected U
1,1-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.74	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.74	Not Detected U	2.6	Not Detected U
Trichloroethene	0.74	Not Detected U	4.0	Not Detected U
Tetrachloroethene	0.74	Not Detected U	5.0	Not Detected U
trans-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Benzene	0.74	0.73 F	2.3	2.3 F
Toluene	0.74	0.23 F	2.8	0.87 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	129	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: VIP-AOC65-08 Lab Duplicate

Lab ID#: 1003158R1-09AA

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031144r1**	**Date of Collection: 3/4/10 4:00:00 PM**
Dil. Factor:	**1.47**	**Date of Analysis: 3/12/10 09:59 AM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Vinyl Chloride	0.74	Not Detected U	1.9	Not Detected U
1,2-Dichloroethane	0.74	Not Detected U	3.0	Not Detected U
1,1-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.74	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.74	Not Detected U	2.6	Not Detected U
Trichloroethene	0.74	Not Detected U	4.0	Not Detected U
Tetrachloroethene	0.74	Not Detected U	5.0	Not Detected U
trans-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Benzene	0.74	0.74	2.3	2.4
Toluene	0.74	0.23 F	2.8	0.85 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.
Q = Exceeds Quality Control limits.
Container Type: 6 Liter Summa Canister

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	132 Q	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	95	70-130

Client Sample ID: VIP-AOC65-09

Lab ID#: 1003158R1-10A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031145r1**	**Date of Collection: 3/4/10 4:15:00 PM**
Dil. Factor:	**1.47**	**Date of Analysis: 3/12/10 10:19 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.74	Not Detected U	1.9	Not Detected U
1,2-Dichloroethane	0.74	Not Detected U	3.0	Not Detected U
1,1-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.74	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.74	Not Detected U	2.6	Not Detected U
Trichloroethene	0.74	Not Detected U	4.0	Not Detected U
Tetrachloroethene	0.74	0.36 F	5.0	2.4 F
trans-1,2-Dichloroethene	0.74	Not Detected U	2.9	Not Detected U
Benzene	0.74	1.0	2.3	3.4
Toluene	0.74	0.44 F	2.8	1.7 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.
Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	130	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: VIP-AOC65-10

Lab ID#: 1003158R1-11A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031146r1**	**Date of Collection: 3/4/10 4:30:00 PM**
Dil. Factor:	**1.45**	**Date of Analysis: 3/12/10 10:42 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.72	Not Detected U	1.8	Not Detected U
1,2-Dichloroethane	0.72	Not Detected U	2.9	Not Detected U
1,1-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.72	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.72	Not Detected U	2.5	Not Detected U
Trichloroethene	0.72	Not Detected U	3.9	Not Detected U
Tetrachloroethene	0.72	Not Detected U	4.9	Not Detected U
trans-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Benzene	0.72	0.81	2.3	2.6
Toluene	0.72	0.21 F	2.7	0.81 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.
Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	128	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: VIP-AOC65-11

Lab ID#: 1003158R1-12A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031147r1**	**Date of Collection: 3/4/10 4:45:00 PM**
Dil. Factor:	**1.45**	**Date of Analysis: 3/12/10 11:20 AM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Vinyl Chloride	0.72	Not Detected U	1.8	Not Detected U
1,2-Dichloroethane	0.72	Not Detected U	2.9	Not Detected U
1,1-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
1,1,1-Trichloroethane	0.72	Not Detected U	4.0	Not Detected U
cis-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Methylene Chloride	0.72	Not Detected U	2.5	Not Detected U
Trichloroethene	0.72	Not Detected U	3.9	Not Detected U
Tetrachloroethene	0.72	Not Detected U	4.9	Not Detected U
trans-1,2-Dichloroethene	0.72	Not Detected U	2.9	Not Detected U
Benzene	0.72	1.4	2.3	4.5
Toluene	0.72	0.52 F	2.7	1.9 F

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F = The analyte was postively identified but the associated numerical value is below the RL.

Container Type: 6 Liter Summa Canister

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	128	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: Lab Blank

Lab ID#: 1003158R1-13A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031134r1**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis:**	**3/11/10 10:15 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.50	Not Detected U	1.3	Not Detected U
1,2-Dichloroethane	0.50	Not Detected U	2.0	Not Detected U
1,1-Dichloroethene	0.50	Not Detected U	2.0	Not Detected U
1,1,1-Trichloroethane	0.50	Not Detected U	2.7	Not Detected U
cis-1,2-Dichloroethene	0.50	Not Detected U	2.0	Not Detected U
Methylene Chloride	0.50	Not Detected U	1.7	Not Detected U
Trichloroethene	0.50	Not Detected U	2.7	Not Detected U
Tetrachloroethene	0.50	Not Detected U	3.4	Not Detected U
trans-1,2-Dichloroethene	0.50	Not Detected U	2.0	Not Detected U
Benzene	0.50	Not Detected U	1.6	Not Detected U
Toluene	0.50	Not Detected U	1.9	Not Detected U

U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	126	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: CCV
Lab ID#: 1003158R1-14A
MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031133**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 3/11/10 09:43 PM**

Compound	**%Recovery**
Vinyl Chloride	117
1,2-Dichloroethane	139 Q
1,1-Dichloroethene	110
1,1,1-Trichloroethane	121
cis-1,2-Dichloroethene	104
Methylene Chloride	130
Trichloroethene	112
Tetrachloroethene	102
trans-1,2-Dichloroethene	113
Benzene	112
Toluene	112

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	130	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: LCS

Lab ID#: 1003158R1-15A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**d031132**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 3/11/10 09:04 PM**

Compound	%Recovery
Vinyl Chloride	95
1,2-Dichloroethane	130
1,1-Dichloroethene	94
1,1,1-Trichloroethane	111
cis-1,2-Dichloroethene	98
Methylene Chloride	114
Trichloroethene	107
Tetrachloroethene	94
trans-1,2-Dichloroethene	106
Benzene	105
Toluene	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	129	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	95	70-130

Attachment 5
Bandera Road Ground Water Plume Superfund Site
Proposed Plan – July 2011

Bandera Road Ground Water Plume Superfund Site

United States Environmental Protection Agency · Region 6 · July 2011

EPA ANNOUNCES PROPOSED PLAN

Introduction

This Proposed Plan identifies the Preferred Alternative for cleaning up contaminated vapor, soil and ground water at the Bandera Road Ground Water Plume Site and provides the rationale for this preference. In addition, this Plan includes summaries of other cleanup alternatives evaluated for use at this site. This document is issued by the U.S. Environmental Protection Agency (EPA), the lead agency, and the Texas Commission on Environmental Quality (TCEQ), the support agency. EPA, in consultation with the TCEQ, may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

EPA is issuing the Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation (RI) and Feasibility Study (FS) reports and other documents contained in the Administrative Record file for this site. EPA and the State encourage the public to review these documents to gain a more comprehensive understanding of the site and Superfund activities that have been conducted at the site.

OPPORTUNITIES FOR COMMUNITY INVOLVEMENT

PUBLIC COMMENT PERIOD
July 18, 2011 – August 16, 2011

During the public comment period, you are encouraged to comment on this Proposed Plan. Comments may be submitted verbally or in writing during the community meeting, or written comments may be sent to:

Chris Villarreal (6SF-RA)
U.S. EPA
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Written comments should be postmarked no later than August 16, 2011

COMMUNITY MEETING
July 21, 2011 at 7:00 p.m.

You are encouraged to attend an upcoming meeting regarding this Proposed Plan for the site. The meeting will be held at:

Leon Valley Community Center
6427 Evers Road
Leon Valley, Texas 78238

The Administrative Record is available at the following locations:

Leon Valley Public Library
6425 Evers Road
Leon Valley, Texas 78238
(210) 684-0720
Tuesday and Thursday 10am – 8 pm
Wednesday and Friday 10 am – 6pm
Saturday and Monday CLOSED

Texas Commission on Environmental Quality
12100 Park 35 Circle
Building E, Room 103
Austin, Texas 78753
512-239-2900
Toll free number 1-800-633-9363

Inquires from the news media should be directed to Dave Barry, EPA Region 6 Press Office, at (214) 665-2208.

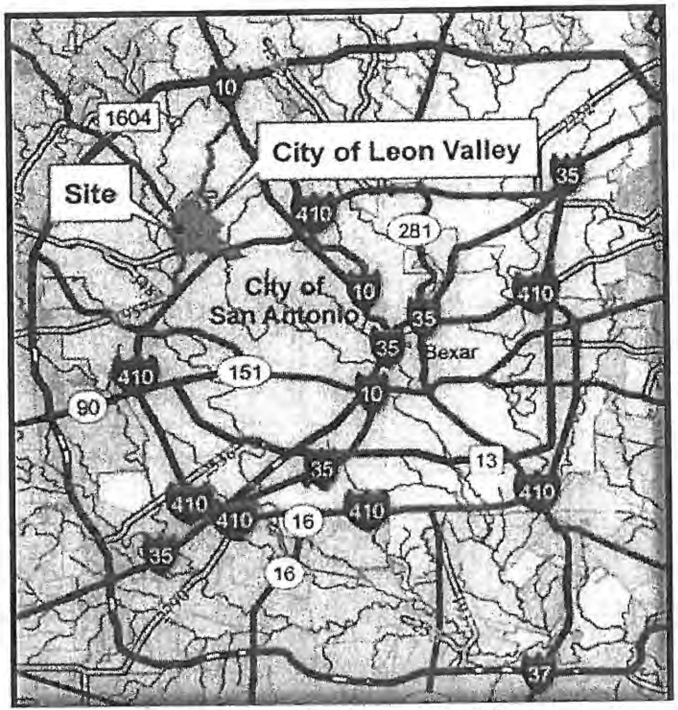


Figure 1 – Site Location Map

Site Background

The Bandera Road Ground Water Plume site is situated in Bexar County, in the City of Leon Valley, in the northwestern section of the City of San Antonio, Texas (see Figure 1). The current estimated site area is approximately one mile long by one-half mile wide. The Site is centered in a business area, with some homes nearby, between Poss Road and Grissom Road. Two City of Leon Valley public water supply wells are within one mile of the center of the site.

The site consists of releases of chlorinated solvents from at least two dry cleaning facilities. These solvents include tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE) and vinyl chloride (VC). These releases have impacted the indoor air, subsurface soils, and the underlying groundwater.

The site was identified through assessment activities conducted under the Texas Commission on Environmental Quality's Voluntary Cleanup Program. The investigation identified the presence of PCE and/or TCE at concentrations above the Federal Drinking Water Standard of 5.0 parts per billion (ppb) in local water wells. Three of these wells were Edwards Aquifer wells which have been plugged and abandoned by the EPA. The Edwards Aquifer has been designated as a sole source drinking water aquifer for Central Texas.

The site was placed on the Superfund National Priorities List (NPL) in 2007. As part of EPA's investigation, individuals served by impacted water wells were connected to the local public water supply. In addition, actions have been taken by the property owner of a former dry cleaner location to mitigate contaminant indoor air concentrations.

To provide site information and project updates to Leon Valley residents, the Bandera Road Community Advisory Group (CAG) was formed in 2007. The Bandera Road CAG includes local citizens and organizational representatives for the Leon Valley area and provides input to EPA on issues regarding the site's investigation and cleanup. The Bandera Road CAG meets quarterly and the meetings are open to the public.

In an effort to identify the reasonably anticipated future land and ground water uses, a reuse assessment was conducted in 2010. The Reuse

Assessment report was funded by the EPA Superfund Redevelopment Initiative which was founded to help communities return Superfund sites to productive use. Anticipated future uses of the site area included: residential, commercial, industrial, and a combination of these uses.

