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Performance Evaluation Report for Soil Vapor Extraction Operations at the 200-PW-1 Carbon Tetrachloride Site, Fiscal Year 2005

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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EXECUTIVE SUMMARY

Soil vapor extraction (SVE) is being used to remove carbon tetrachloride from the vadose zone at the 200-PW-1 Operable Unit (OU) (formerly designated as the 200-ZP-2 OU). The purpose of this report is to evaluate the SVE system operating data and the effectiveness of SVE in remediating carbon tetrachloride contamination based on the existing remedial design. This report covers operations for fiscal year 2005 (FY05) and provides a general overview of the operating period from February 25, 1992, through October 31, 2005. The scope of the report includes the following:

- Summary of the history of SVE operations at the 200-PW-1 OU
- Evaluation of the efficiency of operations over time
- Estimated volume of soil vapor processed
- Measured changes in carbon tetrachloride concentrations
- Calculated mass of carbon tetrachloride removed
- Recommendations for future operations and evaluations
- SVE operations cost data.

Carbon tetrachloride was found in the unconfined aquifer beneath the 200 West Area at the Hanford Site in the mid-1980s. Groundwater monitoring indicated that the carbon tetrachloride plume was widespread and that concentrations were increasing. In response to this contamination, removal of carbon tetrachloride from the vadose zone in the 200 West Area was initiated in 1992 using SVE followed by aboveground vapor treatment using granular activated carbon. By March 1993, three SVE systems (located near the three primary carbon tetrachloride disposal sites) were in operation, with a total capacity of 85 m^3/min. The three primary carbon tetrachloride disposal sites were the 216-Z-9, 216-Z-1A, and 216-Z-18 subsurface infiltration facilities used from 1955 through 1973 for soil column disposal of aqueous and organic liquid wastes containing carbon tetrachloride.

The 14.2-m^3/min SVE system was operated at the 216-Z-9 well field from April through July 2005 and at the 216-Z-1A/Z-18 well field from August through October 2005. Operation of

the SVE system was limited during July 2005 while the concentration-monitoring equipment was being repaired. As a result, the FY05 period of operation was extended to mid-October 2005.

Carbon tetrachloride concentrations in the extracted soil vapor have decreased significantly at all three sites during operation of the SVE systems. Initial carbon tetrachloride concentrations in extracted soil vapor were approximately 30,000 parts per million by volume (ppmv) at the 216-Z-9 well field and 1,500 ppmv at the 216-Z-1A/Z-18 well field. In sharp contrast, concentrations in extracted soil vapor were approximately 26 ppmv at the 216-Z-9 well field in July 2005 and 14 ppmv at the 216-Z-1A/Z-18 well field in October 2005.

The primary source of the remaining carbon tetrachloride appears to be the relatively low-permeability zone from approximately 38 to 45 m in depth, referred to as the Cold Creek unit (formerly the Plio-Pleistocene unit). As carbon tetrachloride from this lower permeability zone migrates into the overlying and underlying higher permeability zones, it can be removed using SVE; however, the rate of removal will be controlled by the rates of carbon tetrachloride desorption and diffusion. At many monitoring locations, including locations within the higher permeability zones, the relatively low carbon tetrachloride rebound concentrations indicate that the readily available mass (i.e., carbon tetrachloride already in the vapor phase or volatizing directly from residual nonaqueous phase liquid) has been removed. At these locations, availability of additional mass for removal is controlled by desorption and diffusion kinetics of carbon tetrachloride adsorbed within soil particle micropores and within soil moisture.

Based on the results found in the *Rebound Study Report for the Carbon Tetrachloride Soil Vapor Extraction Site, Fiscal Year 1997* (Rohay 1997) and the declining rate of carbon tetrachloride removal during continuous extraction operations, the operating strategy was modified in FY98. Rather than operating all three SVE systems continuously, only the 14.2-m^3/min system was used for carbon tetrachloride removal during FY98, FY99, FY01, FY02, FY03, FY04, and FY05. During each of these FYs, the system typically operated from April through September, alternately between the 216-Z-9 and the 216-Z-1A/Z-18 sites (approximately 3-month periods for each site), but was maintained in standby mode from October through March to allow time for carbon tetrachloride vapor concentrations to rebound. Operation was temporarily suspended

during the entire period of FY00 as a result of higher priority remediation activities competing for limited funding. Beginning in FY03, the 28.3-m^3/min and 42.5-m^3/min SVE systems were no longer maintained in standby mode and are being evaluated for the potential to excess.

The SVE system was operated at an average 58% availability from April through October 2005 and extracted 362 kg of carbon tetrachloride. The mass of carbon tetrachloride removed in FY05 is slightly higher than the totals of 256 kg extracted in FY04 and 294 kg extracted in FY03. The higher mass removal in FY05 resulted, in part, because operations continued longer at the high-production area around 216-Z-9 in FY05; operations only included the high-production area around 216-Z-9 for one month in FY04 and zero months in FY03 to avoid interfering with drilling activities. However, the total mass of carbon tetrachloride removed in FY05 was less than the 644 kg removed in FY02. This decrease resulted, in part, because the SVE system was not operated, or operated on dayshift only, for approximately 77 days in FY05 while the automated concentration monitoring equipment was being repaired. Between April 1991 (when the pilot test was conducted) and October 2005, approximately 78,710 kg of carbon tetrachloride were removed from the vadose zone. Of this total, 54,183 kg were removed from the 216-Z-9 well field and 24,528 kg from the 216-Z-1A/Z-18 well field.

Passive SVE systems were installed on eight wells in FY99 and operated from FY00 through FY05 to remove carbon tetrachloride from the vadose zone. Passive SVE is a naturally occurring process driven by barometric pressure fluctuations and is often referred to as "barometric pumping." The eight wells are located in the 216-Z-1A/Z-18 well field. Approximately 10 kg of carbon tetrachloride were removed from the vadose zone using passive SVE in FY05; between October 1999 and September 2005, approximately 70 kg of carbon tetrachloride were removed.

In 1993, it was estimated that between 1955 and 1990, 21% of the original carbon tetrachloride inventory discharged to the three primary disposal sites was lost to the atmosphere, 12% was partitioned into the vadose zone (as vapor, dissolved, and adsorbed phases), 2% was dissolved in groundwater in the upper 10 m of the unconfined aquifer, and 1% was biodegraded. The remaining 64% was assumed to be in residual saturation and non-equilibrium sorption sites

within the vadose zone and aquifer, and possibly as a dense nonaqueous phase liquid in groundwater. Recent deep groundwater sampling for dissolved carbon tetrachloride suggests that a significantly higher percent of the mass may be present throughout the unconfined aquifer (in dissolved and sorbed phases) than previously estimated.

The total mass of carbon tetrachloride removed using SVE represents an estimated 10.4% of the original carbon tetrachloride inventory (average of approximately 750,000 kg) discharged to the soil column. From 1991 through 1997, approximately 74,851 kg, or 10%, of the inventory was removed. In comparison, only about 0.4% of the original inventory was removed from FY98 through FY05.

Recommendations for SVE operations include (1) continuing operation of active and passive extraction systems, and (2) continuing development of a final remedial action determined through the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* remedial investigation/feasibility study process for the 200-PW-1 OU, which began in FY02.

CONTENTS

1.0 INTRODUCTION 1-1

1.1 REPORT PURPOSE 1-1

1.2 REPORT ORGANIZATION 1-2

2.0 200-PW-1 OPERABLE UNIT SOIL VAPOR EXTRACTION SYSTEM 2-1

2.1 SOIL VAPOR EXTRACTION SYSTEM DESCRIPTION 2-1

2.1.1 Active Soil Vapor Extraction 2-1
2.1.2 Passive Soil Vapor Extraction 2-2

2.2 HISTORY OF OPERATIONS 2-2

2.2.1 Carbon Tetrachloride Waste Disposal 2-2
2.2.2 Carbon Tetrachloride Well Field 2-3
2.2.3 Carbon Tetrachloride Soil Vapor Extraction, Fiscal Years 1992 Through 2004 2-3
2.2.4 Carbon Tetrachloride Soil Vapor Extraction in Fiscal Year 2005 2-4

2.3 SOIL VAPOR EXTRACTION SYSTEM PERFORMANCE 2-4

2.3.1 Concentration Changes 2-5
2.3.2 Volume of Soil Vapor Treated 2-6
2.3.3 Carbon Tetrachloride Mass Removed 2-7
2.3.4 System Operation Downtime 2-8

3.0 SOIL VAPOR MONITORING 3-1

3.1 FISCAL YEAR 2005 MONITORING 3-1

4.0 CONCEPTUAL MODEL 4-1

4.1 CONTAMINANT INVENTORY 4-1

4.2 ENVIRONMENTAL SETTING 4-1

4.3 CONTAMINANT TRANSPORT 4-1

4.3.1 Vadose Zone 4-1
4.3.2 Capillary Fringe 4-2

4.4 DATA GAPS 4-2

5.0 EXPEDITED RESPONSE ACTION STATUS 5-1

5.1 MITIGATE THREAT TO SITE WORKERS 5-1

5.2 MITIGATE THREAT TO PUBLIC HEALTH 5-1

5.3 MITIGATE THREAT TO THE ENVIRONMENT CAUSED BY MIGRATION OF CONTAMINANTS FROM THE SOIL INTO GROUNDWATER 5-2

5.4 REDUCE MASS OF CARBON TETRACHLORIDE IN THE SOIL 5-3

6.0 CONCLUSIONS AND RECOMMENDATIONS 6-1

6.1 CONCLUSIONS 6-1

6.2 RECOMMENDATIONS 6-1

7.0 SOIL VAPOR EXTRACTION SYSTEM COST DATA 7-1

8.0 REFERENCES 8-1

APPENDICES

A FISCAL YEAR 2005 DAILY SOIL VAPOR EXTRACTION DATA ..... A-i
B FISCAL YEAR 2005 SOIL VAPOR EXTRACTION WELL CHARACTERIZATION DATA ..... B-i
C FISCAL YEAR 2005 PASSIVE SOIL VAPOR EXTRACTION DATA ..... C-i
D FISCAL YEAR 2005 SOIL VAPOR MONITORING DATA ..... D-i

FIGURES

Figure 2-1. Extraction and Monitoring Wells and Deep (>2 m) Soil Vapor Probes at the Carbon Tetrachloride Soil Vapor Extraction Sites 2-9
Figure 2-2. Cross-Section Through 216-Z-18/Z-12 Well Field 2-11
Figure 2-3. Cross-Section Through 216-Z-1A Well Field 2-13
Figure 2-4. Cross-Section Through 216-Z-9 Well Field. 2-15
Figure 2-5. Daily Carbon Tetrachloride Concentrations and Mass Removed, 2005 2-17
Figure 2-6. Carbon Tetrachloride Concentrations in Vapor Extracted from the 216-Z-9 Site, 1997 Through 2005. 2-18
Figure 2-7. Carbon Tetrachloride Concentrations in Vapor Extracted from the 216-Z-1A Site, 1997 Through 2005 2-19
Figure 2-8. Daily Carbon Tetrachloride Mass Extracted, 1992 Through 2005. 2-20
Figure 2-9. Yearly Mass of Carbon Tetrachloride Extracted, 1991 Through 2005 2-21
Figure 2-10. Soil Vapor Extraction System Availability. 2-22
Figure 3-1. Maximum Carbon Tetrachloride Rebound Concentrations for Fiscal Year 1997 Through Fiscal Year 2005 3-3
Figure 3-2. Carbon Tetrachloride Rebound Concentrations Measured at Well 299-W15-217. 3-4
Figure 5-1. Comparison of the Carbon Tetrachloride Plume Beneath the 200 West Area at the Top of the Unconfined Aquifer.[a] 5-5
Figure 7-1. Cost Breakdown for 200-PW-1 Operable Unit Soil Vapor Extraction Operations in Fiscal Year 2005 7-2
Figure 7-2. Cost for Removal of Carbon Tetrachloride in Fiscal Year 2005 Using Soil Vapor Extraction. 7-3

TABLES

Table 2-1. Contaminant Inventory Discharged to Carbon Tetrachloride Disposal Sites 2-23
Table 2-2. Carbon Tetrachloride Mass Removed Using Soil Vapor Extraction. 2-23
Table 2-3. Volume of Vapor Extracted from Each Extraction Well Between April 1991 and October 2005. (2 sheets) 2-24
Table 4-1. Disposition of Carbon Tetrachloride Inventory Discharged to the Soil Column 4-2
Table 7-1. Costs for Operation of 200-PW-1 Soil Vapor Extraction System, Fiscal Year 2005 7-4

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LIST OF TERMS

B&K	Brüel & Kjaer
bgs	below ground surface
DBBP	dibutyl butyl phosphonate
DNAPL	dense nonaqueous phase liquid
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERA	expedited response action
FY	fiscal year
GAC	granular activated carbon
OU	operable unit
ppmv	parts per million by volume
RAO	remedial action objective
RECUPLEX	Recovery of Uranium and Plutonium by Extraction
RI/FS	remedial investigation/feasibility study
RL	U.S. Department of Energy, Richland Operations Office
SVE	soil vapor extraction
TBP	tributyl phosphate

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METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerel	millibecquerels	0.027	picocuries

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1.0 INTRODUCTION

Carbon tetrachloride was found in the unconfined aquifer beneath the 200 West Area at the Hanford Site in the mid-1980s. Groundwater monitoring indicated that the carbon tetrachloride plume was widespread and that concentrations were increasing. On December 20, 1990, the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) requested that the U.S. Department of Energy, Richland Operations Office (RL) proceed with detailed planning, including non-intrusive field work, required to implement an expedited response action (ERA) for removing carbon tetrachloride contamination from the unsaturated soils in the 200 West Area. The request was based on concerns that carbon tetrachloride residing in the soils was continuing to spread to the groundwater and, if left unchecked, would significantly increase the areal extent of groundwater contamination. The purpose of the ERA was to minimize carbon tetrachloride migration within the vadose zone and away from the carbon tetrachloride disposal sites in the 200 West Area.