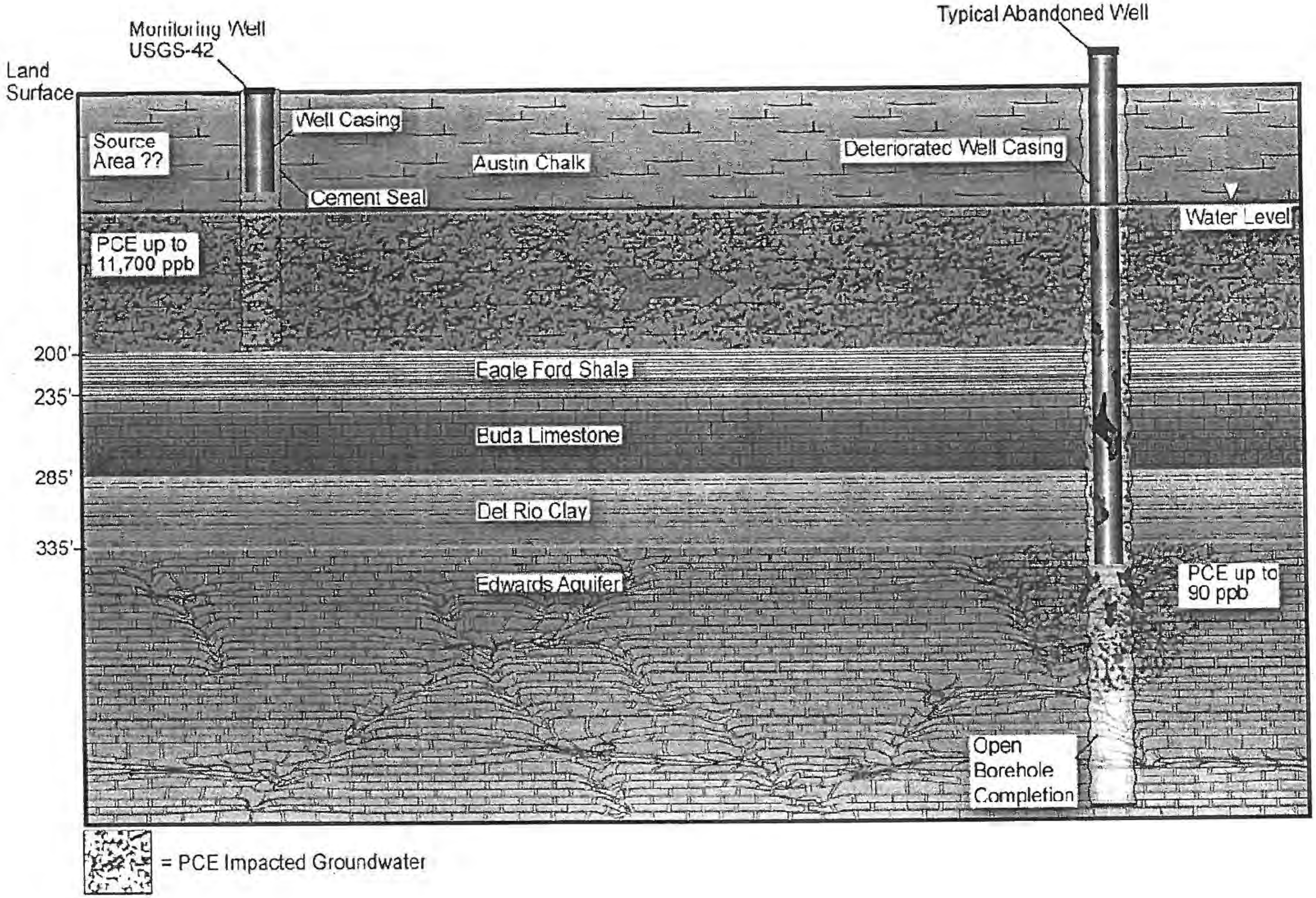
Site Characteristics

The EPA conducted a Remedial Investigation and Feasibility Study (RI/FS) from 2007 through 2011. The RI/FS identified the types, quantities, and locations of contaminants and developed ways to address the contamination problems.

The RI indicated that:

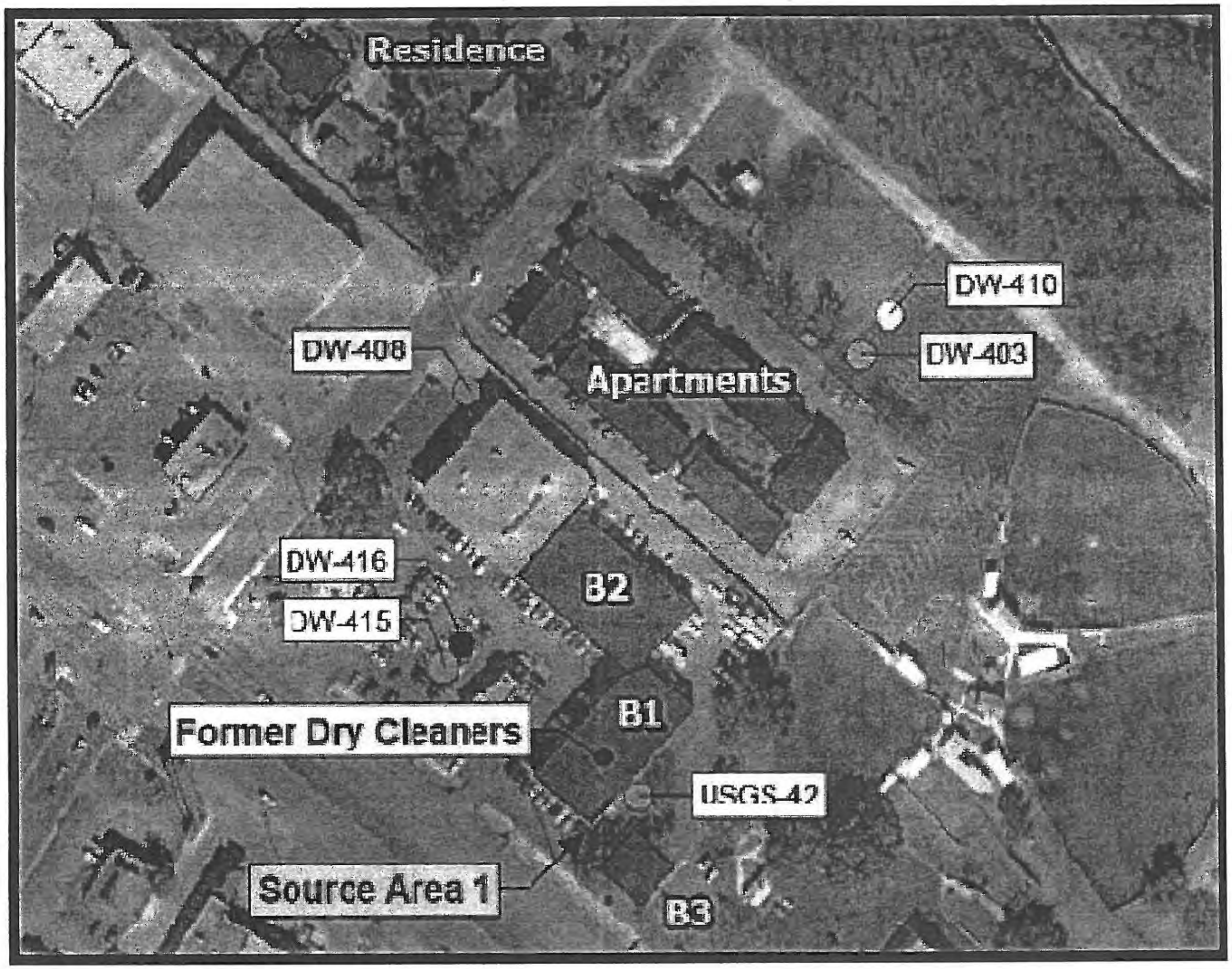
- Older/abandoned water wells and/or wells with deteriorated well casing can act as pathways for the transport of contaminated ground water from the impacted Austin Chalk formation to deeper water zones (i.e., Buda Limestone, Edwards Aquifer) (see Figure 2).
- The site overlays three different karst and fracture dominated water bearing units: the Austin Chalk, the Buda Limestone, and the Edwards Aquifer. Ground water contaminant migration at the site is dependent on the interaction between the three water bearing units.
- Ground water flow in karst aquifers (like those present at the site) will generally be through secondary porosity (e.g., dissolution features, faults, and fractures) that may or may not be interconnected within a well network. Because of the complexity associated with flow through secondary porosity, detailed characterization of flow in karst is very difficult.
- Two confirmed source areas have been identified. The first source area is a former dry cleaner (Area of Investigation 1) (see Figure 3). The second source area is an active dry cleaner (Area of Investigation 2) (see Figure 6). In total, five separate potential areas of interest were investigated. As work progresses, additional areas may be identified and/or investigated as appropriate.
- Source Area 1 was contaminated from a release of PCE within a former dry cleaning facility. Soil gas sampling results indicate the presence of source material in the soil beneath a building (see Figure 4). Soil samples also indicate the presence of source material (see Figure 5). Migration in the vadose zone bedrock (i.e., the bedrock between the impacted surface soil and the water table) is primarily by way of fractures and may have been facilitated by a water leak at the building. Once the contamination reaches the Austin Chalk ground water, it is transported via secondary porosity (i.e., joints, faults, and solution features). Based on water level data, ground water flow in the Austin Chalk is generally to the north/northwest. However, the direction of ground water flow in the Austin Chalk can reverse during significant rainfall events. Dye tracer testing conducted by the Edwards Aquifer Authority using dye injected in Source Area 1 showed the direction of ground water flow was to the south/southwest. Pore space diffusion is also present, although at a much slower rate. Exposure to volatile contaminants from the vapor intrusion pathway has been confirmed in a few occupied structures.
- Source Area 2 was contaminated from a release of PCE at an active dry cleaning facility. Passive soil gas sampling, soil gas sampling and soil sampling have identified PCE contamination (see Figures 7 & 8). Migration in the vadose zone bedrock is primarily via fractures, although a former water well may be acting as a conduit for contaminant migration to deeper formations. Once contamination reaches the Austin Chalk ground water, it is transported via secondary porosity (i.e., joints, faults, solution features) (see Figure 9). Based on water level data, the direction of ground water flow in the Austin Chalk is generally to the northwest. However, dye tracer testing conducted by the Edwards Aquifer using dye injected in Source Area 2 showed the direction of flow was to the south. Pore rate diffusion is also present, although at a much slower rate. Exposure to volatile contaminants from the vapor intrusion pathway has been confirmed in an occupied structure.

Figure 2 - Role of Abandoned Wells



Role of Abandoned Wells - Groundwater Plume Conceptual Drawing
Bandera Road Site CAG

Figure 3
Source Area 1



Legend

- ● Austin Chalk Well
- ● Buda Limestone Well
- ○ Edwards Aquifer Well

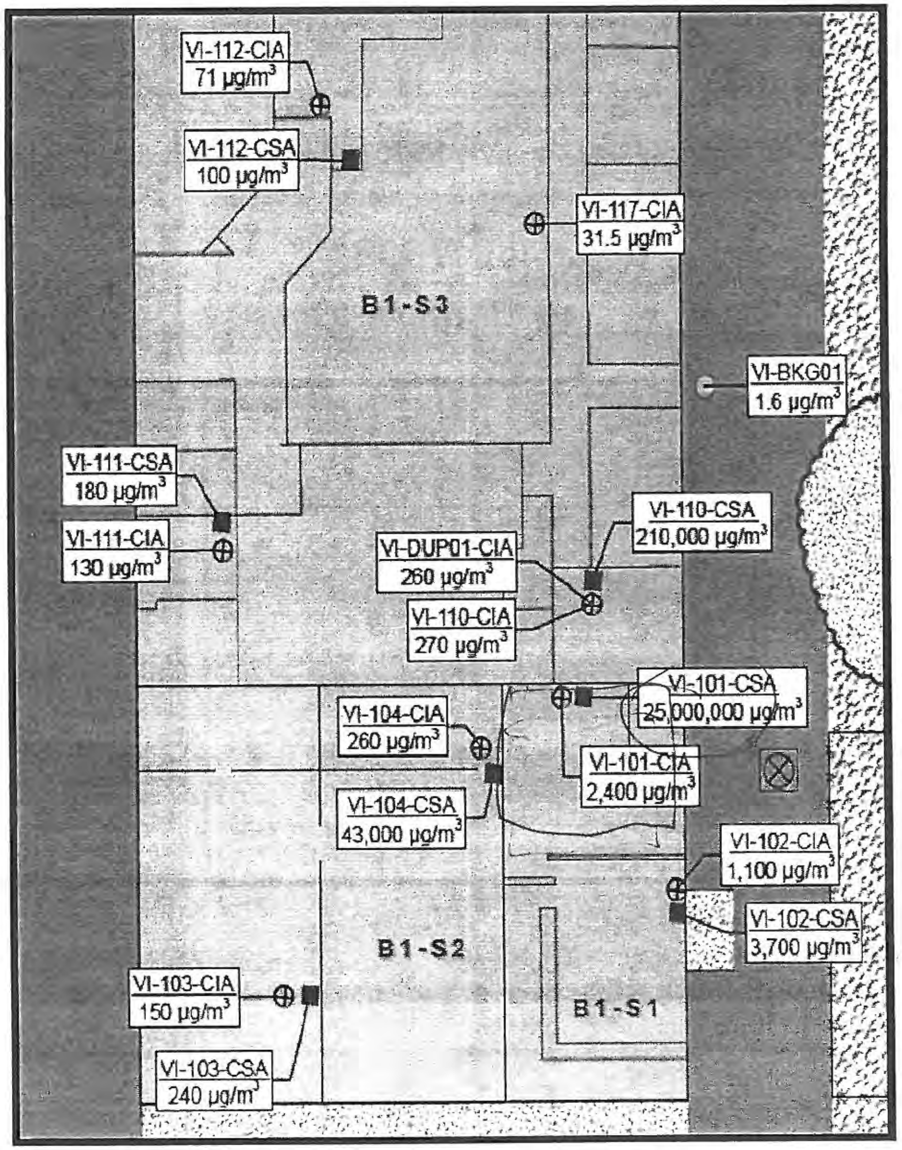


Figure 4
Source Area 1
PCE Vapor
Concentrations

Legend

Background Sample Location ○

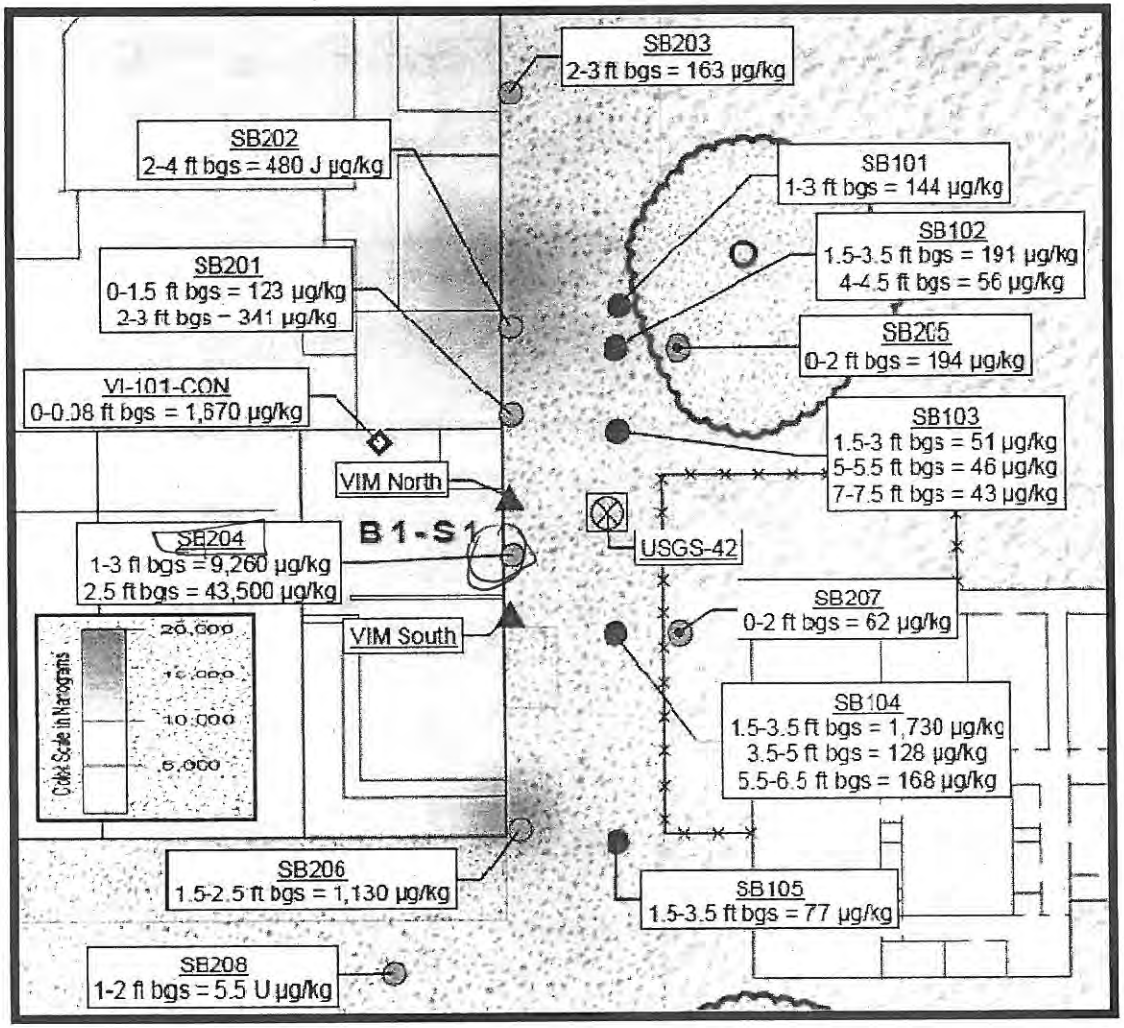
Indoor Air Sample Location ⊕

Sub-slab Sample Location ■

Monitoring Well USGS-42 ⊗

2000 ppb → 200 ppb Indoor Air
95% reduction

Figure 5
Source Area 1
PCE Soil
Concentrations

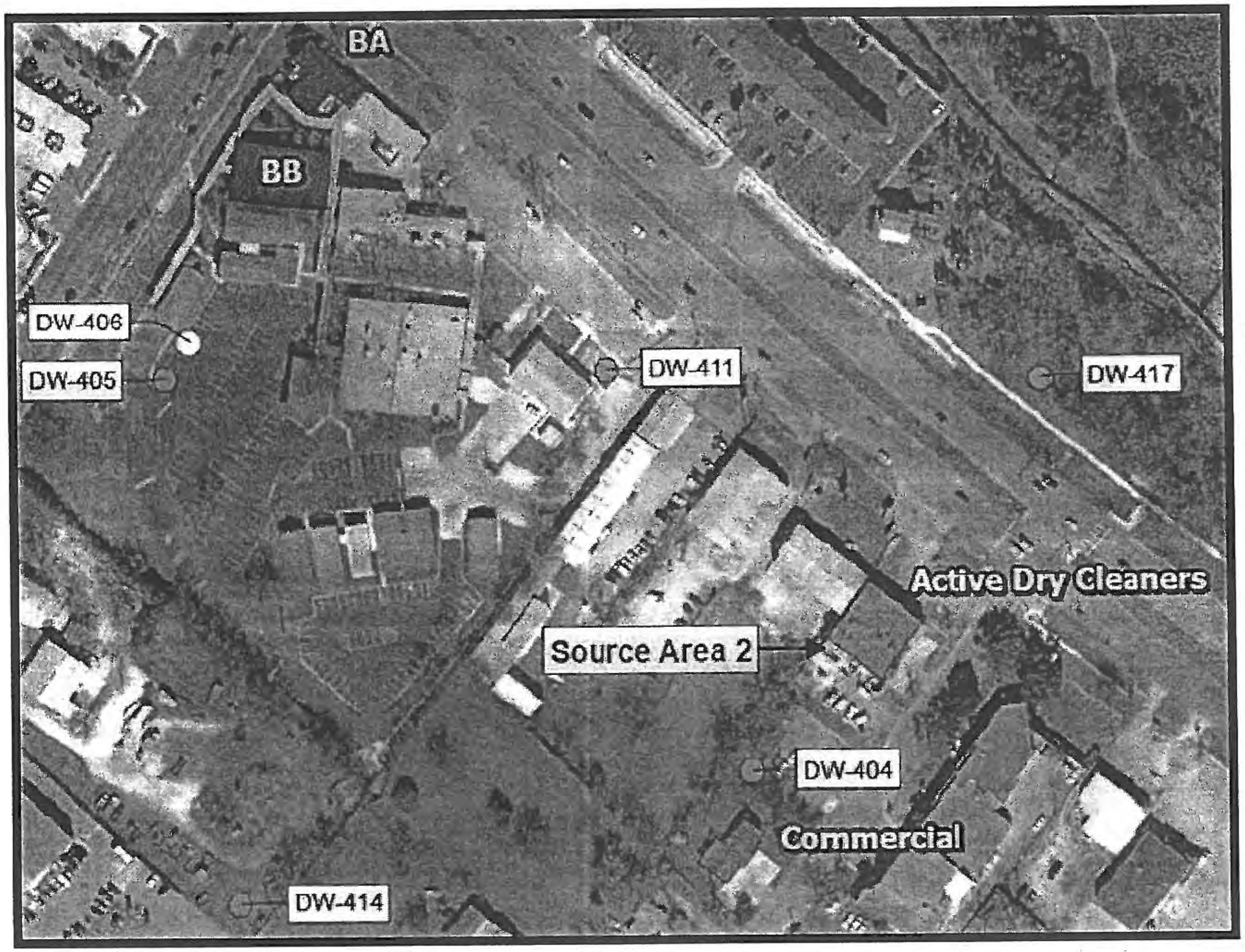


Monitoring Well USGS-42	⊗
<u>Shallow Soil Vapor Points</u> Depth Interval and Corresponding PCE Concentration	●
<u>Deep Soil Vapor Points</u> Depth Interval and Corresponding PCE Concentration	●
<u>Soil Sampling Points</u> Depth Interval and Corresponding PCE Concentration	◎
Concrete From the Floor of the Building	◇
Vapor Intrusion Mitigation Locations	▲