The objective of the ERA, as stated in the action memorandum issued in January 1992 by EPA and Ecology (EPA and Ecology 1992), is to mitigate the threat to site workers, public health, and the environment caused by the migration of carbon tetrachloride vapors through the soil column and into the groundwater. The ERA is an interim action taken to reduce the mass of carbon tetrachloride in the soil column beneath the 200 West Area pending final cleanup activities.

Based on the initial investigations and an engineering evaluation/cost analysis, the preferred alternative for removal of the carbon tetrachloride from the vadose zone was soil vapor extraction (SVE) followed by aboveground vapor treatment using granular activated carbon (GAC) (DOE-RL 1991). The SVE pilot test was conducted in 1991, and the first SVE system began full-scale operations in February 1992.

The final cleanup activities will be determined as part of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* remedial investigation/feasibility study (RI/FS) process for the 200-PW-1 Operable Unit (OU). The RI of the carbon tetrachloride vadose zone plume was initiated in fiscal year 2002 (FY02) (DOE-RL 2004a).

1.1 REPORT PURPOSE

Carbon tetrachloride is being removed from the vadose zone at the 200-PW-1 OU (formerly designated as the 200-ZP-2 OU) using SVE. The purpose of this report is to evaluate the SVE system operating data and the effectiveness of the SVE in remediating the carbon tetrachloride contamination based on the existing remedial design. This report covers operations for FY05 and provides a general overview of the operating period from February 25, 1992, through October 31, 2004. The scope of the report includes the following:

- Summary of the history of SVE operations at the 200-PW-1 OU
- Evaluation of the efficiency of operations over time
- Estimated volume of soil vapor processed
- Measured changes in carbon tetrachloride concentrations
- Calculated mass of carbon tetrachloride removed
- Recommendations for future operations and evaluations
- SVE operations cost data.

1.2 REPORT ORGANIZATION

Detailed information on previous operating periods can be obtained from three earlier reports:

- FY92 through FY01: *Performance Evaluation Report for Soil Vapor Extraction Operations at the Carbon Tetrachloride Site, February 1992 – September 2001* (Rohay 2002)
- FY02: *Performance Evaluation Report for Soil Vapor Extraction Operations at the 200-PW-1 Carbon Tetrachloride Site, Fiscal Year 2002* (FH 2003)
- FY03: *Performance Evaluation Report for Soil Vapor Extraction Operations at the 200-PW-1 Carbon Tetrachloride Site, Fiscal Year 2003* (FH 2004)
- FY04: *Performance Evaluation Report for Soil Vapor Extraction Operations at the 200-PW-1 Carbon Tetrachloride Site, Fiscal Year 2004* (FH 2005).

This report provides an evaluation of data from FY05. Data from previous years is used for comparison and trending purposes. This FY05 report is divided into the following sections:

- Section 1.0 – Provides introductory information and describes the purpose of this SVE report.
- Section 2.0 – Includes information on the design and location of the SVE systems, history of operations, and SVE system performance.
- Section 3.0 – Discusses soil vapor monitoring during FY05 and provides information on historical monitoring activities.
- Section 4.0 – Presents information on the contaminant inventory of carbon tetrachloride discharged to the soil column.
- Section 5.0 – Includes information on the status of the ERA.
- Section 6.0 – Presents conclusions and recommendations.
- Section 7.0 – Presents costs for SVE operations in FY05
- Section 8.0 – Provides a list of the references cited in this report.

Appendices A through D provide the data collected during operations and monitoring in FY05.

2.0 200-PW-1 OPERABLE UNIT SOIL VAPOR EXTRACTION SYSTEM

2.1 SOIL VAPOR EXTRACTION SYSTEM DESCRIPTION

The purpose of the ERA, as described in the action memorandum (EPA and Ecology 1992), can be summarized by four remedial action objectives (RAOs):

- Mitigate the threat to site workers
- Mitigate the threat to public health
- Mitigate the threat to the environment caused by the migration of contaminants from soil into groundwater
- Reduce the mass of carbon tetrachloride in the soil.

To meet these RAOs, the action memorandum authorized the installation and operation of SVE systems. The primary active SVE system uses an applied vacuum to extract carbon tetrachloride vapor from the vadose zone. This system extracts vapor through multiple vadose zone borings at the three primary carbon tetrachloride disposal sites: 216-Z-9 Trench, 216-Z-1A tile field, and 216-Z-18 Crib. The SVE system was operated at the 216-Z-9 site from April through July 2005 and at the 216-Z-1A and 216-Z-18 site from August through October 2005. Passive SVE systems that use naturally occurring changes in barometric pressure to drive the extraction of vapor were installed at eight vadose zone borings and operated throughout FY05. Detailed information for both the active and passive systems is presented in the following subsections.

2.1.1 Active Soil Vapor Extraction

The active SVE system consists of the following:

- A water knockout tank to remove entrained water droplets
- A high-efficiency particulate air filter to remove entrained particulate matter, including radionuclides
- A blower to extract the soil vapor
- An air-to-air heat exchanger to cool the vapor between the blower and the GAC canisters
- A secondary water knockout tank to remove entrained water condensate from the air cooler
- GAC-filled canisters for adsorbing carbon tetrachloride
- A stack for venting the treated vapor to the atmosphere.

Following overheating of a GAC canister in June 1993, a Brüel & Kjaer™ (B&K) Type 1302 multi-gas analyzer was purchased, and manual sampling was performed to test the performance of the instrument. The B&K instrument proved to be accurate and reliable, with the added features of being able to measure several other targeted volatile organic compounds and being readily adaptable to automated operation. The B&K instrument has since been used to support 24 hour/day SVE system operations, providing automated sampling and analysis at the SVE

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system inlet, between GAC canisters, and at the vent stack. The vapor flow rate also is measured at these locations.

2.1.2 Passive Soil Vapor Extraction

Passive SVE uses naturally induced pressure gradients between the subsurface and the surface to drive soil vapor to the surface. The presence of a borehole screened in the vadose zone provides a preferential pathway for flow. In general, falling atmospheric pressure causes subsurface vapor to move to the atmosphere through wells, while rising atmospheric pressure causes atmospheric air to move into the subsurface. At the carbon tetrachloride site, passive SVE systems are installed on selected wells.

The minimum component for a passive SVE system is a well to provide the preferential pathway from the subsurface zone to the surface. On the systems designed for use at the carbon tetrachloride site, additional components include an aboveground canister of GAC to collect the venting carbon tetrachloride; hoses to connect the well to the canister; and a one-way, flow-activated valve that lets soil vapor flow out through the well but prevents atmospheric air from flowing in through the well.

2.2 HISTORY OF OPERATIONS

2.2.1 Carbon Tetrachloride Waste Disposal

Carbon tetrachloride contained in aqueous and organic liquid wastes generated during plutonium-processing operations at Z Plant (currently called the Plutonium Finishing Plant) was discharged primarily to three subsurface infiltration facilities: the 216-Z-9 Trench from 1955 to 1962, the 216-Z-1A tile field (and associated 216-Z-1 and 216-Z-2 Cribs) from 1964 to 1969, and the 216-Z-18 Crib from 1969 to 1973. The Recovery of Uranium and Plutonium by Extraction (RECUPLEX) plutonium-processing operation was discontinued after a criticality incident in April 1962 and was replaced in May 1964 by the Plutonium Reclamation Facility. No liquid organic waste associated with these operations was discharged to cribs between April 1962 and May 1964. No liquid organic waste was discharged to the cribs after 1973. A total of 570,000 to 920,000 kg (360,000 to 580,000 L) of carbon tetrachloride is estimated to have been discharged to the soil column between 1955 and 1973 (Table 2-1) (DOE-RL 1991).

Three other sites in the vicinity of Z Plant also received carbon tetrachloride wastes: 216-Z-12 Crib, 216-Z-19 Ditch, and 216-T-19 Crib. The 216-Z-12 Crib received analytical and development laboratory waste from Z Plant from 1959 to 1973 and is estimated to have received a small volume of organics, which included carbon tetrachloride (Kasper 1982). The 216-Z-19 Ditch was used to convey process cooling water and steam condensate from Z Plant from 1971 to 1981; apparently, carbon tetrachloride was also occasionally and/or accidentally released to this ditch because heavy organic was noted in the outfall (Rohay and Johnson 1991). Between 1973 and 1976, aqueous waste saturated with carbon tetrachloride was sent to the 242-T evaporator. During that time, the 216-T-19 Crib received approximately 1,400 kg (880 L) of carbon tetrachloride in the overhead condensate discharged from this evaporator (Rohay et al. 1993).

2.2.2 Carbon Tetrachloride Well Field

The vadose zone underlying the carbon tetrachloride area consists of approximately 66 m of relatively permeable sand and gravel. This section is interrupted from 38 to 45 m by a less permeable interval composed of 4 m of silt and sand and 3 m of carbonate-rich silt and sand. Because it constitutes a relatively low-flow zone, this less permeable interval effectively divides the subsurface into two distinct zones: an upper zone from the ground surface to the top of the less permeable layer, and a lower zone from the bottom of the less permeable layer to the water table. Because of its higher concentration of calcium carbonate, the less permeable Cold Creek unit (formerly called the Plio-Pleistocene unit) is informally referred to as the "caliche layer." Vapor extraction wells are screened or perforated in both the upper and lower zones, with some wells screened in the low-flow interval.

There are currently 46 drilled wells available for SVE (Figure 2-1). Thirteen of these wells were drilled in 1992 and 1993 and were completed as vapor extraction wells with stainless-steel casings and screens; one well at the north end of 216-Z-9 was drilled at a 45-degree incline. Existing wells, drilled between 1954 and 1978 and completed with carbon-steel casing, were adapted for vapor extraction by perforating the well casing using mechanical or jet perforators. Two of these wells were deepened in 2001 and completed with stainless-steel screens and casing that extend below the perforated intervals (BHI 2001).

Twenty-one well intervals are available at the 216-Z-18/Z-12 well field, 21 well intervals are available at the 216-Z-1A well field, and 23 well intervals are available at the 216-Z-9 well field. Seventeen of these 65 intervals are open below the Cold Creek unit layer (six at 216-Z-18/Z-12, two at 216-Z-1A, and nine at 216-Z-9). Well diameters range from 5 to 20 cm. The SVE system extracts simultaneously from multiple wells that are open either above and/or below the Cold Creek unit layer. Cross-sections through the 216-Z-18/Z-12, 216-Z-1A, and 216-Z-9 well fields are shown in Figures 2-2, 2-3, and 2-4, respectively.

Currently, 126 subsurface monitoring probes are installed at a depth of >2 m (Figure 2-1). These probes are as follows (note that one cone penetrometer well was decommissioned and is not counted):

- A cone penetrometer was used in 1993 to install 11 extraction or monitoring wells. The deepest open interval ends 34 m below ground surface (bgs). One of these wells was decommissioned in April 1997.
- A cone penetrometer was used to install 106 subsurface monitoring probes at 35 locations at the carbon tetrachloride site between 1991 and 1994. The deepest monitoring probe installed at the vapor extraction sites using the cone penetrometer is 36 m bgs.
- Ten stainless-steel tubes were strapped to the outside of the casing of four wells during installation in 1993 to enable monitoring above and below the screened intervals.

2.2.3 Carbon Tetrachloride Soil Vapor Extraction, Fiscal Years 1992 Through 2004

A pilot SVE system was tested at the 216-Z-1A tile field in April 1991 (DOE-RL 1991). Based on the results of this testing and as part of the ERA, a full-scale SVE system was installed and began extracting from wells at the tile field in February 1992. Two of the 216-Z-18 Crib wells were added to the system in May 1992. This system originally had a design capacity of 14.2 m^3/min but was upgraded to 28.3 m^3/min in March 1993. Two additional SVE systems, one

with 42.5-m^3/min capacity and the other with 14.2-m^3/min capacity, began operating in March 1993 at the 216-Z-9 Trench.