Concentration drop off from source area

2E-10^4 Risk   Austin Chalk - 1 10^{-1} HI-100

Figure 6
Source Area 2



Legend

- ◍ Austin Chalk Well
- ● Buda Limestone Well
- ○ Edwards Aquifer Well

PCE

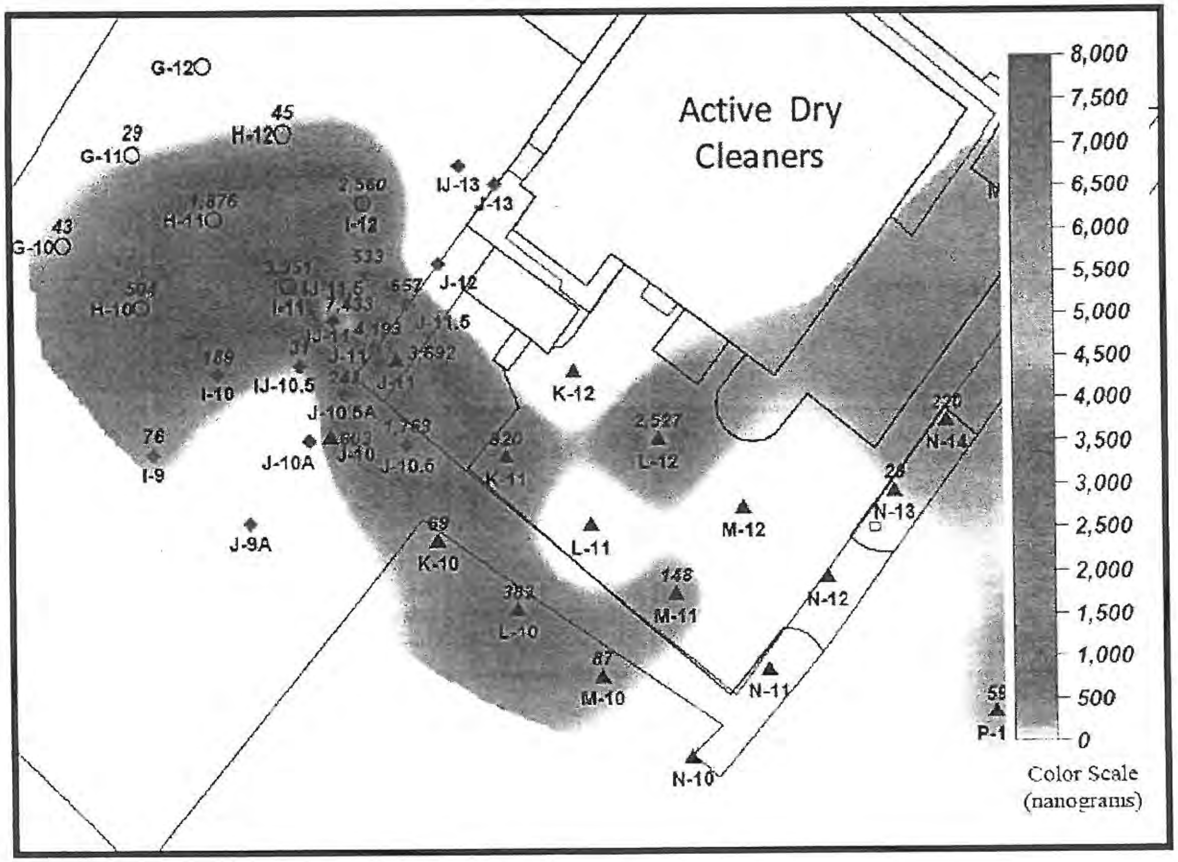


Figure 7
Source Area 2
PCE Passive Soil Gas Survey

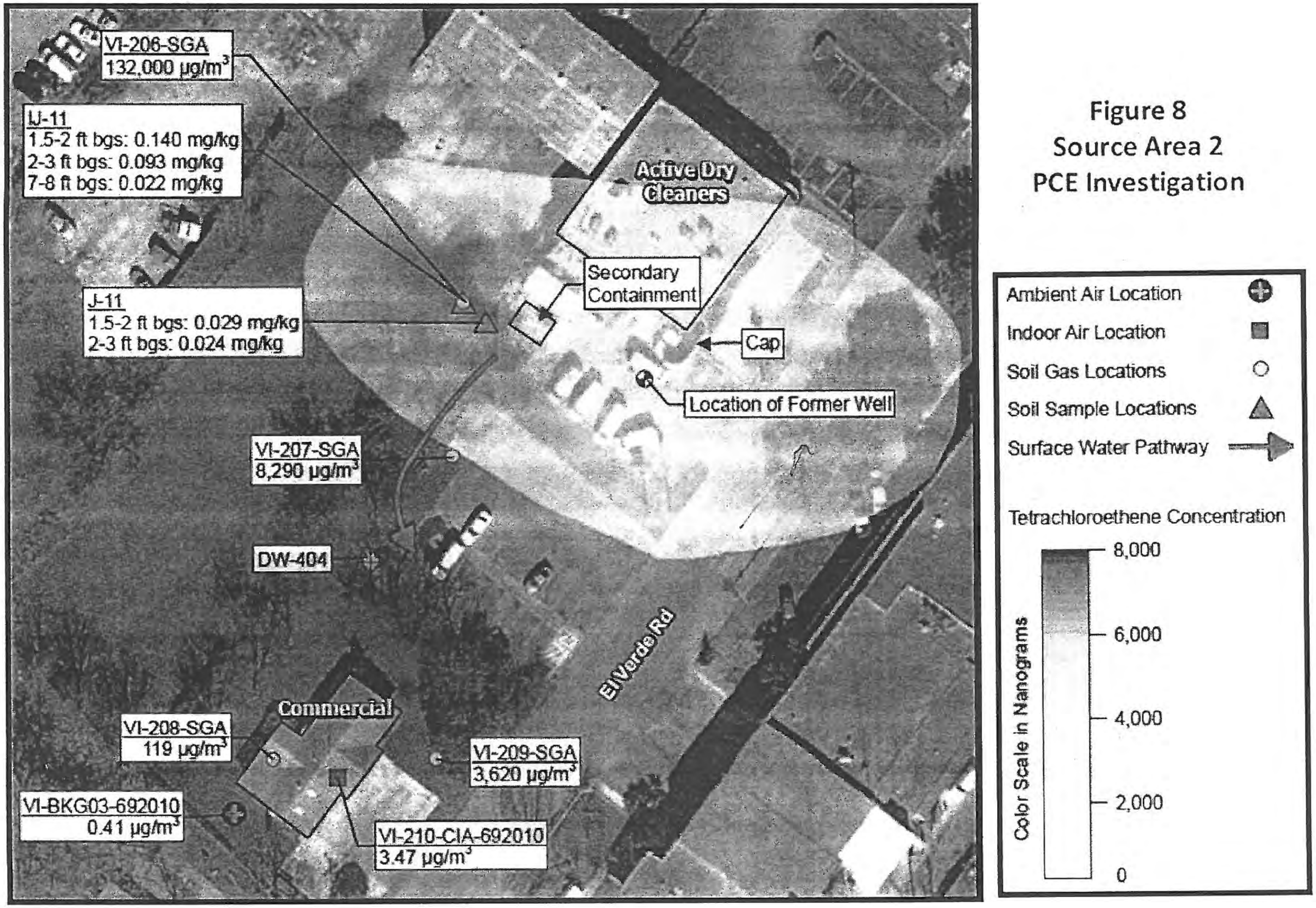
1,000 TETRACHLOROETHENE (nanograms)

▲ K-12 PASSIVE SOIL-GAS SAMPLE LOCATION (October 2009)

◆ I-12 PASSIVE SOIL-GAS SAMPLE LOCATION (May 2010)

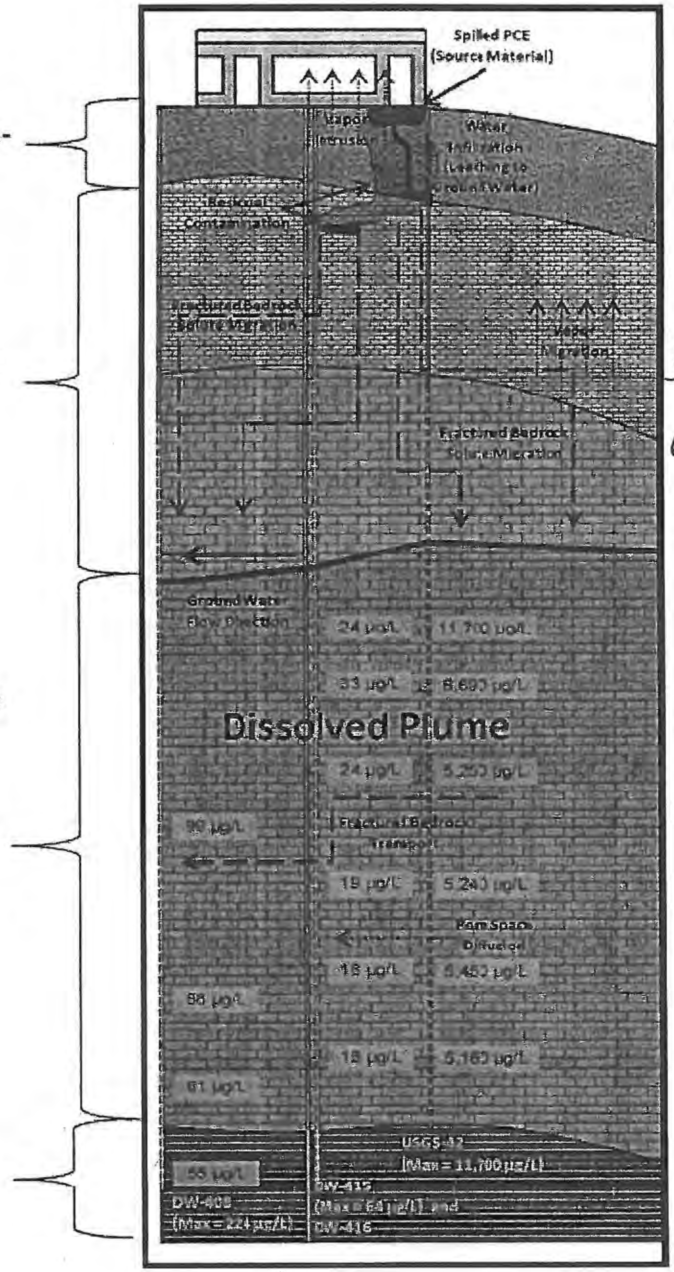
○ H-11 PASSIVE SOIL-GAS SAMPLE LOCATION (July 2010)

Figure 8
Source Area 2
PCE Investigation



Indoor Air & GW 10' to bedrock?

Figure 9
Contaminant Movement



Surface and Sub-Surface Soils

Vadose Zone Bedrock

Austin Chalk Ground Water Zone

Eagle Ford Shale

200'

E

LEGEND

■ Spilled PCE (Source Material)

■ Residual Contamination

■ Vadose Zone Contamination

■ Ground Water Dissolved Plume

FORMATIONS

▨ Surface Sediments

▨ Anacacho Limestone

▨ Austin Chalk Limestone

▨ Eagle Ford Shale

Indoor Air

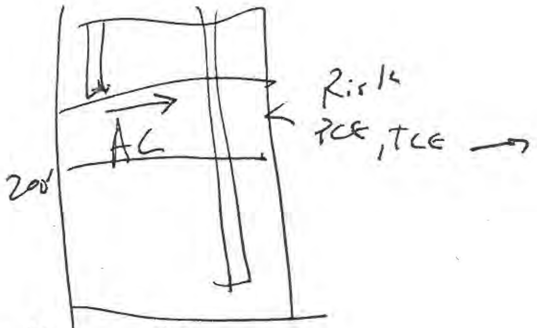
PCE - 21 µg/m³

12 DCE - 4.7 µg/m³

VC - 28 µg/m³

TCE - 61 µg/m³

6.3 Hz · Zinc,



1960s prior hwy well, to EA

CONTAMINANTS OF CONCERN (COCs)

Contaminants that were detected in soil, ground water, and ambient air were considered COCs for the site. Tetrachloroethene, also known as perchloroethylene – hence the common acronym PCE, and its degradation daughter products trichloroethene (TCE), cis-1,2-Dichloroethene (DCE), and vinyl chloride (VC) have been selected as the primary COCs because these chemicals are most prevalent (in terms of screening level exceedance and magnitude) and by-in-large are co-located with other COCs. PCE is a manmade chlorinated solvent, is used commercially as an industrial degreaser, spot remover, and in dry cleaning. Chronic (long-term) PCE exposure can cause damage to the liver, the kidneys and central nervous system. It may also lead to an increased risk of cancer. Other chemicals that exceed screening levels may be elevated due to petroleum hydrocarbon sources in the area (e.g., former gas stations).

WHAT IS A "PRINCIPAL THREAT"?

The NCP establishes an expectation that EPA will use to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. Principal threat waste are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. The analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

- The sub-slab soil gas concentrations of 25,000,000 micrograms per cubic meter ($\mu g/m^3$) in Source Area 1 indicate source material. Elevated soil gas concentrations as high as 132,000 $\mu g/m^3$ were also detected in Source Area 2 soils.
- The chlorinated solvent (i.e., PCE) impacted soils at the former dry cleaner (Source Area 1) and the active dry cleaner (Source Area 2) are considered to be "principal threat wastes" due to their high mobility in the site's fractured bedrock/karst setting. Because of the fractured bedrock/karst setting, the solvent impacted soil cannot be reliably contained. PCE has migrated approximately 100-feet vertically to the ground water.
- Estimates of principal threat waste at Source Areas 1 and 2 are subject to uncertainty. However, for remedy cost estimating purposes, it was estimated that the impacted surface and subsurface soils at Source Area 1 comprise a volume of approximately 50 square feet by 10 feet deep. Impacted surface and subsurface soils in Source Area 2 was estimated to comprise a volume of approximately 25 feet by 50 feet by 10 feet deep.

Scope and Role of the Response Action

This action will be the final action for the site. In 2007, the EPA initiated a time critical removal action involving the installation of water lines and connection of seven properties to the local public water system. EPA has also previously plugged and abandoned three solvent (i.e., PCE) impacted Edward Aquifer wells which were acting as a contaminant migration pathway to the Edwards Aquifer. Response actions have also been undertaken by the current property owner of the former dry cleaner (Source Area 1) to reduce PCE indoor air concentrations. The remedial action objectives are to prevent exposure to contaminated media, prevent or minimize further migration of COCs, source control, and to return ground waters to their expected beneficial uses wherever practicable through a combination of limited action (i.e., institutional controls, engineering controls, and/or long-term monitoring), source excavation, and in-situ treatment of impacted soil, bedrock and groundwater at the site. Through the use of source area excavation and treatment technologies, this response will permanently reduce the toxicity, mobility, and volume of those source materials that constitute the principal threat waste at Source Areas 1 and 2.

If additional Source Areas are identified and have similar characteristics (i.e., current or former dry cleaners), the remedial approach defined in the Record of Decision (ROD) will be applied. Documentation of any changes to the ROD must comply with the requirements of the NCP. Minor changes can be made through an administrative process with public notification. If the remedial action changes significantly, but does not fundamentally alter the remedy selected in the ROD, EPA must prepare an explanation of significant differences, as detailed in 40 CFR 300.435(c)(2)(i), which is made available to the public and placed in the administrative record. If the action fundamentally alters the selected remedy with respect to scope, performance, or costs, then EPA must amend the ROD. Amending the ROD requires public notification and public comment; 40 CFR 300.435(c)(2)(ii) details specific ROD amendment procedures.

Summary of Site Risks

As part of the RI/FS, EPA conducted a baseline risk assessment to determine the current and future effects of contaminants on human health and the environment. The 2010 Reuse Assessment funded by the EPA Superfund Redevelopment Initiative concluded that the anticipated future uses of the site area included: residential, commercial, industrial, and a combination of these uses. In addition, the potential future use of impacted ground water will be as a drinking water source for the community once safe cleanup levels have been achieved.

The Edwards Aquifer is currently being used a public water supply source for the City of Leon Valley and central Texas area. Due to the fractured bedrock/karst environment of the site area, preventing further ground water degradation and restoring the overlying contaminated ground water to acceptable human health cleanup levels is necessary to protect the Edwards Aquifer and to protect the overlying ground water resource.

The baseline risk assessment focused on potential health effects for a resident (child and adult exposure combined), a commercial/industrial worker (C/I), a construction worker (CW), and a recreational/trespasser (R/T). Exposure pathways included the soil exposure pathway (surface soil and subsurface soil), the ground water exposure pathway, and the vapor intrusion exposure pathway. The Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in this Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Human Health Risks

In expressing estimated cancer risk, the use scientific notation is often applied. For example, a 1 in 10,000 increased cancer risk can be expressed as 1×10^{-4}. An increased cancer risk of 1 in 1,000,000 can be expressed as 1×10^{-6}.

For the surface soil (samples from 0 to 2 feet below ground surface), risks were estimated based on exposure to contaminants from soil ingestion and from the inhalation of volatile contaminants present in the soil. The estimated increased cancer risks and hazard indexes are as follows:

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment estimates the "baseline risk." This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. To estimate the baseline risk at a Superfund site, EPA undertakes a four-step process:

Step 1: Analyze Contamination
Step 2: Estimate Exposure
Step 3: Assess Potential Health Dangers
Step 4: Characterize Site Risk

In Step 1, EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies help EPA to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, EPA considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentration that people might be exposed to, and the potential frequency and duration of exposure. Using this information, EPA calculates a "reasonable maximum exposure" (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In Step 3, EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. EPA considers two types of risk: cancer risk and non-cancer risk. The likelihood of any kind of cancer resulting from a Superfund site is generally expressed as an upper bound probability: for example, a "1 in 10,000 chance." In other words, for every 10,000 people that could be exposed to site contaminants, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to form all other cases. For non-cancer health effects, EPA calculates a "hazard index." The key concept here is that a "threshold level" (measured usually as a hazard index less than 1) exists below which non-cancer health effects are no longer predicted.