Operation of all three systems was temporarily suspended in June 1993 because of an incident involving a GAC canister overheating at 216-Z-9 (Driggers 1994). The 28.3-m^3/min system resumed operation at the 216-Z-1A/Z-18 well field in November 1993; the 42.5-m^3/min system resumed operation at the 216-Z-9 well field in February 1994; and the 14.2-m^3/min system, which was moved to the 216-Z-18 well field, resumed operation in June 1994. In August 1995, SVE operations using the 14.2-m^3/min SVE system were expanded to include the 216-Z-12 site.

A rebound study was conducted throughout the carbon tetrachloride SVE sites in FY97 (Rohay 1997). The purpose of the study was to determine the increase in carbon tetrachloride vapor concentrations following temporary cessation of operations. Operation of all three SVE systems was temporarily suspended in November 1996 and then restarted in July 1997. All three SVE systems continued to operate through September 1997.

Based on the results of the FY97 rebound study and the declining rate of carbon tetrachloride removal during continuous extraction operations, the operating strategy was modified in FY98. Rather than operating all three SVE systems continuously, only the 14.2-m^3/min system was used for carbon tetrachloride removal during FY98, FY99, FY01, FY02, FY03, FY04, and FY05. During each of these FYs, the system typically operated from April through September alternately between the 216-Z-9 and the 216-Z-1A/Z-18 sites (for approximately 3 months at each site) and was maintained in standby mode from October through March to allow time for carbon tetrachloride vapor concentrations to rebound. Operation was temporarily suspended during the entire period of FY00 as a result of higher priority remediation activities competing for limited funding. Beginning in FY03, the 28.3-m^3/min and 42.5-m^3/min SVE systems were no longer maintained in standby mode and are being evaluated for the potential to excess.

2.2.4 Carbon Tetrachloride Soil Vapor Extraction in Fiscal Year 2005

The 14.2-m^3/min SVE system was operated at the 216-Z-9 well field from April through July 2005 and at the 216-Z-1A/Z-18 well field from August through October 2005. For approximately 77 days in the period of June through August, the SVE system was not operated, or was operated only on day shift, while the automated B&K monitoring system was being repaired. As a result, the FY05 period of operation was extended through mid-October 2005.

2.3 SOIL VAPOR EXTRACTION SYSTEM PERFORMANCE

The operating data that are routinely recorded for the SVE system include carbon tetrachloride concentrations, applied vacuums, system flow rates, and hours of operation (Appendix A). These parameters are monitored at the inlet to the SVE system to represent the combined contribution of all extraction wells currently on-line. In addition, samples are periodically taken at individual wells to obtain well-specific data (Appendix B). All instruments (i.e., flow meters, vacuum gauges, and volatile organic monitors) are calibrated, and the calibration data for each instrument are retained and available for review. The volatile organic compound monitoring instruments are checked periodically with gas standards. The detection limit for carbon tetrachloride using this instrumentation is 1 part per million by volume (ppmv).

2.3.1 Concentration Changes

Carbon tetrachloride concentrations in the extracted soil vapor have decreased significantly at both the 216-Z-9 and 216-Z-1A/Z-18/Z-12 well fields during operation of SVE. This is typical of SVE operations and represents removal of the volatile contaminant readily available in the swept pore spaces. Extracted contaminant vapor concentration approaches an asymptotic level as the supply of volatile contaminant to the high-flow zone becomes limited by desorption and diffusion of carbon tetrachloride from sediment particles and soil moisture. Diffusion also controls contaminant migration from the pore spaces between sediment particles in the lower permeability/lower flow zones to pore spaces in the higher permeability/higher flow zones.

Carbon tetrachloride concentrations in soil vapor extracted from the 216-Z-9 well field using the 42.5-m^3/min and 14.2-m^3/min SVE systems have declined from approximately 30,000 ppmv at startup in March 1993 to 26 ppmv (using only the 14.2-m^3/min SVE system) in July 2005. Carbon tetrachloride concentrations in soil vapor extracted from the 216-Z-1A/Z-18/Z-12 well field using the 28.3- and 14.2-m^3/min SVE systems have declined from approximately 1,500 ppmv at startup in February 1992 to 14 ppmv (using only the 14.2-m^3/min SVE system) in October 2005.

In FY05, SVE resumed on April 1, 2005, at the 216-Z-9 well field using the 14.2-m^3/min SVE system. Following an extraction strategy similar to that used in previous years, initial on-line wells were selected close to the 216-Z-9 Trench, and wells farther away from the trench were brought on-line as extraction continued. Each selection of on-line wells included wells open near the groundwater and wells open near the lower permeability Cold Creek unit. The selection of initial on-line wells was modified to accommodate the cross-well seismic test being conducted at 216-Z-9 for the Alternatives for Carbon Tetrachloride Source-Term Location (i.e., dense nonaqueous phase liquid [DNAPL]) Project. In addition to wells 299-W15-82 and 299-W15-217, the initial on-line wells included wells 299-W15-95U and 299-W15-95L rather than the usual wells 299-W15-9U and 299-W15-9L. During FY05, carbon tetrachloride concentrations extracted from the 216-Z-9 well field appeared to initially increase and then decrease with continued extraction (Figure 2-5). Concentrations appeared to remain relatively constant after approximately 8 weeks of operation (Figure 2-5).

The SVE operations resumed on July 29, 2005, at the 216-Z-1A/Z-18 well field using the 14.2-m^3/min SVE system. Following an extraction strategy similar to that used in previous years, extraction wells open near the Cold Creek unit within the 216-Z-1A tile field were selected to optimize mass removal. The initial wells were 299-W18-165, 299-W18-166, 299-W18-167, 299-W18-168, and 299-W18-174, as planned. The passive SVE systems were installed on eight wells open near the groundwater in the 216-Z-1A/Z-18 well field. During FY05, carbon tetrachloride concentrations extracted from the 216-Z-1A/Z-18/Z-12 well field decreased only slightly between July and October (Figure 2-5).

The daily mass removal rate remained relatively low from June through August when SVE operation was limited because of the need to repair the automated monitoring system (Figure 2-5).

Although the initial carbon tetrachloride concentrations were an order of magnitude higher at the 216-Z-9 site (30,000 ppmv) than at the 216-Z-1A site (1,500 ppmv), concentrations at the two sites are now similar. Operation of the SVE system at the 216-Z-9 site reduced the inlet concentrations to approximately 20 to 40 ppmv each year of operation from FY97 through FY05

(Figure 2-6). At the 216-Z-1A site, operation of the SVE system appears to have reduced the inlet concentrations to approximately 15 to 25 ppmv each year of operation from FY97 through FY05 (Figure 2-7).

Well 299-W15-8U was prioritized for early addition to the mix of on-line wells at 216-Z-9. Well 299-W15-8U was used for vapor extraction in lieu of new well 299-W15-46 (C3426), which was completed as a groundwater well. Relatively high carbon tetrachloride vapor concentrations (approximately 9,500 ppmv) were detected at 33 to 34 m bgs during drilling of well 299-W15-46 in FY04 (FH 2005). Well 299-W15-8U, which is perforated from 28 to 34 m bgs, was placed on-line on May 5, 2005, and monitored at 1- to 2-hour intervals on May 5 and May 6. During the first 25.5 hours of operation, carbon tetrachloride concentrations detected at well 299-W15-8U increased from 63 ppmv to 170 ppmv (Appendix B). The maximum concentration detected was 191 ppmv on May 11, 2005.

2.3.2 Volume of Soil Vapor Treated

For each SVE system, the volume of soil vapor processed was calculated using the hours that the system operated and the measured flow rate of soil vapor exiting the system. The flow rate measured at the SVE system represents the combined flow from all on-line wells and may change as the selection of on-line wells changes. For a given applied vacuum, the flow produced from each well is a function of the air permeability of the soil, the open area of the screened or perforated interval, the well diameter, and the radius of influence of the well.

Between April 1991 (pilot testing) and October 2005, 97.5 million m^3 of soil vapor were extracted and processed using the three SVE systems. This volume was extracted from two well fields, with 42.9 million m^3 extracted from the 216-Z-9 well field and 54.6 million m^3 extracted from the 216-Z-1A/Z-18/Z-12 well field.

The flow rates at individual extraction wells were estimated by apportioning the flow rates measured at the SVE systems among the on-line wells (Rohay 2002, Appendix A). For each well, the system flow rate was multiplied by the ratio of the well's open area to the sum of the open areas for all the wells in operation on that system on that particular day. The daily flow rates and the number of operating hours were then used to estimate the cumulative flow from each extraction wells. At the 216-Z-9 well field, an estimated 27.3 million m^3 of soil vapor were extracted from wells open above the Cold Creek unit, and 15.6 million m^3 of soil vapor were extracted from wells open below the Cold Creek unit (Table 2-2). For the 216-Z-1A/Z-18/Z-12 well field, an estimated 34.1 million m^3 of soil vapor were extracted from wells open above the Cold Creek unit, and 20.5 million m^3 were extracted from wells open below the Cold Creek unit.

Based on an average areal zone of influence of 55,000 m^2 above the Cold Creek unit in the 216-Z-9 area, an average Hanford formation thickness of 38 m, an average porosity of 20%, and assuming a uniform distribution of flow, 65 pore volumes of soil vapor have been extracted by the 42.5- and 14.2-m^3/min SVE systems above the Cold Creek unit. Similarly, for the 216-Z-1A/Z-18/Z-12 area, based on an average areal zone of influence of 155,000 m^2, 29 pore volumes of soil vapor have been extracted by the 28.3- and 14.2-m^3/min SVE systems above the Cold Creek unit.

Based on an average areal zone of influence of 40,000 m^2 below the Cold Creek unit in the 216-Z-9 area, an average Ringold Unit E thickness of 21 m in the unsaturated zone, an average porosity of 20%, and an assumed uniform distribution of flow, 93 pore volumes of soil vapor

have been extracted by the 42.5- and 14.2-m^3/min SVE systems below the Cold Creek unit. Similarly, for the 216-Z-1A/Z-18/Z-12 area, based on an average areal zone of influence of 100,000 m^2, 49 pore volumes of soil vapor have been extracted by the 28.3- and 14.2-m^3/min SVE systems below the Cold Creek unit.

2.3.3 Carbon Tetrachloride Mass Removed

The mass of carbon tetrachloride removed from each well field was calculated using the measured flow, concentration, and hours of operation data (Appendix A). In FY05, approximately 67 kg of carbon tetrachloride were removed from the 216-Z-1A/Z-18/Z-12 well field and 295 kg were removed from the 216-Z-9 well field (Table 2-3). Between April 1991 (when the pilot test was conducted) and October 2005, approximately 24,528 kg of carbon tetrachloride were removed from the 216-Z-1A/Z-18/Z-12 well field. Between March 1993 and July 2005, approximately 54,183 kg of carbon tetrachloride were removed from the 216-Z-9 well field. The total mass of carbon tetrachloride removed from all sites (78,710 kg) represents approximately 10% of the original carbon tetrachloride inventory (average of approximately 750,000 kg) discharged to the soil column (Table 2-1). Approximately 0.1% of the original carbon tetrachloride inventory was removed each year in 1998, 1999, and 2001 and less than 0.1% in 2003, 2004, and 2005 (Figure 2-8). The decline in mass removed in 2003 and 2004 may have resulted, in part, because the SVE system operated primarily at the 216-Z-1A well field, where less mass is typically extracted (Table 2-3). The decline in mass removed in 2005 resulted, in part, because the SVE system was not operated, or operated on dayshift only, for approximately 77 days while the automated concentration monitoring equipment was being repaired. The masses of carbon tetrachloride removed by year, by waste site, and cumulatively are provided in Table 2-3 and Figure 2-9.

Based on the following assumptions, the total mass of carbon tetrachloride removed represents an average of 13.8% of the residual mass potentially available in the vadose zone. An estimated 440,000 kg of carbon tetrachloride were initially discharged to the 216-Z-1A tile field and 216-Z-18 Crib, and 330,000 kg were initially discharged to the 216-Z-9 Trench. Of this original inventory, an estimated 21% had been lost to the atmosphere by 1990, 1% to 2% dissolved in the upper 10 m of the unconfined aquifer, and 1% had biodegraded (WHC 1993, Rohay and Johnson 1991, Hooker et al. 1996). For the purpose of this calculation, all mass that has not been estimated as lost to the atmosphere, dissolved in the aquifer, or biodegraded is assumed to be present as residual mass, in any phase, in the vadose zone. Assuming that 330,000 kg of carbon tetrachloride remained as residual mass in the vadose zone beneath the 216-Z-1A and 216-Z-18 sites, 7.4% (24,528 kg ÷ 330,000 kg) of the residual mass potentially available has been removed. Assuming that 240,000 kg remained beneath the 216-Z-9 site, 22.6% (54,183 kg ÷ 240,000 kg) of the available mass potentially available has been removed. The total mass of carbon tetrachloride removed represents an average of 13.8% (78,710 kg ÷ 570,000 kg) of the total mass of carbon tetrachloride potentially available in the vadose zone.

With the overall decrease in extracted soil vapor concentrations and the subsequent decline in mass removed, the question arises regarding the location of the remaining carbon tetrachloride. Several possible hypotheses could explain this:

- Carbon tetrachloride migrated laterally from the known disposal sites, beyond the influence of the SVE system.

- Carbon tetrachloride was disposed at other unknown sites and tabulated on the 216-Z-9, 216-Z-1A, and/or 216-Z-18 sites.
- Estimates of the initial inventory discharged to the waste sites were too high.
- Original estimates of percentages lost to the atmosphere, dissolved in the upper unconfined aquifer, and biodegraded are understated.
- Carbon tetrachloride is present as DNAPL deeper in the vadose zone and/or aquifer and beyond the influence of SVE operations/well configuration.
- Influence of the SVE system within the well fields is not uniform and provides incomplete coverage.
- The carbon tetrachloride could be located in lower permeability/lower flow zones where SVE is less effective.
- Carbon tetrachloride is irreversibly sorbed to intra-particle pores.

The mass of carbon tetrachloride removed in FY05 using the eight passive SVE wells is estimated to be approximately 10 kg. Carbon tetrachloride concentrations were monitored at the passive wells in FY05 (Appendix C). These monthly concentrations were used to calculate the mass removed from each well. This calculation assumes that (1) the wells exhale 50% of the time; (2) during outflow, the average flow rate is one-half the maximum flow rate; (3) during outflow, the average concentration is one-half of the maximum concentration; and (4) the concentrations measured each month were maximum values. The maximum flow values were assumed to be the same as used in FY01 (Rohay 2002).

2.3.4 System Operation Downtime

The availability of each SVE system is evaluated by comparing the amount of actual operating time to the potential amount of operating time (scheduled outages are excluded from this calculation). Because operation of the systems is most difficult to maintain during the winter months (i.e., with the need to drain water from the extraction hoses and water knockout tanks during cold weather and potential freezing of water in the hoses), temporary suspension of operation has continued each winter since 1998.

In FY05, the total availability of the system was 58%. Between November 1994 and October 2005, the monthly availability for all three systems averaged 87%, which is slightly below the objective of 90% availability. Figure 2-10 shows operational availability for FY05 and since 1994.

Figure 2-1. Extraction and Monitoring Wells and Deep (>2 m) Soil Vapor Probes at the Carbon Tetrachloride Soil Vapor Extraction Sites.

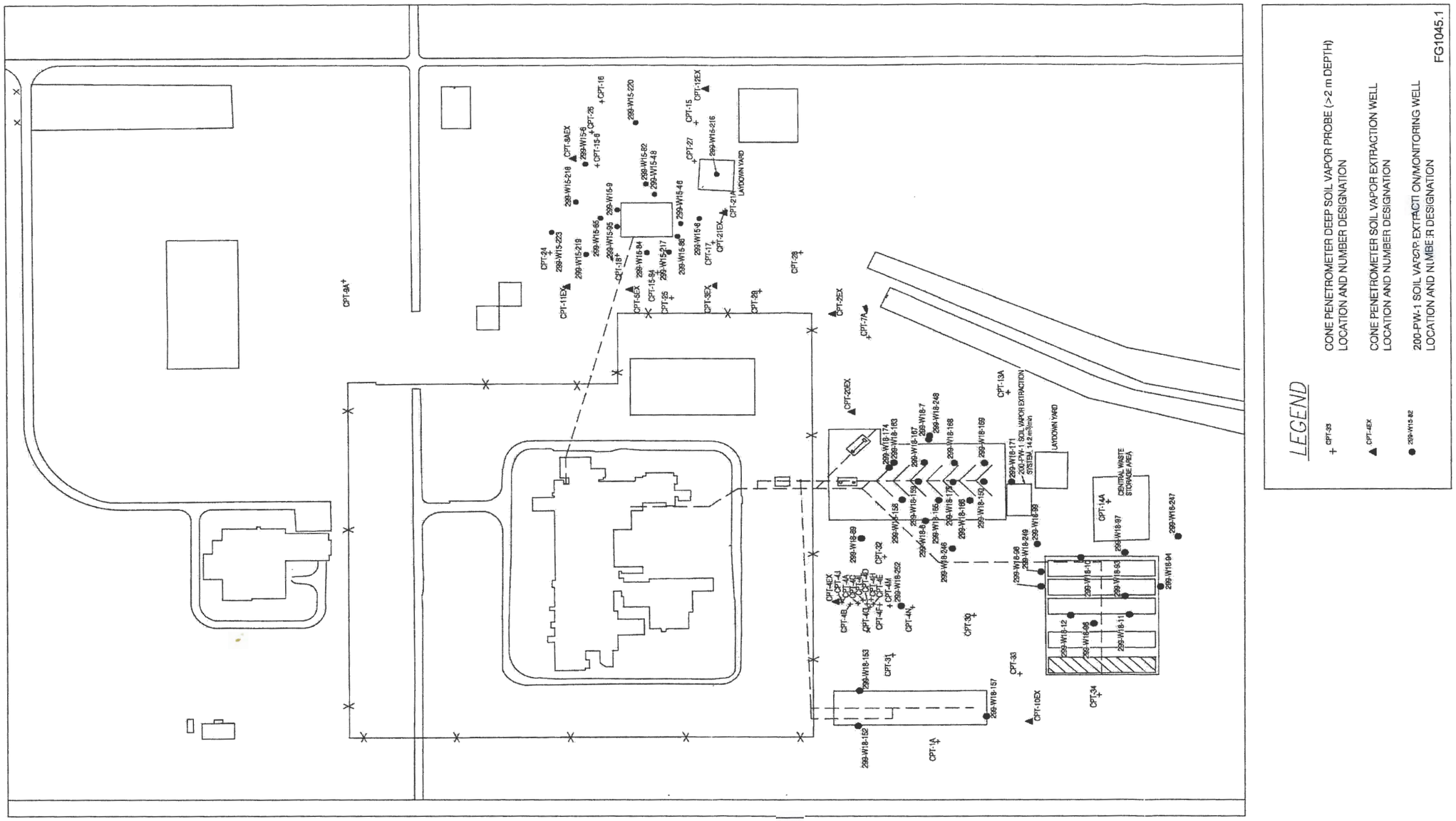

Figure 2-2. Cross-Section Through 216-Z-18/Z-12 Well Field.

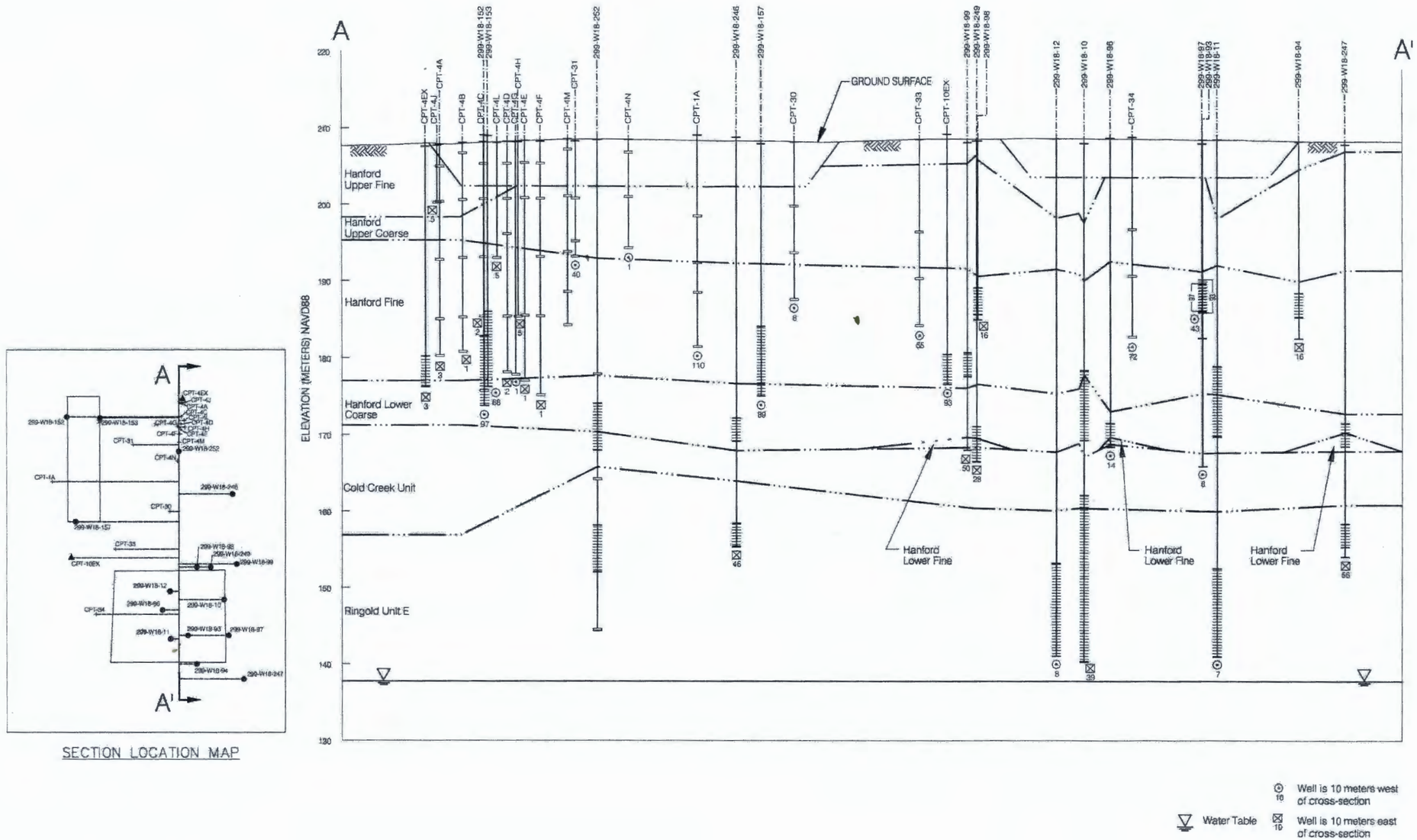

Figure 2-3. Cross-Section Through 216-Z-1A Well Field.

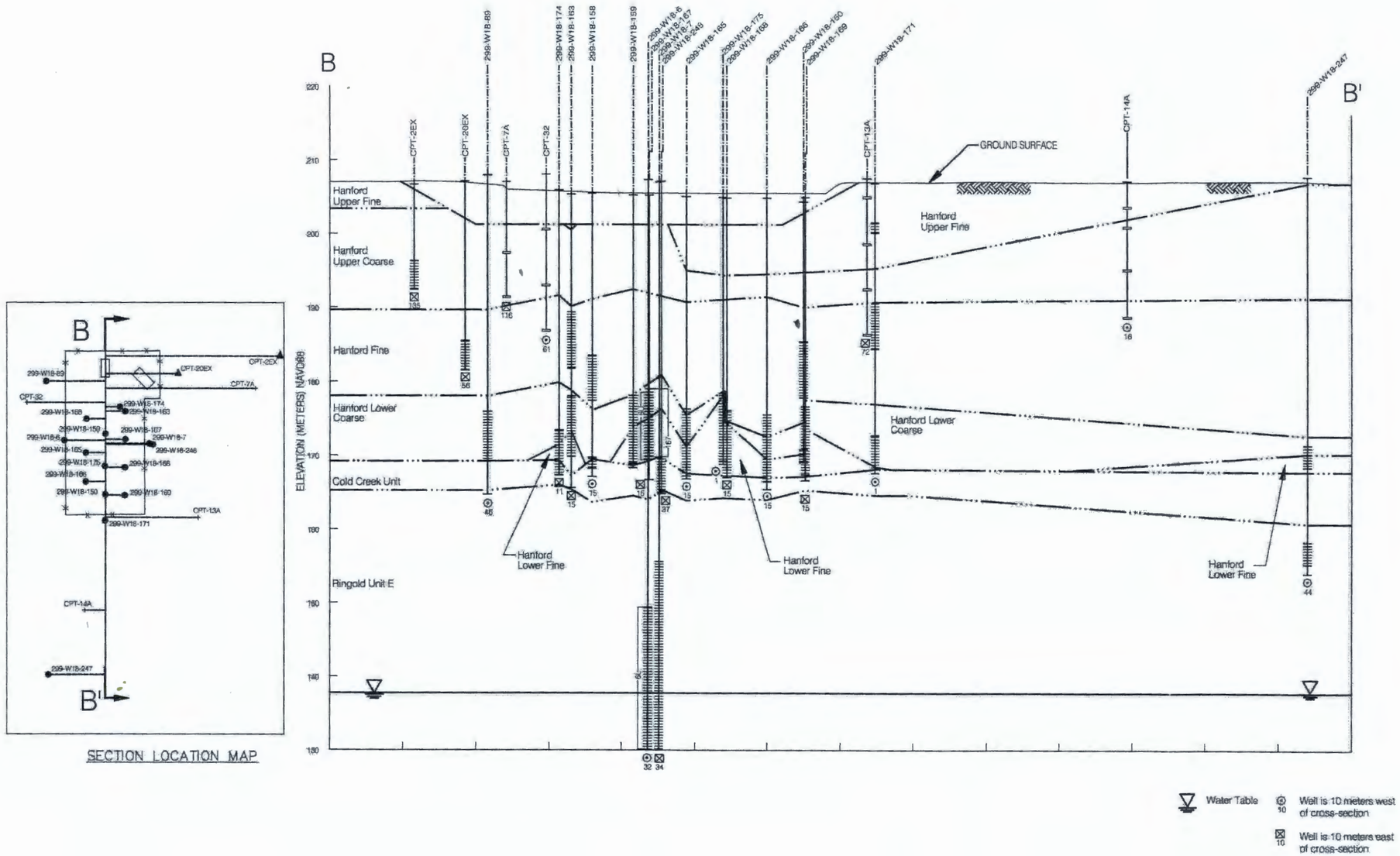

Figure 2-4. Cross-Section Through 216-Z-9 Well Field.