In Step 4, EPA determines whether site risks are great enough to cause health problems for people at or near the Superfund site. The results of the three previous steps are combined, evaluated and summarized.

	Cancer Risk	Hazard Index
SOURCE AREA 1		
Resident	1×10^{-5}	0.02
C/I Worker	3×10^{-6}	0.003
CW	3×10^{-7}	0.005
R/T	3×10^{-7}	0.0002
SOURCE AREA 2		
Resident	3×10^{-7}	0.0004
C/I Worker	5×10^{-8}	0.00006
CW	5×10^{-9}	0.00009
R/T	6×10^{-9}	0.000004

For the subsurface soil (samples from 2 to 10 feet below ground surface), risks were estimated based on exposure to contaminants from soil ingestion and from the inhalation of volatile contaminants present in the soil.

	Cancer Risk	Hazard Index
SOURCE AREA 1		
Resident	3×10^{-5}	0.05
C/I Worker	7×10^{-6}	0.008
CW	6×10^{-7}	0.01
R/T	8×10^{-7}	0.0006
SOURCE AREA 2		
Resident	2×10^{-7}	0.0003
C/I Worker	4×10^{-8}	0.00004
CW	3×10^{-9}	0.00006
R/T	4×10^{-9}	0.000003

For the ground water, three water bearing zones are of interest: the Austin Chalk, the Buda Limestone, and the Edwards Aquifer (see Figure 2).

For the Austin Chalk, five separate risk evaluations were conducted. Areas were grouped based on the spatial distribution of contaminant detections. Unimpacted Austin Chalk wells located north of Source Area 1 comprise the Northern Unimpacted area. Impacted wells at Source Area 1 comprise the Northern Plume area. Unimpacted wells between Source Area 1 and Source Area 2 comprise the Middle Unimpacted area. Source Area 2 impacted wells comprise the Southern

Plume area. Unimpacted wells south of Source Area 2 comprise the Southern Unimpacted area.

Ground water risks were estimated based on exposure from ground water ingestion, dermal contact (e.g., from showering), and inhalation of volatile contaminants present in the water. Risks for the resident (adult + child) and the commercial/industrial worker were calculated. The estimated increased cancer risks and hazard indexes for the Austin Chalk ground water are as follows:

	Cancer Risk	Hazard Index
NORTHERN UNIMPACTED		
Resident	7×10^{-6}	0.02
C/I Worker	2×10^{-6}	0.003
NORTHERN PLUME		
Resident	1×10^{-1}	100
C/I Worker	2×10^{-2}	10
MIDDLE UNIMPACTED		
Resident	7×10^{-6}	0.02
C/I Worker	2×10^{-6}	0.003
SOUTHERN PLUME		
Resident	8×10^{-3}	7
C/I Worker	2×10^{-3}	0.9
SOUTHERN UNIMPACTED		
Resident	5×10^{-8}	0.002
C/I Worker	1×10^{-8}	0.0003

For the Buda Limestone water bearing zone, the estimated increased cancer risks and hazard indexes are as follows:

	Cancer Risk	Hazard Index
BUDA LIMESTONE		
Resident	2×10^{-5}	0.02
C/I Worker	4×10^{-6}	0.003

For the Edwards Aquifer, the estimated increased cancer risks and hazard indexes are as follows:

	Cancer Risk	Hazard Index
EDWARDS AQUIFER		
Resident	8×10^{-6}	1
C/I Worker	2×10^{-6}	0.2

The residential hazard index of 1 is primarily attributed to ingestion of iron (0.7), manganese (0.2) and zinc (0.1).

The estimated increased cancer risks were also calculated for the impacted plugged and abandoned (P&A) Edwards Aquifer wells. These wells were determined to be providing migration pathways for contaminants to enter the Edwards Aquifer. The estimated increased cancer risks and hazard indexes are as follows:

	Cancer Risk	Hazard Index
EDWARDS AQUIFER (P&A WELLS)		
Resident	7×10^{-4}	2
C/I Worker	1×10^{-4}	0.2

For a large number of existing wells in the study area (primarily current or former private residential wells), the construction details and thus the well completion depths are unknown. Based on ground water sampling results, some of these wells are considered to not be impacted by site contaminants (Unknown Aquifer – Background), while others are considered to be impacted (Unknown Aquifer – Impacted). The estimated increased cancer risks and hazard indexes for the Unknown Aquifer wells are as follows:

	Cancer Risk	Hazard Index
UNKNOWN AQUIFER (BACKGROUND)		
Resident	6×10^{-6}	0.7
C/I Worker	1×10^{-6}	0.1
UNKNOWN AQUIFER (IMPACTED)		
Resident	5×10^{-5}	5
C/I Worker	1×10^{-5}	2

The final exposure pathway evaluated for this site is the vapor intrusion pathway. Vapor intrusion is the migration of volatile chemicals (i.e., PCE, TCE, cis-1,2-DCE, vinyl chloride) from the subsurface into buildings. Volatile chemicals (i.e., those that evaporate into the air) may migrate upward through soil and enter into buildings through cracks in the floors, plumbing/piping conduits, utility corridors, or electrical shafts (see Figure 10). The vapor intrusion pathway is complex, and indoor air quality is affected by many factors other than subsurface vapor intrusion, such as use of consumer products, building construction/use, and contributions from the same chemicals in outdoor air.

To assess the vapor intrusion pathway, the following types of samples were collected:

- Indoor Air – These samples were collected from occupied air to evaluate the presence of volatile organic compounds (VOCs) that may result from vapor intrusion.
- Sub-slab or Soil Gas – These samples were collected from beneath a building slab or from soil gas to evaluate whether VOCs may be emanating from subsurface sources into indoor air.
- Crawl Space – These sample were collected from a building crawl space to evaluate whether VOCs may be emanating from subsurface sources into indoor air.
- Background Ambient Air – These samples were collected from outside to evaluate the presence of VOCs in ambient air that are not related to vapor intrusion in indoor air.

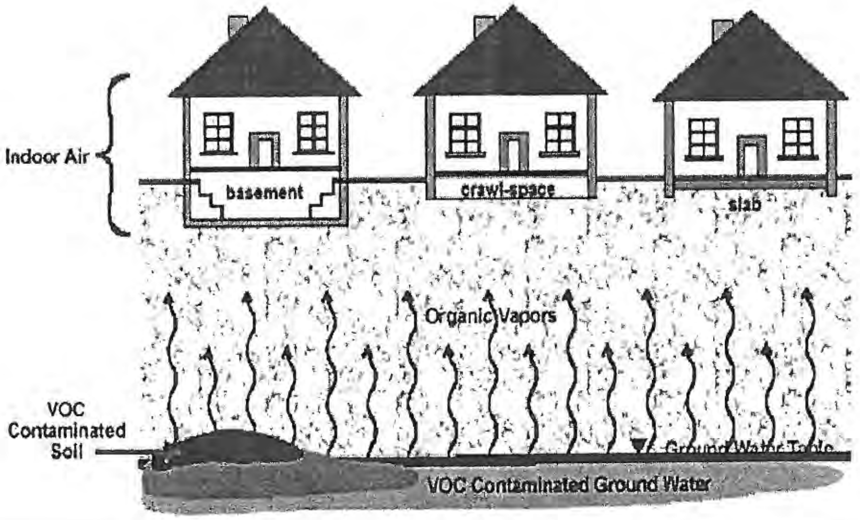
Indoor air samples were used to evaluate inhalation exposure. Sub-slab and crawl space samples were used to evaluate migration pathways. Background ambient air samples were evaluated with the same exposure parameters as indoor air samples.

Twenty-seven air samples (twenty-two indoor air samples and five background (BKG) ambient air samples) were evaluated for the residential and commercial/industrial worker exposure scenarios. Samples were analyzed for VOCs using a laboratory method with low reporting limits (TO-15 SIM) necessary for evaluating the vapor intrusion pathway. Samples were collected from buildings B1, B2, B3, BA, BB, a commercial building and apartment complex (see Figures 3 and 6). Vapor sample locations (i.e., VI-101) are identified on Figure 4 and Figure 8. The estimated increased cancer risks and hazard indexes (HI) are as follows:

		Cancer Risk	HI
BUILDING BI			
VI-101	Resident	6×10^{-3}	9.0
	C/I Worker	1×10^{-3}	2.0
VI-102	Resident	3×10^{-3}	4.0
	C/I Worker	6×10^{-4}	1.0
VI-102-2010	Resident	5×10^{-4}	2.0
	C/I Worker	1×10^{-4}	0.5

Figure 10

Vapor Intrusion to Indoor Air



		Cancer Risk	HI
BUILDING BI			
VI-103	Resident	4×10^{-4}	0.6
	C/I Worker	7×10^{-5}	0.1
VI-104	Resident	6×10^{-4}	0.9
	C/I Worker	1×10^{-4}	0.2
VI-109	Resident	3×10^{-4}	0.5
	C/I Worker	7×10^{-5}	0.1
VI-110	Resident	1×10^{-3}	2.0
	C/I Worker	2×10^{-4}	0.5
VI-111	Resident	3×10^{-4}	0.5
	C/I Worker	7×10^{-5}	0.1
VI-112	Resident	2×10^{-4}	0.3
	C/I Worker	4×10^{-5}	0.07
VI-117	Resident	1×10^{-4}	0.5
	C/I Worker	3×10^{-5}	0.1
VI-BKG-1	Resident	2×10^{-5}	0.1
	C/I Worker	4×10^{-6}	0.02
BUILDING B2			
VI-105	Resident	1×10^{-5}	0.04
	C/I Worker	3×10^{-6}	0.01
VI-106	Resident	2×10^{-5}	0.05
	C/I Worker	4×10^{-6}	0.01
BUILDING B3			
VI-107	Resident	7×10^{-5}	0.1
	C/I Worker	1×10^{-5}	0.03
VI-108	Resident	7×10^{-5}	0.8
	C/I Worker	1×10^{-5}	0.2
VI-118	Resident	2×10^{-4}	1.0
	C/I Worker	5×10^{-5}	0.3
BUILDING BA			
VI-115	Resident	7×10^{-6}	0.04
	C/I Worker	1×10^{-6}	0.01
VI-116	Resident	7×10^{-6}	0.04
	C/I Worker	1×10^{-6}	0.009
BUILDING BB			
VI-113	Resident	1×10^{-5}	0.1
	C/I Worker	3×10^{-6}	0.02
VI-114	Resident	1×10^{-5}	0.06
	C/I Worker	2×10^{-6}	0.01
VI-BKG-2	Resident	4×10^{-6}	0.02
	C/I Worker	8×10^{-7}	0.005

		Cancer Risk	HI
COMMERCIAL BUILDING			
VI-210	Resident	5×10^{-5}	0.3
	C/I Worker	1×10^{-5}	0.07
VI-BKG-3	Resident	8×10^{-6}	0.08
	C/I Worker	2×10^{-6}	0.02
APARTMENT COMPLEX			
VI-211	Resident	6×10^{-5}	1.0
	C/I Worker	1×10^{-5}	0.3
VI-212	Resident	7×10^{-5}	1.0
	C/I Worker	1×10^{-5}	0.3
VI-BKG	Resident	2×10^{-5}	0.05
	C/I Worker	4×10^{-6}	0.01
VI-BKG-4	Resident	7×10^{-6}	0.07
	C/I Worker	1×10^{-6}	0.02

Generally, where the baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions for either current or future land use exceeds the 1×10^{-4} lifetime excess cancer risk end of the risk range (1×10^{-4} to 1×10^{-6}), action under CERCLA is generally warranted at the site.

The estimated increased cancer risks and hazard levels indicate that there is significant potential risk to residents and commercial/industrial workers from Austin Chalk groundwater (Northern and Southern Plume) and vapor intrusion. These risk estimates are based on current and future reasonable maximum exposure scenarios and were developed by taking into account various conservative assumptions about the frequency and duration of an individual's exposure to soil, water, and vapor, as well as the toxicity of contaminants including PCE, TCE, cis-1,2-DCE and vinyl chloride.

Ecological Risks

An ecological exposure pathway evaluation was conducted for the site. Impacted areas are located in highly commercial/industrial areas that present poor habitats for wildlife. Only small areas (e.g., 500 square feet) near the location of the original releases have uncovered soil. The depth to ground water generally varies between 65 and 110 feet below ground surface. There are no potential complete exposure pathways by which wildlife could come in direct contact with ground water. Because the releases occurred in highly commercial/industrial areas, there are no complete and significant exposure pathways identified for ecological receptors.

In addition to the ecological exposure pathway evaluation, the TCEQ Tier I exclusion criteria checklist (30 TAC 350.77(b)) was completed to document the incomplete and insignificant ecological exposure pathways.

Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the site are to:

- Prevent exposure to COCs associated with the site in surface soil, subsurface soil, ground water, and indoor air above cleanup levels.
- Prevent or minimize further migration of COCs associated with the site in surface soil, subsurface soil, vadose zone bedrock, and ground water above cleanup levels.
- Return ground waters to their expected beneficial uses wherever practicable (aquifer restoration).