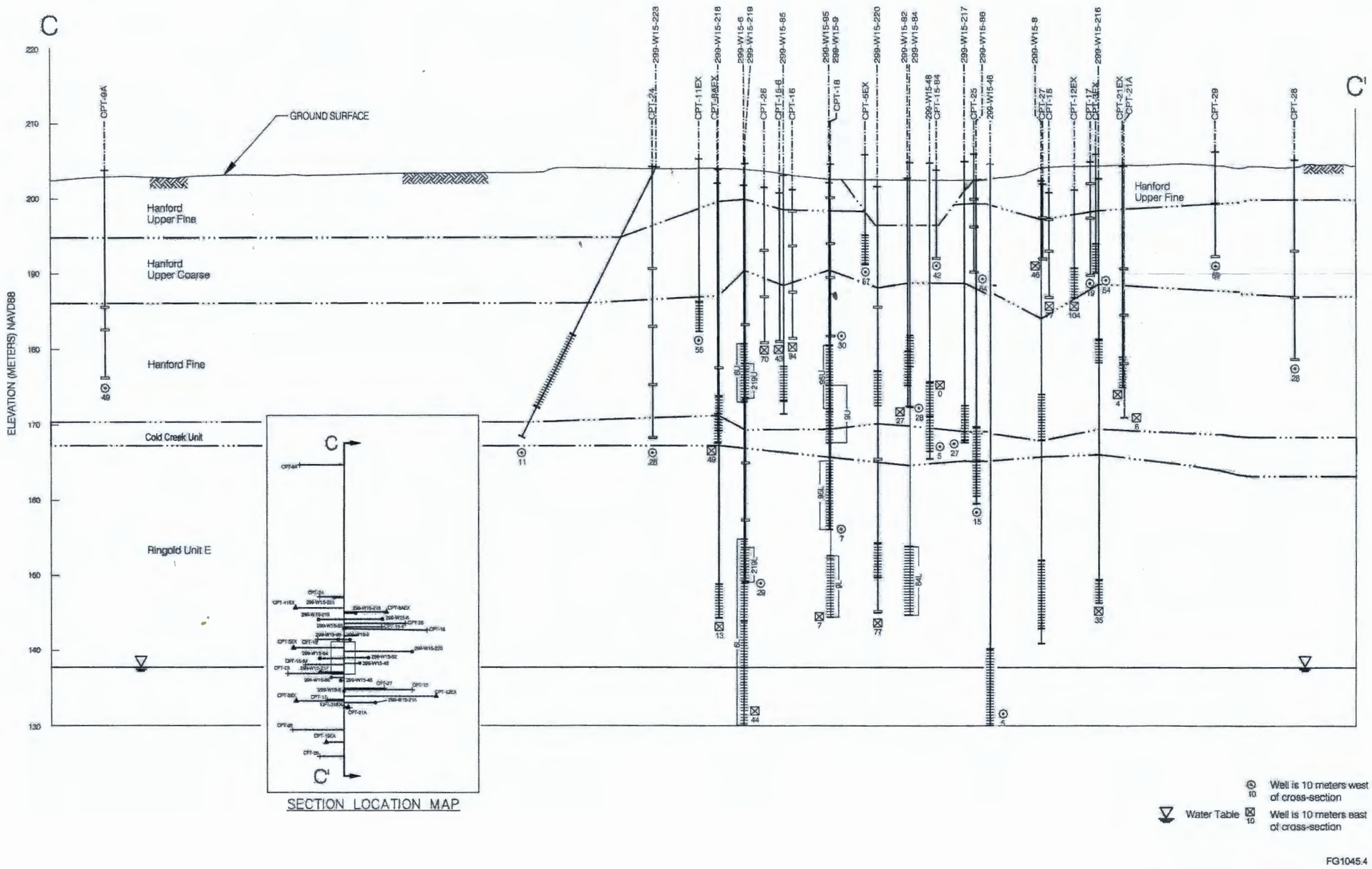

Figure 2-5. Daily Carbon Tetrachloride Concentrations and Mass Removed, 2005.

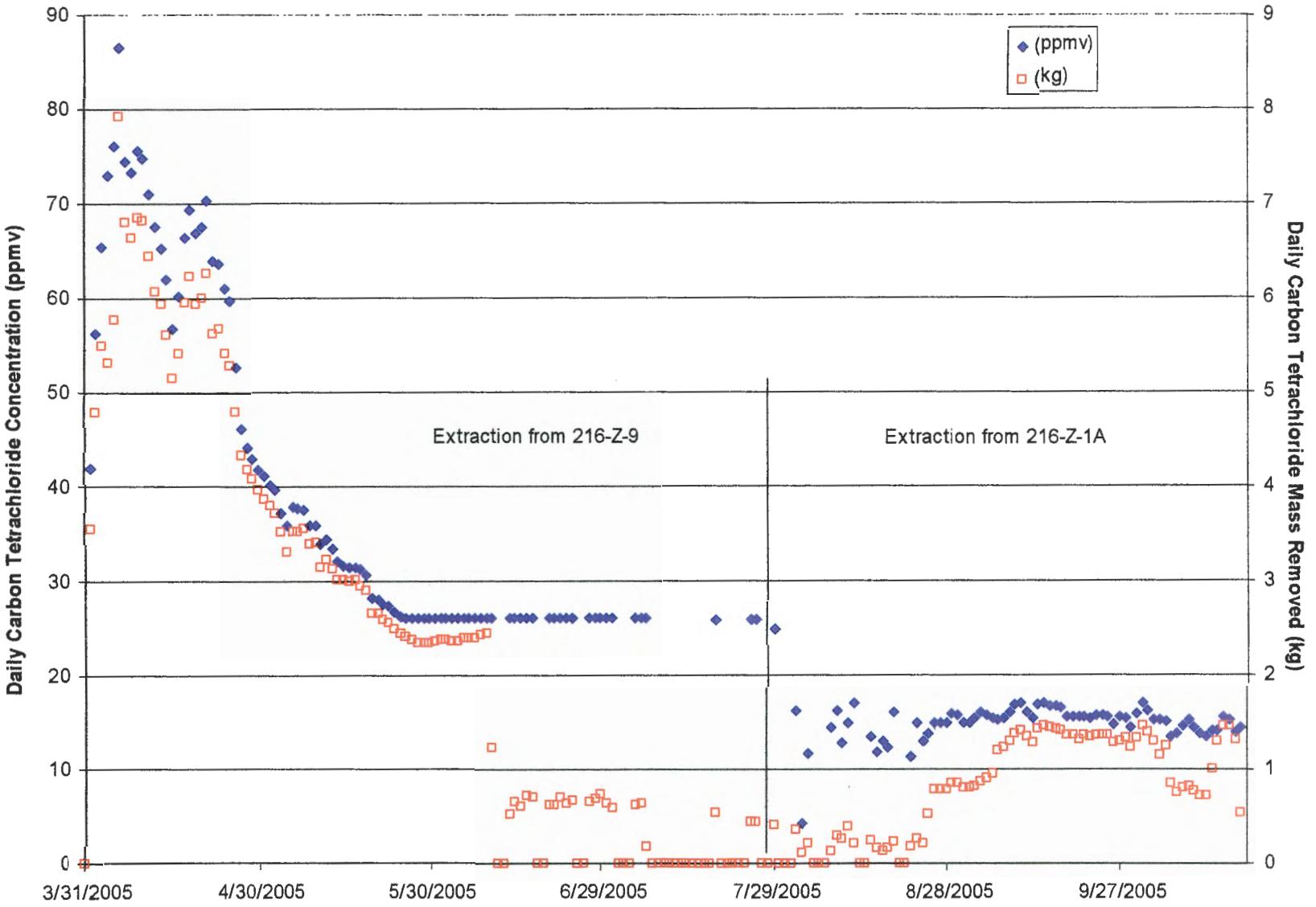

Figure 2-6. Carbon Tetrachloride Concentrations in Vapor Extracted from the 216-Z-9 Site, 1997 Through 2005.

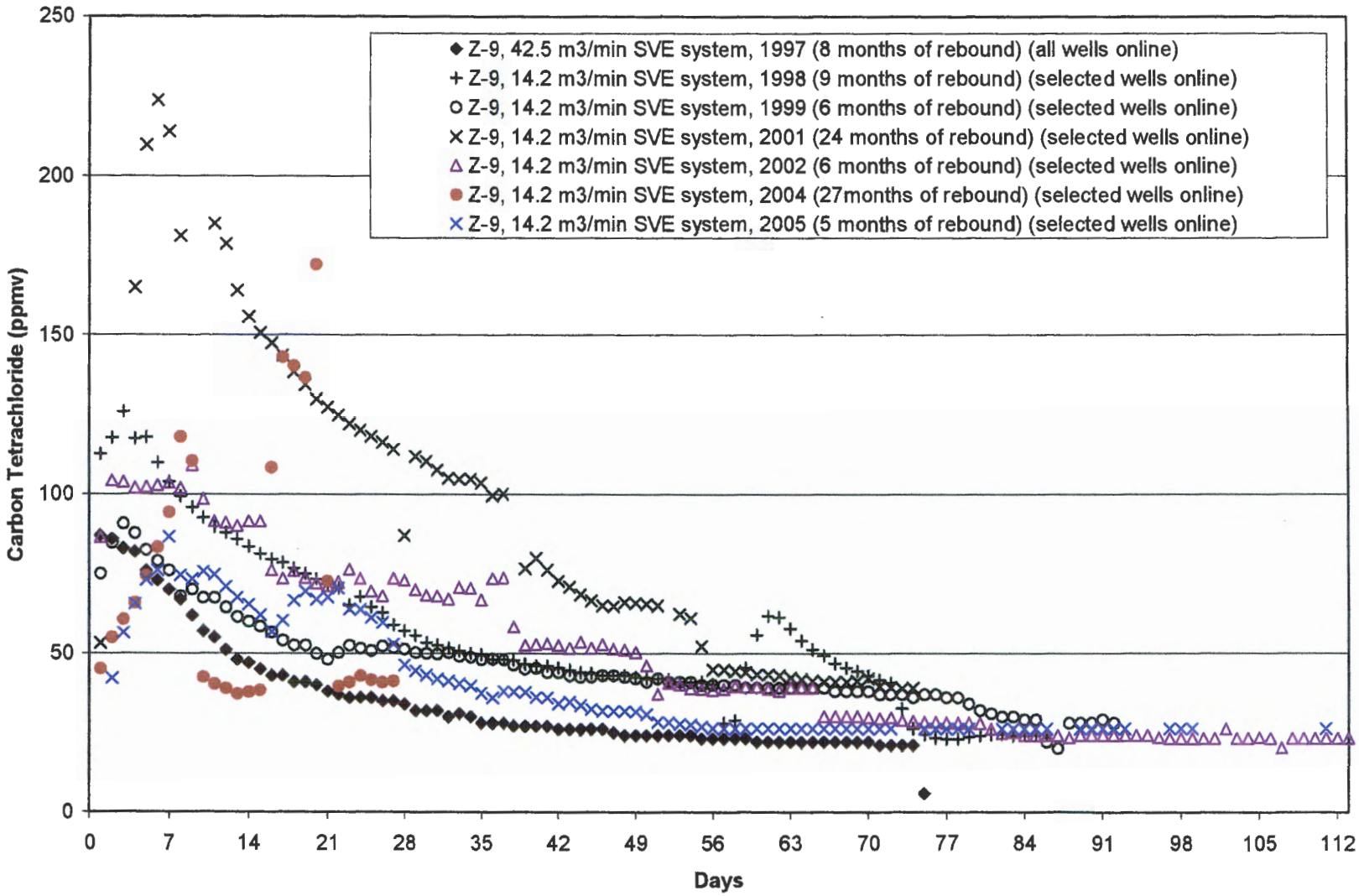

Figure 2-7. Carbon Tetrachloride Concentrations in Vapor Extracted from the 216-Z-1A Site, 1997 Through 2005.

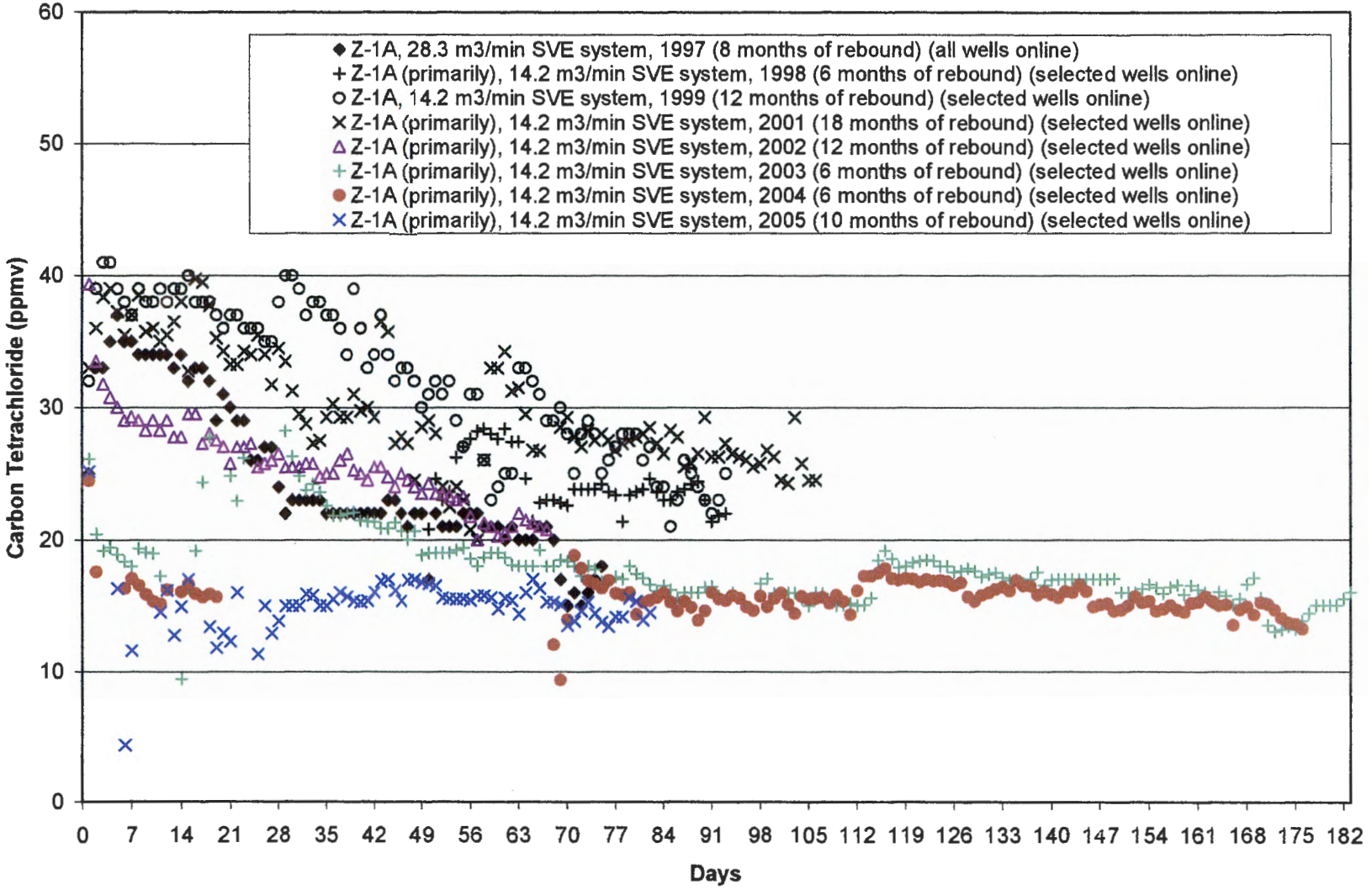

Figure 2-8. Daily Carbon Tetrachloride Mass Extracted, 1992 Through 2005.

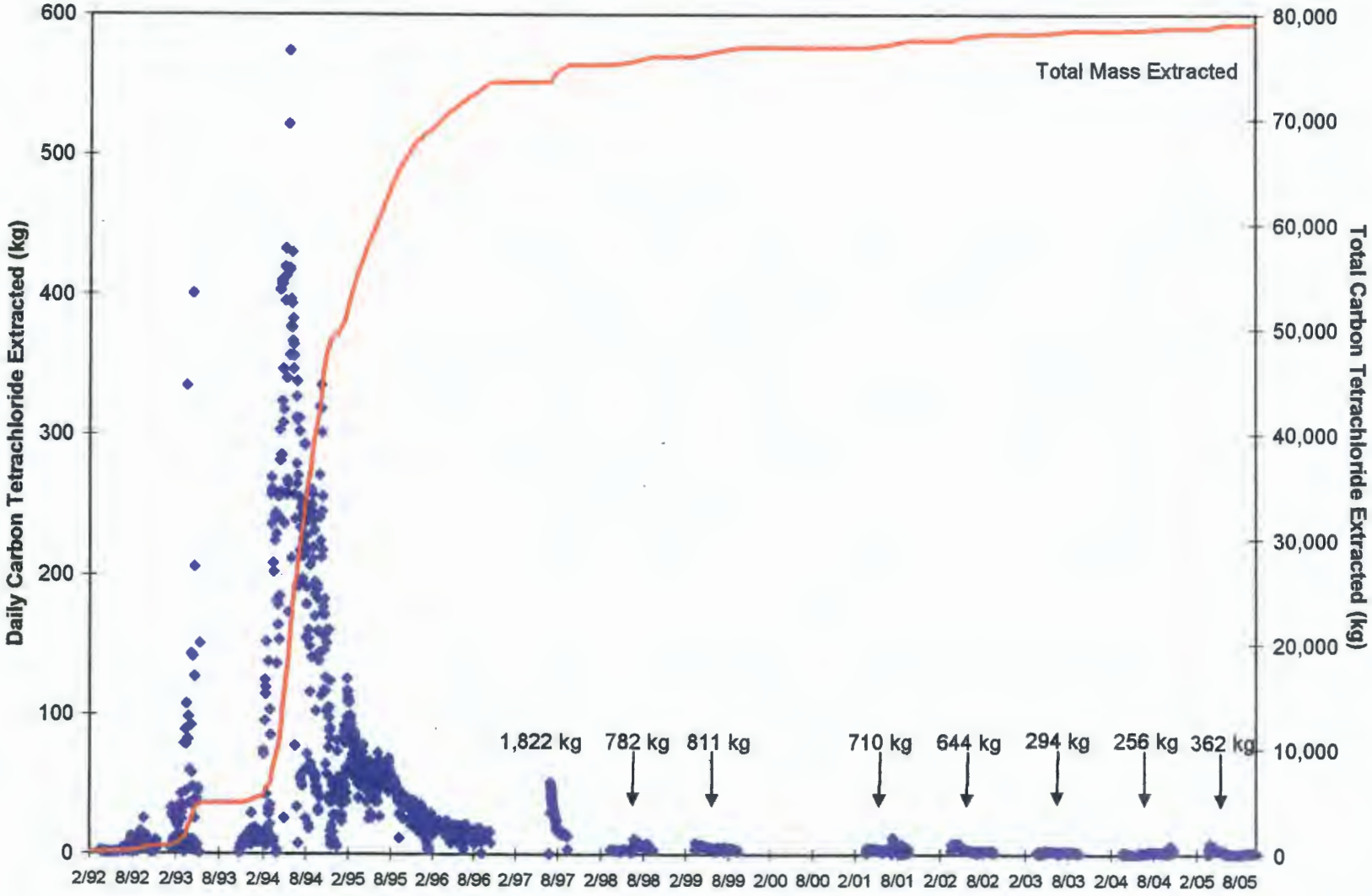

Figure 2-9. Yearly Mass of Carbon Tetrachloride Extracted, 1991 Through 2005.

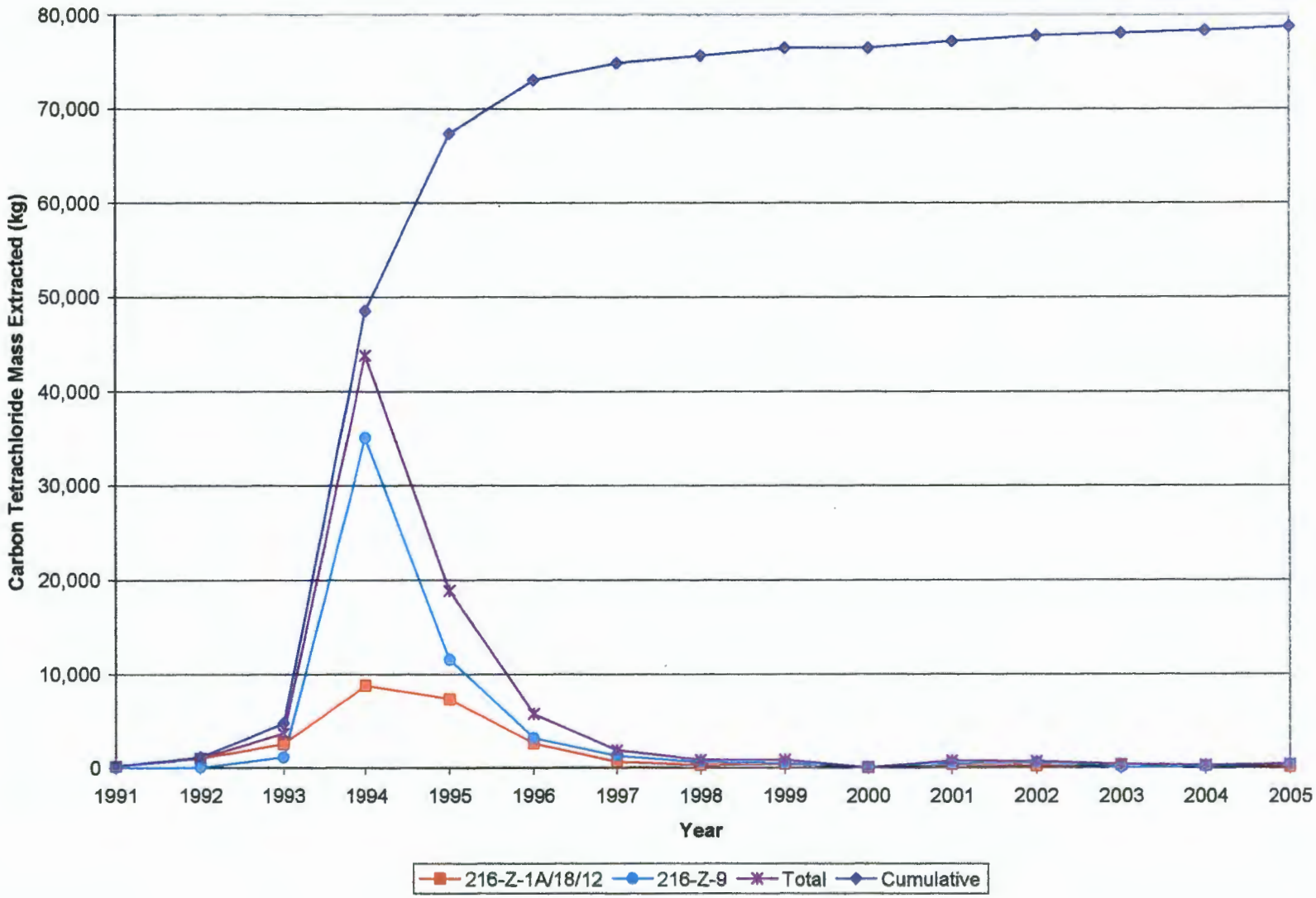

Figure 2-10. Soil Vapor Extraction System Availability.