Cleanup Levels

This proposed action will reduce the excess chemical specific cancer risk associated with exposure to contaminated vapor via vapor intrusion to indoor air to 1 in 100,000 (i.e., 1×10^{-5}). This will be achieved by reducing the concentrations of contaminated indoor vapor to the following cleanup levels:

1,1,2,2-Tetrachloroethane	2.1 $\mu g/m^3$
1,2-Dichloroethane	4.7 $\mu g/m^3$
1,4-Dichlorobenzene	11 $\mu g/m^3$
Bromodichloromethane	3.3 $\mu g/m^3$
Tetrachloroethene	21 $\mu g/m^3$
Trichloroethene	61 $\mu g/m^3$
Vinyl Chloride	28 $\mu g/m^3$

These cleanup levels are based on a commercial /industrial worker exposure scenario. Based on the evaluation of the vapor exposure pathway, only commercial/industrial buildings were identified as having increased cancer risk greater than 1×10^{-4} or hazard indexes greater than 1.0.

The following cleanup levels for contaminated ground water are the Maximum Contaminant Levels (MCLs) which were established under the Safe Drinking Water Act:

Tetrachloroethene	5 µg/L
Trichloroethene	5 µg/L
1,1-Dichloroethene	7 µg/L
Cis-1,2-Dichlorothene	70 µg/L
Vinyl Chloride	2 µg/L
Toluene	1000 µg/L

For the surface and subsurface soils in Source Areas 1 and 2, the calculated risks did not exceed a 1×10^{-5} excess cancer risk or have hazard indexes greater than 1 for direct contact exposure in the current and expected commercial land use. Thus, specific cleanup criteria were not developed at this time for surface or subsurface material. The soils and vadose zone bedrock in Source Areas 1 and 2 contain PCE vapor concentrations that continue to act as a reservoir for migration of contamination to ground water and indoor air.

In Source Area 1, elevated PCE soil concentrations as high as 43,500 µg/kg were detected at location SB204 adjacent to Building B1 in the near proximity of the suspected PCE spill location (see Figure 5). PCE soil concentrations decreased significantly with distance from the suspected PCE spill location suggesting a limited lateral extent of affected soil. For example, SB104 located approximately fifteen feet away from SB204, contained a PCE concentration of 1,730 µg/kg.

Similar trends can be seen in regards to sub-slab soil gas concentrations. At Building B1, the sub-slab soil gas sample collected near the back wall of the former dry cleaners (i.e., VI-101-CSA) had a PCE soil gas concentration of 25,000,000 $\mu g/m^3$. The sub-slab soil gas sample V1-102 CSA, located approximately 50 feet away from V1-101-CSA, had a PCE sub-slab soil gas concentration of 3,700 μg/m^3. The estimated extent of principal threat surface and subsurface soils comprise of a volume of 50 square feet by 10 feet deep. Further delineation of this source material in will be conducted during the remedial design.

In Source Area 2, soil gas sample location VI-206-SGA had a PCE concentration of 132,000 μg/m^3 while soil gas sample V1-207-SGA, located approximately 60 feet away, had a PCE soil gas concentration of 8,290 μg/m^3. The estimated extent of principal threat surface and subsurface soil comprise a volume of 25 feet by 50 feet by 10 feet deep. Further delineation of this source material will be conducted during the remedial design.

Summary of Remedial Alternatives

Remedial alternatives for the Bandera Road Ground Water Plume Site presented below. The alternatives and numbers correspond with the alternatives and numbers in the RI/FS Reports.

Common Elements

Many of these alternatives include limited actions. Limited actions utilize institutional controls (ICs), engineering controls, and/or long-term monitoring. ICs are administrative and/or legal instruments that place restrictions on the use or development of land and/or ground water within a defined area. These legal and administrative tools are used to maintain protection of public health and/or the environment, and to protect the integrity of a remedy by limiting land or resource use. IC

SUMMARY OF REMEDIAL ALTERNATIVES BANDERA ROAD GROUND WATER PLUME SITE		
Medium	**RI/FS Designation**	**Description**
SURFACE AND SUBSURACE SOIL	S-1	No Further Action
	S-2	Limited Action: Institutional controls (ICs), engineering controls, etc.
	S-3	Excavation and off-site disposal
	S-4	Soil Vapor Extraction
VADOSE ZONE BEDROCK	B-1	No Further Action
	B-2	Limited Action: Soil gas monitoring in buildings, ICs, engineering controls
	B-3	Soil Vapor Extraction
	B-4	*In-situ* Desorption
GROUND WATER	GW-1	No Further Action
	GW-2	Limited Action: monitoring, ICs, engineering controls
	GW-3	Municipal Water Supply
	GW-4	*In situ* Bioremediation
	GW-5	Pump and Treat
INDOOR AIR	VI-1	No Further Action
	VI-2	Limited Action: ICs, engineering controls
	VI-3	Positive Pressure System
	VI-4	Membrane/Sealant with Vapor Vent
	VI-5	Sub-slab Depressurization System

instruments include restrictive covenants, deed notices, ordinances, zoning restrictions, building and excavation permits, easement, well drilling prohibitions, or a combination thereof. Because some alternatives may include leaving material above EPA Cleanup Levels, ICs (e.g. zoning ordinances) will need to be included, not just for the Limited Action alternative.

Engineering controls are instruments such as fencing or signage that are used to minimize access to contaminated areas or areas that may pose a physical hazard. ICs and engineering controls can be used in all stages of the remedial process to accomplish various remedial objectives, and will be implemented in a series to provide overlapping assurances of protection against contamination.

NO ACTION ALTERNATIVES

Alternative S-1/B-1/GW-1/VI-1: No Further Action

Estimated Capital Costs: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: NA
Estimated Time Until Action Complete: NA

As required by the NCP (40 CFR § 300.430 [e][6]), the alternatives must include the No Further Action alternative. This is to be used as the baseline alternative against which the effectiveness of all other remedial alternatives are judged. Under No Further Action, no remedial actions will be conducted at the Site. All contaminants will remain in place and will be subject to environmental influences. Furthermore, no action will be taken to prevent unauthorized access or development at the Site. No deed notices to inform interested parties regarding the site conditions will be implemented.

SURFACE AND SUBSURFACE SOIL ALTERNATIVES

Alternative S-2: Limited Action

Source Area 1
Estimated Capital Costs: $33,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $3,000
Estimated Present Worth Costs: $70,000

Source Area 2
Estimated Capital Costs: $33,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $3,000
Estimated Present Worth Costs: $70,000

Estimated Time Until Action Complete: Not applicable - no field construction performed.

The limited action alternative for the surface and subsurface soil consists of indoor air monitoring, soil gas sampling, and a combination of institutional and engineering controls (e.g., deed notices).

Alternative S-3: Excavation and Off-site Disposal

Source Area 1
Estimated Capital Costs: $1,631,000
Estimated Annual O&M Cost: $9,000
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $1,793,000
Estimated Construction Timeframe: 4 months
Estimated Time Until Action Complete: 4 months

Source Area 2
Estimated Capital Costs: $638,000
Estimated Annual O&M Cost: $3,000
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $725,000
Estimated Construction Timeframe: 2 months
Estimated Time Until Action Complete: 2 months

Alternative S-3 is the excavation and removal of contaminated surface and subsurface soils. The removed soil can be transported for off-site disposal. Estimates of principal waste at Source Areas 1 and 2 are subject to uncertainty. However, for the purpose of this cost estimate, it was assumed that Source Area 1 was approximately 50-feet square and 10-feet deep; Source Area 2 was assumed to be approximately 25-feet by 50-feet and 10-feet deep.

Excavation at Source Area 1 where contaminated material is present beneath the retail building would require shutting down businesses and demolishing parts of the building that overlie the source area. Disposal requirements will depend on whether the excavated material is classified as a hazardous waste, in which case land disposal restrictions (LDRs) may apply. If the material is considered hazardous waste, it may require treatment prior to disposal. Because the two source areas contain chlorinated solvents that are considered principal threat wastes, it was assumed that the material requiring excavation may require treatment prior to disposal.

The cost of incineration significantly exceeds the cost of disposal at the nearest landfill. The cost of excavation and off-site disposal is presented in the cost estimate for this alternative.

Alternative S-4: Soil Vapor Extraction (SVE)

Source Area 1
Estimated Capital Costs: $824,000
Estimated Annual O&M Cost: $66,000
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $1,039,000
Estimated Construction Timeframe: 4 months
Estimated Time Until Action Complete: 3.5 years

Source Area 2
Estimated Capital Costs: $559,000
Estimated Annual O&M Cost: $62,000
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $738,000
Estimated Construction Timeframe: 4 months
Estimated Time Until Action Complete: 3 years

Alternative S-4 utilizes SVE. SVE is a physical means of removing or reducing concentrations of volatile compounds. This technology targets the adsorbed, vapor and free (NAPL) phases of the volatile contaminant present in the unsaturated (vadose) portion of the subsurface.

The SVE process involves applying a vacuum to contaminated soils in the unsaturated zone in order to induce air flow in the subsurface. The volatile fraction of contaminants stuck to soil particles evaporate and are swept away to extraction wells. Those contaminants that have already volatilized, or 'weathered', are also carried to extraction wells. If volatile NAPL is floating or pooled on the groundwater table, it is also carried away in a way similar to a fan blowing past a pool of gasoline. Soil gas collected by the induced vacuum will be treated with granulated activated carbon.

To address the contamination at Source Area 1, it was estimated that 12 horizontal SVE wells will be drilled underneath the existing building (B1). Additionally, contaminated soils outside the building footprint will need to be excavated to install the horizontal wells. This material will taken offsite for disposal. Vertical SVE wells will be employed to address the contamination at Source Area 2. An estimated thirteen vertical SVE wells will be drilled to a depth of 10 feet to address the Preliminary COCs in the surface and subsurface soils.

Institutional controls to prevent access or use of areas that present unacceptable risk to human health during the construction and operation of the SVE system are included. In addition, institutional controls may also impose restrictions on the development of residential dwellings, and the unauthorized drilling, excavating, digging, trenching, or any other activities that might otherwise compromise the remedy. Long term monitoring costs included the collection and analysis of soil gas samples.

VADOSE ZONE BEDROCK ALTERNATIVES

Alternative B-2: Limited Action

Source Area 1
Estimated Capital Costs: $33,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $83,000

Estimated Construction Timeframe: 0
Estimated Time Until Action Complete: NA

Source Area 2
Estimated Capital Costs: $33,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $83,000
Estimated Construction Timeframe: 0
Estimated Time Until Action Complete: NA

The limited action alternative for the vadose zone bedrock consists of soil gas monitoring in the buildings and surrounding areas on-site and a combination of institutional and engineering controls (e.g., deed notices) to prevent access or use of areas that present unacceptable risk to human health due to contamination in the vadose zone bedrock.

Alternative B-3: Soil Vapor Extraction

Source Area 1
Estimated Capital Costs: $1,073,000
Estimated Annual O&M Cost: $80,000
Estimated Annual Long Term Monitoring: $30,000
Estimated Present Worth Costs: $1,487,000
Estimated Construction Timeframe: 3 months
Estimated Time Until Action Complete: 4 years

Source Area 2
Estimated Capital Costs: $1,061,000
Estimated Annual O&M Cost: $70,000
Estimated Annual Long Term Monitoring: $30,000
Estimated Present Worth Costs: $1,441,000
Estimated Construction Timeframe: 3 months
Estimated Time Until Action Complete: 4 years

Alternative B-3 utilizes SVE wells that will remove Preliminary COCs from the vadose zone bedrock by inducing a vacuum. Soil gas collected by the vacuum will be treated with appropriate granular activated carbon vessels. In addition to addressing vadose zone bedrock RAOs, this combined technology alternative will address the ground water RAO for preventing further degradation of ground water quality by removing the primary source material.

To address the contamination at Source Area 1 and Source Area 2, vertical SVE wells would be employed and their associated piping. Institutional controls to prevent access or use of areas that present unacceptable risk to human health during the construction and operation of the SVE system are included. Long term monitoring includes the collection and analysis of soil gas samples.

Alternative B-4: In situ Desorption

Source Area 1
Estimated Capital Costs: $7,436,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $194,000
Estimated Present Worth Costs: $8,093,000
Estimated Construction Timeframe: 6 months
Estimated Time Until Action Complete: 6 months

Source Area 2
Estimated Capital Costs: $5,683,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $194,000
Estimated Present Worth Costs: $6,340,000
Estimated Construction Timeframe: 6 months
Estimated Time Until Action Complete: 6 months

Alternative B-4 involves heating the vadose zone bedrock in place. Thermal conductive heating is the heating method represented in the cost estimate. The vaporized organics can be collected and treated. The estimated target area for Source Area 1 is 150 feet by 50 feet. The estimated target area for Source Area 2 is 90 feet by 60 feet. The treatment depth is the depth to the water table.

The wells will be installed with a vapor cover to ensure that the heated vapors do not escape through the surface and are captured via the SVE wells. Collected vapors will pass through a condenser, where it will be treated.

GROUND WATER REMEDIAL ALTERNATIVES

Alternative GW-2: Limited Action

Source Area 1
Estimated Capital Costs: $181,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $11,000
Estimated Present Worth Costs: $317,000
Estimated Construction Timeframe: 0
Estimated Time Until Action Complete: NA

Source Area 2
Estimated Capital Costs: $181,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $11,000
Estimated Present Worth Costs: $317,000
Estimated Construction Timeframe: 0
Estimated Time Until Action Complete: NA

The limited action alternative for ground water consists of ground water monitoring for VOCs and a combination of institutional and engineering controls to prevent ground water use that presents an unacceptable risk to human health. Institutional controls (e.g., local ordinance) to limit future use of ground water or prevent drilling wells would be placed to prevent unacceptable risk from exposure to receptors. In addition, a series of engineering controls could be employed to eliminate access to existing impacted ground water wells (e.g., well plugging and abandonment) and thus eliminating the potential contaminant migration pathway to the Edwards Aquifer. Ground water monitoring would be conducted yearly in a select set of wells to evaluate migration of contaminants.

Alternative GW-3: Municipal Water Supply

Source Area 1
Estimated Capital Costs: $309,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $11,000
Estimated Present Worth Costs: $445,000
Estimated Construction Timeframe: 2 months
Estimated Time Until Action Complete: 2 months

Source Area 2
Estimated Capital Costs: $309,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $11,000
Estimated Present Worth Costs: $445,000
Estimated Construction Timeframe: 2 months
Estimated Time Until Action Complete: 2 months

The purpose of Alternative GW-3 is to provide residents with a source of water to ensure that they do not need to use contaminated ground water. Residences with water wells in contaminated regions or in the path of contaminated ground water flow will be connected to the municipal water supply. Because connection to the municipal supply does not include a ground water remediation component, it may require a demonstration of monitored natural attenuation or a Technical Impracticability Waiver to be a stand-alone remedy.

The cost estimate assumes that up to 12 residences within Source Area 1 and 2 will need to be connected to the municipal water supply. Institutional and engineering controls to restrict the use of ground water at residences in impacted areas will be required to prevent unacceptable risk from exposure to ground water. Long-term monitoring to evaluate plume migration is provided. The monthly costs for water usage will be the responsibility of the resident at a rate set by the municipal water supplier.

Alternative GW-4: In situ Bioremediation

Source Area 1
Estimated Capital Costs: $2,011,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $25,000
Estimated Present Worth Costs: $2,321,000
Estimated Construction Timeframe: 20 months
Estimated Time Until Action Complete: 4 -6 years

Source Area 2
Estimated Capital Costs: $2,142,000
Estimated Annual O&M Cost: $0

Estimated Annual Long Term Monitoring: $25,000
Estimated Present Worth Costs: $2,452,000
Estimated Construction Timeframe: 20 months
Estimated Time Until Action Complete: 4-6 years

Alternative GW-4 includes injecting amendments into the Austin Chalk Aquifer that promote the biodegradation of chlorinated solvents. An enhancement to this alternative may include bioaugmentation, where microorganisms that degrade chlorinated solvents are injected into the aquifer in addition to the amendments. This alternative may be coupled with the municipal water supply alternative to protect human health during the implementation of the remedy.

This alternative includes the installation of 12 injection wells for each of the two source areas. The treatment areas include and extend downgradient of the injection areas because the amendment migrates downgradient via fractures and channels in the formation. The injection area of Source Area 1 was assumed to be 500 feet by 300 feet. The injection area of Source Area 2 was assumed to be 600 feet by 300 feet.

Two injection events were assumed. It was assumed that the second event would follow approximately 18 months after the first one. Additional injection events may be required, but were not estimated. Institutional and engineering controls to restrict the use of ground water in impacted areas will be required to prevent unacceptable risk from exposure to ground water.

Alternative GW-5: Pump and Treat

Source Area 1
Estimated Capital Costs: $1,897,000
Estimated Annual O&M Cost: $403,000
Estimated Annual Long Term Monitoring: $23,000
Estimated Present Worth Costs: $7,183,000
Estimated Construction Timeframe: 3 months
Estimated Time Until Action Complete: 5-10 years

Source Area 2
Estimated Capital Costs: $1,888,000
Estimated Annual O&M Cost: $425,000
Estimated Annual Long Term Monitoring: $23,000
Estimated Present Worth Costs: $7,447,000
Estimated Construction Timeframe: 3 months
Estimated Time Until Action Complete: 5-10 years

Alternative GW-5 will employ several extraction wells to remove contaminated ground water from the VOC plume. This extracted water will then be treated (e.g., air stripper) to remove VOCs and may be reinjected or discharged. Following the air stripper, water will pass through a liquid granular activated carbon vessel before being discharged. The effluent air from the air stripper will be treated in a vapor phase granular activated carbon vessel.

This alternative may be coupled with the municipal water supply alternative to protect human health during the implementation of the remedy. A combination of institutional and engineering controls would be necessary to prevent ground water use that presents an unacceptable risk to human health and protect the integrity of the remedy.

VAPOR INTRUSION ALTERNATIVES

Alternative VI-2: Limited Action

Source Area 1
Estimated Capital Costs: $34,000
Estimated Annual O&M Cost: $0
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $84,000
Estimated Construction Timeframe: 0
Estimated Time Until Action Complete: 30 years

The limited action alternative for vapor intrusion consists of indoor air monitoring for chlorinated solvents and a combination of institutional and engineering controls to prevent access or use of the areas that present an unacceptable risk to human health.

Alternative VI-3: Positive Pressure System
Estimated Capital Costs: $162,000
Estimated Annual O&M Cost: $3,000

Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $249,000
Estimated Construction Timeframe: 1 week
Estimated Time Until Action Complete: 30 years

Alternative VI-3 attempts to reduce the concentrations of VOC vapors in indoor air for Building B1 by retrofitting or installing a system that brings in more outside air and pressurizes the building. Typical systems are modified HVAC systems. Alternatively, positive pressure can be achieved by introducing outside air into the building using a fan or blower. The goal is to create enough back pressure to prevent soil gas from entering the building. The system will run continuously to prevent intrusion. Periodic air sampling that will be necessary to confirm the efficacy of this alternative.

Alternative VI-4:
Membrane/Sealant with Vapor Vent

Estimated Capital Costs: $150,000
Estimated Annual O&M Cost: $3,000
Estimated Annual Long Term Monitoring: $4,000
Estimated Present Worth Costs: $237,000
Estimated Construction Timeframe: 2 weeks
Estimated Time Until Action Complete: 30 years

The purpose of Alternative VI-4 is to address vapor intrusion into the existing building within Source Area 1 and divert vapor emissions from contaminated concrete floor within the office space with the use of a protective barrier. With this alternative, a chemically impermeable gel inserted between two chemically resistant woven fibers will be applied over the concrete foundation of the structure within the immediate vicinity of the contaminant source area. The removal of carpeting and demolition of interior walls is required in order to create a single continuous coat over the concrete foundation. A single continuous coat is necessary to prevent any perforations between the edges of the seals. The protective barrier will prevent VOCs from penetrating through the cracks within the concrete foundation. An additional layer of concrete will be laid above the sealant to protect against potential breakage of the membrane. Passive vapor vents will be installed underneath the membrane to redirect the vapors away from the building. The ventilation exit will be routed above the roof line in order to prevent inhalation to pedestrians. Periodic indoor air sampling collected will be necessary to confirm the efficacy of this alternative.

Alternative VI-5:

Sub-Slab Depressurization System
Estimated Capital Costs: $105,000
Estimated Annual O&M Cost: $1,000
Estimated Annual Long Term Monitoring: $6,000
Estimated Present Worth Costs: $191,000
Estimated Construction Timeframe: 2 weeks
Estimated Time Until Action Complete: 30 years

Alternative VI-5 utilizes a sub-slab depressurization system within the existing structure adjacent to the source area. This system will depressurize the area underneath the concrete foundation and redirect the VOCs to an exhaust vent located above the roof line. Depressurization is expected to reduce contaminant migration into occupied spaces within the building.

Once the system is in place, routine maintenance will be required to ensure the system is continuously running. Occasional inspection of the piping will be required to prevent direct intrusion into the building. Periodic air sampling will be necessary to confirm the efficacy of this alternative. Additionally routine maintenance of the depressurization system and a five year replacement of the extraction fans will be required.

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with ARARs evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement the alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as relative availability of goods and services.

Costs includes estimated capital and annual operations and maintenance costs, as well as present worth costs. Present worth cost is the total costs of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommends, as describe in the RI/FS and Proposed Plan.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

how it compares to the other options under consideration. The "Detailed Analysis of Alternatives" can be found in the Feasibility Study.

1. Overall Protection of Human Health and the Environment

The no action alternative does not ensure protection of human health or the environment because chemicals exceeding preliminary cleanup levels will remain onsite. The limited action alternative may contain institutional and engineering controls to limit access to impacted material, so these measures are considered protective. However, institutional controls (e.g., restricting land use) are easily violated and engineering controls (e.g., fencing) can be circumvented. The remaining surface and subsurface soil, vadose zone bedrock, ground water, and vapor intrusion alternatives provide protection of human health.

2. Compliance with ARARs

The limited action alternatives contain institutional and engineering controls to limit access to impacted material and ensure compliance with ARARs. However, institutional controls (e.g., restricting land use) are easily violated and engineering controls (e.g., fencing) can be circumvented. The remaining surface and subsurface soil, vadose zone bedrock, and vapor intrusion alternatives can comply with ARARs. The alternatives with soil vapor extraction will be required to comply with air quality action-specific ARARs that address emissions. Ground water alternative GW-2 (Limited Action) and GW-3 (Municipal Water Supply) would not meet Clean Water Act Standards because contaminants would remain above the Maximum Contaminant Levels. Alternative GW-5 (Pump and Treat) will be required to comply with action-specific ARARs associated with air discharge (if an air stripper is used) and treated water discharge standards. Vapor intrusion alternatives VI-4 (Membrane-Sealant with Vapor Vent) which diverts vapor from within the building and Alternative VI-5 (Sub-Slab Depressurization System) which diverts vapors from beneath the slab must comply with action-specific ARARs ensuring that emissions do not exceed acceptable concentrations.

3. Long-term Effectiveness and Permanence

Surface and Subsurface Soil Alternatives

The alternative that utilizes excavation and off-site disposal is the most effective long-term because the impacted material is removed from the Site. The alternative that utilizes soil vapor extraction is not as effective long-term because although, the soil gas from the impacted material is removed and treated, the soil gas from the slab or just beneath the slab of the building is not removable via SVE. The limited action alternative, which utilizes institutional controls to limit exposure, is more protective than the no action alternative.

Vadose Zone Bedrock Alternatives

The alternative that utilizes *in situ* thermal desorption is the most effective long-term because the bedrock is heated in order to increase production of soil vapor containing COCs for extraction. The alternative that utilizes soil vapor extraction alone is almost as effective long-term because the existing soil gas is extracted for treatment of COCs. The limited action alternative, which utilizes institutional controls to limit exposure, is more protective than the no action alternative.

Ground Water Alternatives

The alternative that utilizes connection to the municipal supply alternative is more effective limited action alternative because it eliminates exposure to ground water. The pump and treat system alternative is considered more effective than *in situ* bioremediation because the phase transfer mechanisms associated with pump and treat are more predictable and reliable than creating optimal ground water conditions suitable for *in situ* bioremediation. The limited action alternative, which utilizes institutional and engineering controls to limit exposure, is more effective than the no action alternative.

Vapor Intrusion

The alternative that utilizes a membrane/sealant with vapor vents is the most effective long-term especially in addressing vapor emission emanating from the concrete slab within the office space of the former dry cleaner where a PCE release occurred. This alternative will prevent vapor intrusion and redirect vapors away from the building via passive vapor vents without the concern of mechanical failure or power outages that may debilitate other systems.

The alternative that utilizes sub-slab de-pressurization is almost as effective long-term because it redirects vapors that would normally enter into the building from beneath the concrete foundation to vents on the roof via extraction fans. However, sub-slab communication is essential, which is not proven to be effective at Building B1. This alternative will not address vapors emitting from the concrete slab.

The effectiveness of the positive pressure system is contingent on the building's air exchange rate (e.g., opening doors), vapor intrusion to indoor air, and system balancing, which can be troublesome in large buildings with multiple occupied spaces.

The limited action alternative, which utilizes institutional and engineering controls to limit exposure, is more protective than the no action alternative.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Surface and Subsurface Soil Alternatives

The alternative that utilizes excavation and off-site disposal has a reduction in the contaminated volume because the impacted soils are removed from the site; mobility is also reduced. If this alternative is executed with incineration instead of disposal, it also provides a reduction in toxicity of the impacted soils by incinerating the organic matter.

The alternative that utilizes soil vapor extraction reduces the volume and mobility, but not the toxicity of the contaminants. This alternative does not however, reduce the volume of impacted soils as much as the excavation alternative does.

The remaining alternatives do not include treatment so they are equally weighted.