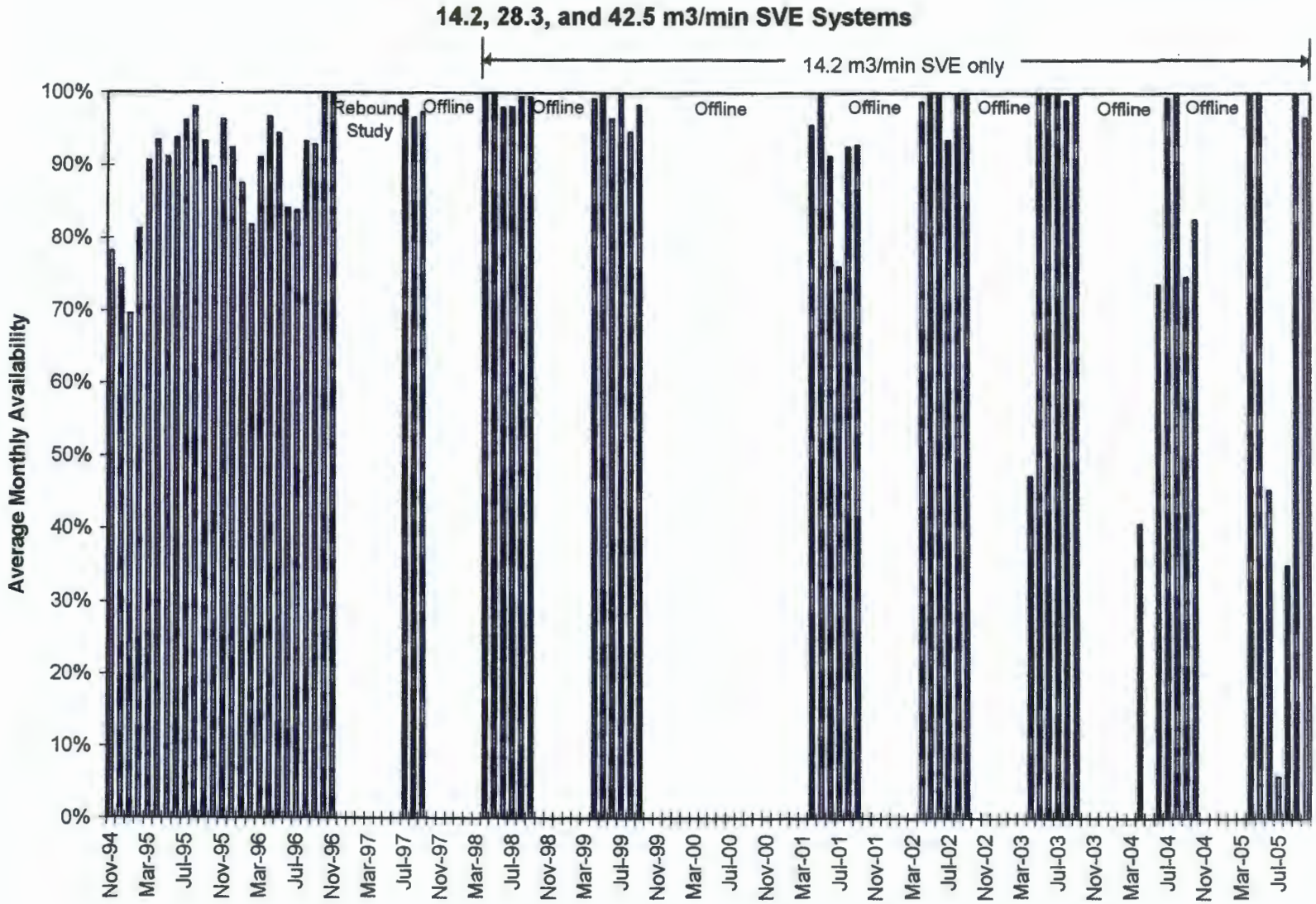

Table 2-1. Contaminant Inventory Discharged to Carbon Tetrachloride Disposal Sites.

Site	Carbon Tetrachloride (kg)	Plutonium (kg)	Americium (kg)	Carbon Tetrachloride (L)	Total Liquid (Aqueous and Organic) (L)	Operating Dates
216-Z-9	130,000 to 480,000	106[a]	2.5	83,000 to 300,000	4,090,000	1955 to 1962
216-Z-1A	270,000	57	1	170,000	5,200,000	1964 to 1969
216-Z-18	170,000	23	0.4	110,000	3,860,000	1969 to 1973
Totals	**570,000 to 920,000**	**186**	**3.9**	**363,000 to 580,000**	**13,150,000**	**1955 to 1973**

[a] 58 kg have been removed.

Table 2-2. Carbon Tetrachloride Mass Removed Using Soil Vapor Extraction.

Site	Carbon Tetrachloride Removed by Year (kg)															
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
216-Z-1A 216-Z-18/Z-12	140	959	2,541	8,757	7,307	2,581	583	258	375	0	335	164	294	167	67	24,528
216-Z-9	--	--	1,065	35,029	11,500	3,150	1,239	524	436	0	375	480	0	90	295	54,183
Totals	**140**	**959**	**3,606**	**43,786**	**18,807**	**5,731**	**1,822**	**782**	**811**	**0**	**710**	**644**	**294**	**256**	**362**	**78,710**
Cumulative	**140**	**1,099**	**4,705**	**48,491**	**67,298**	**73,029**	**74,851**	**75,633**	**76,444**	**76,444**	**77,154**	**77,798**	**78,092**	**78,348**	**78,710**	
Weeks 14.2-m^3/min soil vapor extraction system operated each year.																
216-Z-1A and 216-Z-18/Z-12	--	--	--	--	--	--	--	13	13	0	15	10	26	18	12	107
216-Z-9	--	--	--	--	--	--	--	13	13	0	11	16	0	4	17	74
Average carbon tetrachloride removed per week of operation (kg/wk).																**Average**
216-Z-1A and 216-Z-18/Z-12	--	--	--	--	--	--	--	20	29	0	22	16	11	9	6	16
216-Z-9	--	--	--	--	--	--	--	40	34	0	34	30	0	23	17	30

Table 2-3. Volume of Vapor Extracted from Each Extraction Well Between April 1991 and October 2005. (2 sheets)

Z-9 Wells, Mar. 1993-Oct. 2005	Extracted Vapor (m^3)	Z-18/Z-12 Wells, Feb. 1992-Oct. 2005	Extracted Vapor (m^3)	Z-1A Wells Apr. 1991-Oct. 2005	Extracted Vapor (m^3)
W15-6L	2,400E+03	W18-10L	2,720E+03	W18-6L	2,360E+03
W15-6U	150E+03	W18-10U	660E+03	W18-6U	190E+03
W15-8L	20E+03	W18-11L	240E+03	W18-7	8,880E+03
W15-8U	10E+03	W18-12	1,040E+03	W18-87L	40E+03
W15-9L	940E+03	W18-93	10E+03	W18-87M	20E+03
W15-9U	890E+03	W18-94	0E+03	W18-87U	40E+03
W15-82	5,270E+03	W18-96	450E+03	W18-89	8,450E+03
W15-84L	700E+03	W18-97	230E+03	W18-150L	240E+03
W15-84U	2,510E+03	W18-98	0E+03	W18-150M	40E+03
W15-85	2,650E+03	W18-99	160E+03	W18-150U	60E+03
W15-86	740E+03	W18-152	1,770E+03	W18-158L	230E+03
W15-95L	1,710E+03	W18-153	480E+03	W18-158M	0E+03
W15-95U	820E+03	W18-246L	1,650E+03	W18-158U	900E+03
W15-216L	1,170E+03	W18-246U	780E+03	W18-159	980E+03
W15-216U	570E+03	W18-249	800E+03	W18-163L	240E+03
W15-217	4,750E+03	W18-252L	3,650E+03	W18-163M	60E+03
W15-218L	3,630E+03	W18-252U	1,290E+03	W18-163U	520E+03
W15-218U	3,410E+03			W18-165	2,210E+03
W15-219L	2,820E+03			W18-166	1,070E+03
W15-219U	2,790E+03			W18-167	1,810E+03
W15-220L	1,470E+03			W18-168	1,910E+03
W15-220U	2,040E+03			W18-169	150E+03
W15-223	1,420E+03			W18-171L	500E+03
				W18-171M	390E+03
				W18-171U	460E+03
				W18-174	3,530E+03
				W18-175	350E+03
				W18-248	3,050E+03

Table 2-3. Volume of Vapor Extracted from Each Extraction Well Between April 1991 and October 2005. (2 sheets)

Z-9 Wells, Mar. 1993-Oct. 2005	Extracted Vapor (m^3)	Z-18/Z-12 Wells, Feb. 1992-Oct. 2005	Extracted Vapor (m^3)	Z-1A Wells Apr. 1991-Oct. 2005	Extracted Vapor (m^3)
Above Cold Creek unit	27,280E+03	Above Cold Creek unit	6,640E+03	Above Cold Creek unit	27,440E+03
Below Cold Creek unit	15,600E+03	Below Cold Creek unit	9,290E+03	Below Cold Creek unit	11,240E+03
Total	**42,880E+03**	**Total**	**15,940E+03**	**Total**	**38,680E+03**

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3.0 SOIL VAPOR MONITORING

Non-operational soil vapor monitoring data are collected at wells and probes that are not on-line to the SVE system. The objectives of monitoring the non-operational wells and probes are (1) to measure carbon tetrachloride concentrations and trends near the vadose/atmosphere and vadose/ groundwater interfaces to evaluate whether non-operation of the SVE system is negatively impacting the atmosphere or groundwater, and (2) to be cognizant of carbon tetrachloride concentrations and trends near the Cold Creek unit to provide an indication of concentrations that can be expected during restart of SVE operations and to support selection of on-line wells. For each well field, the period of rebound begins when SVE operations are temporarily suspended.

Carbon tetrachloride concentrations rebound during periods of non-operation as a result of carbon tetrachloride accumulating in the pore spaces after apparent diffusion from sediment micropores, soil moisture, residual DNAPL, and/or low-permeability zones. When operations resume, initial extracted carbon tetrachloride concentrations are higher than the carbon tetrachloride concentrations at the previous shutdown. These initial concentrations will generally be lower than the initial concentrations following previous periods of rebound. However, the non-operational duration for each well field varies from year to year, which may also affect rebound concentrations.

3.1 FISCAL YEAR 2005 MONITORING

Soil vapor monitoring at off-line wells and probes was conducted in FY05 using the sampling methods developed for the rebound study in FY97 (Rohay 1997). A low-flow (0.8-L/min) sampling pump was used to draw soil vapor samples from wells and probes into a 1-L Tedlar bag for analysis using a B&K multi-gas monitor. Two purge volumes were drawn before the sample was collected. At the wells, a tube was lowered to the target depth where the casing is perforated to minimize the volume of air to be purged. A metal filter attached to the end of the tube also served as a weight. Each sampling tube remained in the well for the duration of the monitoring period. Each well equipped with a sampling tube remained sealed at the well head throughout the monitoring period.

Soil vapor samples were collected from approximately 30 off-line wells and probes once each month. The FY05 soil vapor monitoring data are included in Appendix D. As in previous years, soil vapor samples were analyzed primarily to monitor for carbon tetrachloride. However, samples were also analyzed for chloroform, methylene chloride, methyl ethyl ketone, and water vapor because the B&K multi-gas analyzer has been configured to monitor these constituents in support of routine operations.

Passive SVE systems are operating on eight wells in the 216-Z-1A/Z-18 well field. The eight wells are 299-W18-6L, 299-W18-7, 299-W18-10L, 299-W18-11L, 299-W18-12, 299-W18-246L, 299-W18-247L, and 299-W18-252L (Figure 2-1). All of the passive SVE systems are open below the Cold Creek unit. During FY05, soil vapor was sampled at passive SVE wells and analyzed for carbon tetrachloride, chloroform, methylene chloride, methyl ethyl ketone, and water vapor using a B&K multi-gas monitor. The FY04 passive monitoring data are included in Appendix C. These data are included in the evaluation of FY05 rebound data.

Soil vapor concentrations near the groundwater and ground surface were monitored to assess whether non-operation of the SVE system was allowing carbon tetrachloride to migrate out of the vadose zone to the atmosphere and/or to the groundwater. Monitoring was also conducted at locations near the lower permeability Cold Creek unit to provide an indication of concentrations that could be expected during restart of SVE operation.

The maximum concentration detected near the ground surface (between 2 and 10 m bgs) was 11.4 ppmv at a depth of 3.0 m in the 216-Z-9 well field (CPT-17). At the 216-Z-1A/Z-18 well field, the maximum concentration detected near the ground surface was 8.6 ppmv at a depth of 7.6 m (CPT-32). Near the groundwater (>40 m bgs), the maximum concentration was 26.7 ppmv at a depth of 43.9 m bgs at the 216-Z-9 site (well 299-W15-95L). At the 216-Z-1A well field, the maximum concentration detected near groundwater was 25.3 ppmv at a depth of 51.8 m bgs (well 299-W18-246L) (Appendix C). Near the Cold Creek unit, at depths ranging from 25 to 40 m bgs, the maximum concentration detected was 374 ppmv at a depth of 34.7 m in the 216-Z-9 well field (well 299-W15-217). At the 216-Z-1A/Z-18 well field, the maximum concentration detected was 249 ppmv at a depth of 39.9 m bgs (well 299-W18-248).

For each period of rebound monitoring since FY97, the maximum rebound concentrations have occurred near the Cold Creek unit (Figure 3-1). With the exception of FY02, the maximum carbon tetrachloride rebound concentration has been measured at well 299-W15-217.

Carbon tetrachloride rebound concentrations measured at well 299-W15-217 during different periods of non-operation of the SVE system are shown in Figure 3-2. Although the lengths of time available for rebound varied, the maximum carbon tetrachloride concentration decreased with each successive monitoring period from FY97 to FY02. During the 27-month-long rebound period from July 2002 through September 2004, maximum carbon tetrachloride concentrations were comparable to the maximum concentrations measured during the 24-month-long rebound period from July 1999 through June 2001.

Because carbon tetrachloride concentrations did not increase significantly at the near-surface probes, temporarily suspending operation of the SVE system appears to have caused minimal detectable vertical transport of carbon tetrachloride through the soil surface to the atmosphere. Because carbon tetrachloride concentrations did not increase significantly near the water table during this time, temporarily suspending operation of the SVE systems appears to have had no negative impact on groundwater quality. As in previous years, soil vapor monitoring in FY05 suggests that the Cold Creek unit is the most likely source zone for the observed carbon tetrachloride vapor.

Figure 3-1. Maximum Carbon Tetrachloride Rebound Concentrations for Fiscal Year 1997 Through Fiscal Year 2005.