Vadose Zone Bedrock Alternatives

The alternatives that utilize soil vapor extraction and *in situ* thermal desorption are rated the highest and equal. Both of these alternatives will reduce the mobility and volume of contaminants as concentration levels decrease; however *in situ* thermal desorption relies on increased mobility of contaminants. Neither of these alternatives reduces the toxicity of the COCs.

The remaining alternatives do not include treatment so they are equally weighted.

Ground Water Alternatives

The pump and treat alternative reduces the volume and mobility of contaminated ground water via treatment. It is rated higher because it will remove more contaminants than the *in situ* bioremediation alternative. The *in situ* bioremediation alternative will reduce the volume and toxicity of the COCs if complete dechlorination is achieved.

The municipal water supply alternative is ranked lower than the *in situ* bioremediation and pump and treat system alternatives because it does not reduce volume, toxicity, or mobility. Therefore this alternative is weighted equal to the limited action alternative, which utilizes institutional and engineering controls to limit exposure, and the no action alternative.

Vapor Intrusion Alternatives

The alternatives that utilize a membrane/sealant with vapor vents and a sub-slab depressurization system reduce volume and mobility of the COCs by removing soil gas from underneath the concrete foundation of the building. Therefore, they are both weighted equally.

The alternative that utilizes a positive pressure system reduces the mobility of the contaminant by preventing them from entering the building, but does not reduce the toxicity or volume. Therefore, this alternative is ranked lower than the membrane/sealant with vapor vents and sub-slab depressurization system alternatives, but higher than the limited action and no action alternatives.

The limited action and no action alternatives do not include treatment so they are weighted equally.

5. Short-term Effectiveness

Surface and Subsurface Soil Alternatives

The excavation and off-site disposal and soil vapor extraction alternatives offer increased short-term risk to the community, workers, and the environment because of the construction activities performed. Additionally, both of these alternatives will involve transporting hazardous material off-site on public roads. Because the excavation and off-site disposal/off-site incineration alternative is more intrusive and would likely result in more contact with impacted material, the soil vapor extraction alternative is ranked higher.

The no action alternative would not offer any additional short-term risk to the community, workers or the environment other than what is already occurring. The limited action alternative would not provide any additional short-term risk either because institutional controls do not involve any field activity, such as construction. The no action would not achieve RAOs, but the limited action alternative would achieve one RAOs by limiting exposure.

Vadose Zone Bedrock Alternatives

The soil vapor extraction and *in situ* thermal desorption alternatives pose a short-term risk to the community, workers, and the environment due to the construction activities that take place. The *in situ* thermal desorption alternative poses a greater short-term risk than the soil vapor extraction because it contains a heating component that increases the level of caution workers must take. The soil vapor extraction alternative is ranked higher than the *in situ* thermal desorption alternative.

The no action alternative would not offer any additional short-term risk to the community, workers or the environment other than what is already occurring. The limited action alternative would not provide any additional short-term risk either because institutional controls do not involve any field activity, such as construction. The no action would not achieve RAOs, but the limited action alternative would achieve one RAOs by limiting exposure.

Ground Water Alternatives

The pump and treat system alternative is ranked slightly lower than the *in situ* bioremediation because the latter will take longer to achieve RAOs. The municipal water supply has a construction component, but is considered routine and does not include exposure to impacted material; however, it will not meet the RAOs for migration or ground water restoration. Therefore, this alternative is ranked lower than the *in situ* bioremediation or pump and treat system alternatives.

The no action alternative would not offer any additional short-term risk to the community, workers or the environment other than what is already occurring. The limited action alternative would not provide any additional short-term risk either because institutional controls do not involve any field activity, such as construction. The no action would not achieve RAOs, but the limited action alternative would achieve one RAOs by limiting exposure.

Vapor Intrusion

The positive pressure system alternative is ranked higher than the remaining alternatives because it involves routine construction activities associated with installation of the HVAC system. The membrane/sealant with vapor vents and sub-slab depressurization alternatives are ranked after the positive pressure system alternative and are weighted equally because both involve some form of demolition of the building's floor, take a longer time for installation, and may include some exposure to COCs.

The no action alternative would not offer any additional short-term risk to the community, workers, or the environment other than what is already occurring. The limited action alternative would not provide any additional short-term risk either because institutional controls do not involve any field activity, such as construction. The no action alternative would not achieve RAOs, but the limited action alternative would achieve one RAOs by limiting exposure.

6. Implementability

Surface and Subsurface Soil

The no action alternative would be the easiest to implement. The limited action alternative would follow because it relies on institutional and engineering controls, which are easier to implement than an intrusive remedy.

The soil vapor extraction alternative is ranked next because it involves usage of horizontal wells to treat the contamination underneath the building at Source Area 1. Installation of horizontal wells may prove difficult with respect to utilities. The excavation and off-site disposal alternative is ranked last because it requires shutting down businesses and demolishing parts of the building at Source Area 1 to remove the contaminated soil underneath, making it harder to implement.

Vadose Zone Bedrock Alternatives

The no action alternative would be the easiest to implement. The limited action alternative would follow because it relies on institutional controls, which are easier to implement than an intrusive remedy.

The soil vapor extraction and *in situ* thermal desorption alternatives are harder to implement than the no action and limited action alternatives, but the *in situ* thermal desorption alternative will be more difficult to implement because the system to heat the rock is more complicated.

Ground Water Alternatives

The no action alternative would be the easiest to implement. The limited action alternative would follow because it relies on institutional and engineering controls, which are easier to implement than an intrusive remedy.

The municipal water supply is considered easy to implement because it relies on standard construction techniques. The *in situ* bioremediation alternative is weighted higher than the pump and treat alternative; although both rely on installation of numerous wells, the pump and treat system is more complicated to implement so is ranked last.

Vapor Intrusion Alternatives

The no action alternative would be the easiest to implement. The limited action alternative would follow because it relies on institutional and engineering controls, which are easier to implement than an intrusive remedy.

The positive pressure system would be easier to implement than the other alternatives because it relies on standard construction techniques. The sub-slab depressurization is ranked higher than the membrane/sealant with vapor vents because the sub-slab depressurization alternative does not require demolition of major portions of the building to implement.

7. Costs

The present worth costs presented in this Proposed Plan are estimates with an expected accuracy of +50% to -30%. For the estimated present worth costs for the surface and subsurface soil, vadose zone bedrock, ground water, and indoor air alternatives are summarized in the following tables:

Indoor Air – Building B1		
VI-1	No Further Action	$0
VI-2	Limited Action	$84,000
VI-3	Positive Pressure System	$249,000
VI-4	Membrane/Sealant with Vapor Vent	$237,000
VI-5	Sub-Slab Depressurization System	$191,000

Surface and Subsurface Soil

		Source Area 1	Source Area 2
S-1	No Further Action	$0	$0
S-2	Limited Action	$70,000	$70,000
S-3	Excavation and Offsite Disposal	$1,793,000	$725,000
S-4	Soil Vapor Extraction	$1,039,000	$738,000

Vadose Zone Bedrock

		Source Area 1	Source Area 2
B-1	No Further Action	$0	$0
B-2	Limited Action	$83,000	$83,000
B-3	Soil Vapor Extraction	$1,487,000	$1,441,000
B-4	In Situ Desorption	$8,093,000	$6,340,000

Ground Water

		Source Area 1	Source Area 2
GW-1	No Further Action	$0	$0
GW-2	Limited Action	$317,000	$317,000
GW-3	Municipal Water Supply	$445,000	$445,000
GW-4	In situ Bioremediation	$2,321,000	$2,452,000
GW-5	Pump and Treat	$7,183,000	$7,447,000

8. State/Support Agency Acceptance

The State of Texas was provided a copy of this Proposed Plan. The State will notify the EPA of its analysis and recommendations regarding this Proposed Plan.

9. Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD for the site.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative for the Bandera Road Ground Water Plume site is a combination of the following remedial alternatives:

Indoor Air
VI-4 (Membrane/Sealant with Vapor Vent) for Source Area 1 – Building B1

Surface and Subsurface Soil
S-3 (Excavation and Offsite Disposal) for Source Area 2, and
S-4 (Soil Vapor Extraction) for Source Area 1

Vadose Zone Bedrock
B-3 (Soil Vapor Extraction) for Source Areas 1 & 2

Ground Water
G-4 (In situ Bioremediation) for Source Areas 1 and 2.

The preferred indoor air alternative that utilizes a membrane/sealant with vapor vents is most effective long-term by preventing vapor intrusion and redirecting vapors away from the building without the concern of mechanical failure or power outages that may debilitate other systems.

The preferred surface and subsurface alternatives (S-3 and S-4) were selected over other alternatives because they address source materials constituting principal threats and would also meet the statutory preference for a selection of a remedy that involves treatment as a principal element.

In regards to soil vapor extraction alternatives (S-4 and B-3), the performance will be monitored by VOC analysis of samples of the vapor extracted from the soil. It is anticipated that soil vapor extraction systems will be operated until asymptotic removal levels are obtained: the operational definition of "asymptotic removal rate" refers to the point where declining mass removal rates (by the SVE system) make continued operation of the system ineffective and indicate operations should be terminated. Prior to terminating operations, the system will undergo rebound testing (a series of periodic operation and rest periods) to determine if significant VOCs remain. If significant VOCs remain, an evaluation of the residual VOC vapor concentrations will be conducted to determine if the SVE system should continue to operate or if alternative actions should be evaluated.

The preferred ground water remedy alternatives were selected over other alternatives because they are expected to achieve substantial risk reduction through treatment of contaminants in the ground water, provide measures to prevent exposure to currently impacted ground water, and prevent migration of contaminants by plugging and abandoning impacted wells. The Preferred Alternative can change in response to public comment or new information.

The total estimated present worth cost of the Preferred Alternative is $9,702,000

COMMUNITY PARTICIPATION

EPA provides information regarding actions at the Bandera Road Ground Water Plume site to the public through Community Advisory Group public meetings, public notices, fact sheets, the site Administrative Record, and this Proposed Plan.

Consideration of public input is an important part of the remedy selection process. EPA encourages all community members, business owners, and other interested stakeholders to provide input on the proposed remedy. EPA will select the final remedy only after considering the comments submitted during the public comment period.

The dates for the public comment period and the date, location, and time of the public meeting are provided on the front page of this Proposed Plan.

For further information on the Bandera Road Ground Water Plume Site, please contact:

Chris Villarreal
Remedial Project Manager
(214) 665-6758

June Hoey
Community Relations Coordinator
(214) 665-8522

U.S. EPA
Superfund Division (6SF-RA)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

GLOSSARY OF TERMS

Specialized terms used in this Proposed Plan are defined below:

Applicable or relevant and appropriate requirements (ARARs) – the Federal and State environmental laws that a selected remedy will meet. These requirements may vary among sites and alternatives.

Bioremediation – the use of microorganisms to transform or alter, through metabolic or enzymatic action, hazardous organic contaminants into non-hazardous substances.

Carbon adsorption – a process using activated carbon to remove primarily soluble organics from air and water. There are granular and powdered activated carbon based on the size of the carbon particles.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – Also known as Superfund. CERCLA is a Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. Under CERCLA, the EPA can either pay for the site cleanup or take legal action to force parties responsible for site contamination to clean up the site or pay back the Federal government for the cost of the cleanup.

Ground water – underground water that fill pores in soils or openings in rocks to the point of saturation. Ground water is often used as a source of drinking water via municipal or domestic wells.

Karst is a terrain with distinctive landforms and hydrology created from the dissolution of soluble rocks, principally limestone and dolomite.

LDR – Land Disposal Restrictions. The land disposal restrictions program requires certain waste to be treated before they may be disposed of in the land.

Micrograms per Liter (μg/L) - Is a measurement of concentration used to measure how many micrograms of a contaminant are present in one liter of water. One μg/L is equal to 0.001 milligrams per liter (mg/L).

Milligrams per Liter (mg/L) – Is a measurement of concentration used to measure how many milligrams of a contaminant are present in one liter of water. One mg/L is equal to 1000 micrograms per liter (μg/L).

Monitoring – ongoing collection of information about the environment that helps gauge the effectiveness of a clean-up action. Ground water, soil, vapor and indoor air samples with be collected at the Bandera Road Ground Water Plume site as part of EPA's ongoing monitoring activities.

National Priorities List (NPL) – EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response.

Present Worth Analysis – a method of evaluation of expenditures that occur over different time periods. By discounting all costs to a common base year, the costs for different remedial action alternatives can be compared on the basis of a single figure for each alternative. When calculating present worth costs for Superfund sites, total operations & maintenance costs are to be included.

Primary Porosity – The openings between individual grains of rock, which can range from negligible (metamorphic rock) to high (sandstone).

Secondary Porosity – The openings or discontinuities in a rock matrix caused by breakage, fracture or dissolution, which are further subdivided by origin as faults, joints or karst channels.

Remedial Investigation (RI) – The collection and assessment of data to determine the nature and extent of contamination at a site.

Safe Drinking Water Act Maximum Contaminant Level (SDWA MCL) – the maximum permissible level of a contaminant in water that is delivered to any user of a public water system.

Vadose Zone – the material between the surface soil and the water table.