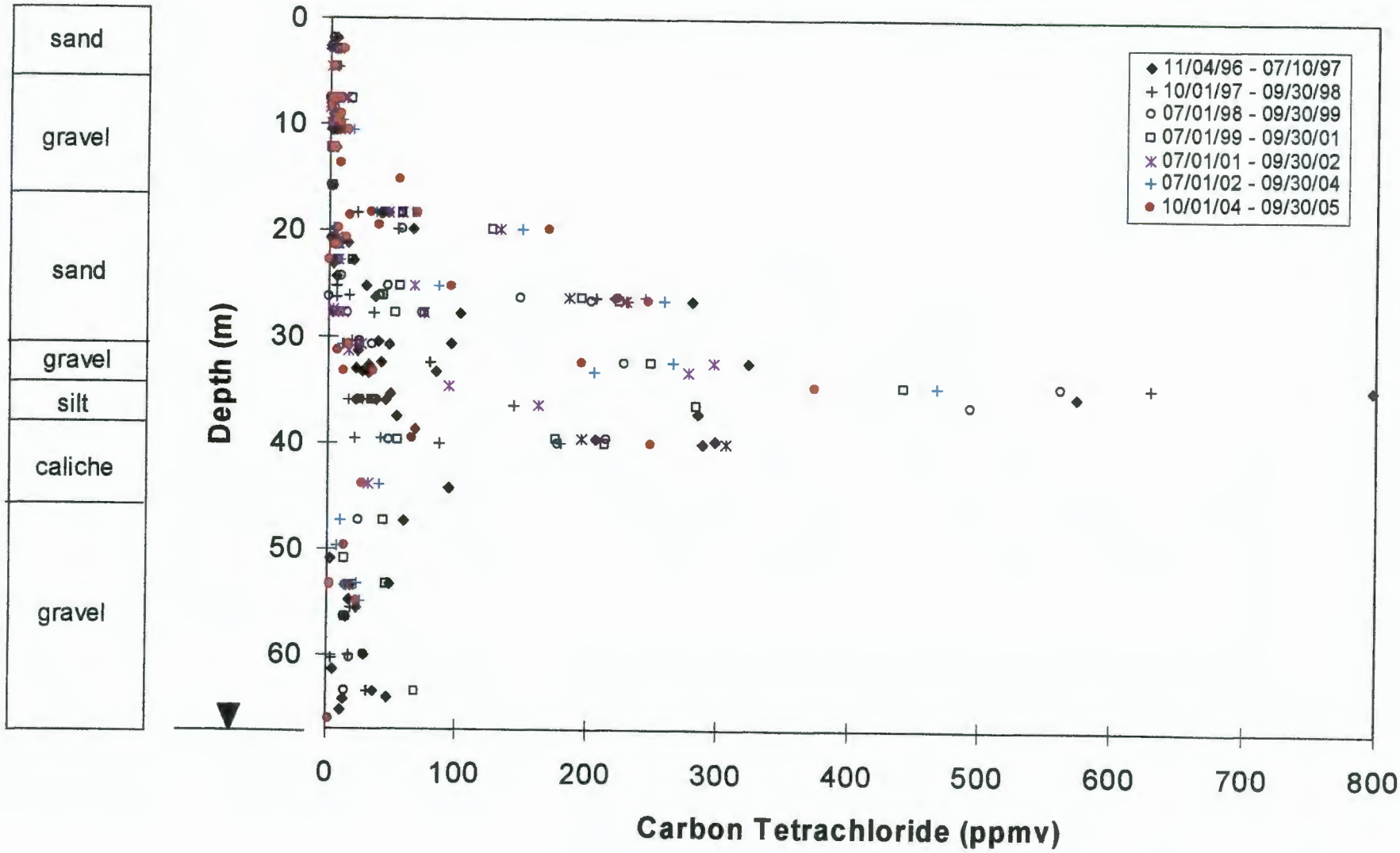
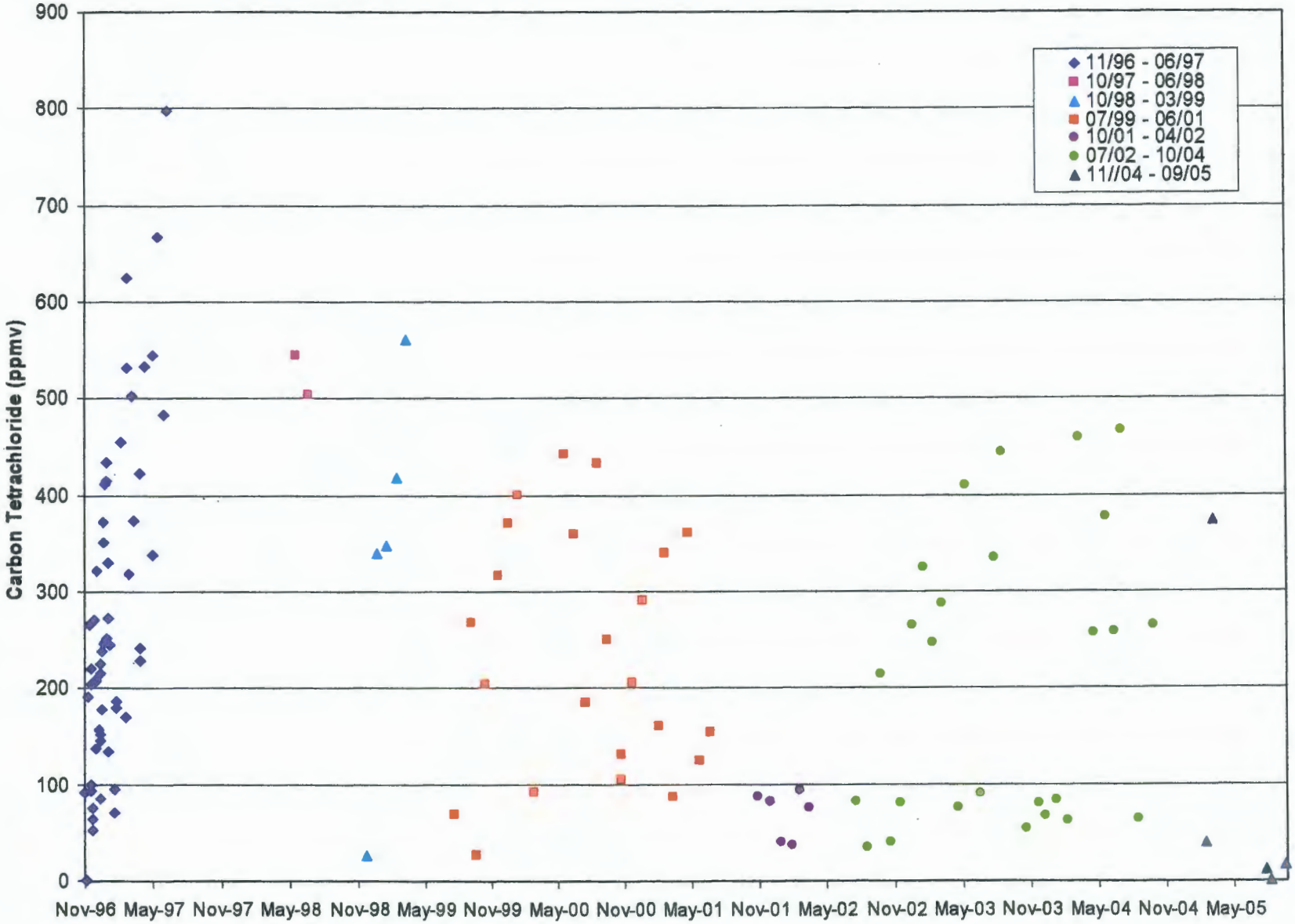


Figure 3-2. Carbon Tetrachloride Rebound Concentrations Measured at Well 299-W15-217.



4.0 CONCEPTUAL MODEL

This section summarizes the contaminant inventory, environmental setting, and contaminant transport for carbon tetrachloride at the primary disposal sites. Additional details are available in *Performance Evaluation Report for Soil Vapor Extraction Operations at the Carbon Tetrachloride Site, February 1992 - September 2001* (Rohay 2002) and *Carbon Tetrachloride Flow and Transport in the Subsurface of the 216-Z-9 Trench at the Hanford Site: Heterogeneous Model Development and Soil Vapor Extraction Modeling* (PNNL 2006a).

4.1 CONTAMINANT INVENTORY

A total of 570,000 to 920,000 kg of carbon tetrachloride was discharged to the soil column from 1955 through 1973. Estimates of the pre-remediation distribution of the original inventory were developed in 1993 based on historical information, equilibrium partitioning calculations, and site-specific characterization measurements available at that time (Table 4-1). Recent deep groundwater sampling for dissolved carbon tetrachloride suggests that a significantly higher percent of the mass may be present throughout the unconfined aquifer, in dissolved and sorbed phases, than previously estimated.

4.2 ENVIRONMENTAL SETTING

The approximately 66-m-thick vadose zone can be broadly divided into an upper gravel and sand interval (Hanford formation) and a lower gravel and sand interval (Ringold Unit E), separated by a finer grained, carbonate-cemented Cold Creek unit at approximately 38 m bgs. Based on characterization results, the Cold Creek unit appears to have been an accumulation zone for carbon tetrachloride. Numerical simulation results indicate that the Cold Creek unit accumulated carbon tetrachloride and had a large impact on DNAPL movement and the resulting distribution of carbon tetrachloride in the subsurface (PNNL 2006a). Other fine-grained zones in both the upper and lower gravel and sand intervals may also be accumulation zones. For example, high carbon tetrachloride concentrations were observed in a silt zone 20 m bgs during drilling of well 299-W15-46 on the south side of the 216-Z-9 Trench in FY04. Carbon tetrachloride may be in non-equilibrium sorption sites within intra-particle sediment pore spaces in these fine-grained units (Yonge et al. 1996).

4.3 CONTAMINANT TRANSPORT

4.3.1 Vadose Zone

Carbon tetrachloride was not discharged as a pure liquid, but rather as a mixture with other organics (i.e., tributyl phosphate [TBP], dibutyl butyl phosphonate [DBBP], and lard oil). The organic composites were all found to be denser and more viscous than water (Last and Rohay 1993). Vapor pressures of the carbon tetrachloride-DBBP and carbon tetrachloride-lard oil mixtures are half that of pure carbon tetrachloride and the carbon tetrachloride-TBP mixture. The interfacial tension between the 50:50 carbon tetrachloride-lard oil mixture and a 5M sodium nitrate solution was found to be low, suggesting that the fluids may be somewhat miscible, allowing them to mix and behave more as an aqueous fluid (Last and Rohay 1993).

4.3.2 Capillary Fringe

The primary mechanisms for aqueous contaminant migration through the capillary fringe are diffusion and dispersion, advection due to infiltrating water, and water table fluctuations. Lateral spreading of carbon tetrachloride vapor may occur at the capillary fringe (PNNL 2006a). The DNAPL may enter the water table as a separate phase. Residual DNAPL would remain at this interface even after the main body of DNAPL contamination has moved through. Water-level fluctuations at this interface could increase or decrease the amount of contamination dissolving from the residual mass. A relatively high water table occurred from 1965 to 1984 and may have resulted in carbon tetrachloride dissolving from any residual mass into the groundwater. The water table is now declining at a rate of approximately 0.25 m/yr in the area of the disposal sites, extending the depth of vadose zone vapor plume (DOE-RL 2006).

4.4 DATA GAPS

Data gaps identified in the *Performance Evaluation Report for Soil Vapor Extraction Operations at the Carbon Tetrachloride Site, February 1992 – September 2001* (Rohay 2002) are being addressed through the RI/FS process for the 200-PW-1 OU. The RI, which was initiated in FY02, is designed to identify and fill pertinent data gaps in order to make remedial decisions (DOE-RL 2004a).

Table 4-1. Disposition of Carbon Tetrachloride Inventory Discharged to the Soil Column.

Carbon Tetrachloride Disposition	Percent of Estimated Original Carbon Tetrachloride Inventory (Avg. 750,000 kg)	Estimated Mass of Carbon Tetrachloride (kg)	Reference
Estimated Using Pre-Remediation Data			
Equilibrium partitioning within vadose zone into vapor, dissolved, and adsorbed phases	12	91,000	WHC 1993
Lost to atmosphere	21	159,000	WHC 1993
Biodegraded	1	8,000	Hooker et al. 1996
Dissolved in upper 10 m of unconfined aquifer (assuming 30% porosity and no partitioning to aquifer solids)	1 to 2	5,250 to 15,740	Rohay and Johnson 1991
DNAPL/residual in vadose and/or unconfined aquifer	65	484,000	WHC 1993

DNAPL = dense nonaqueous phase liquid

5.0 EXPEDITED RESPONSE ACTION STATUS

The action memorandum (EPA and Ecology 1992) described the purpose of the ERA as follows:

> *The purpose of this action is to mitigate the threat to site workers, public health, and the environment caused by the migration of carbon tetrachloride vapors through the soil column and into the groundwater. The action is an interim action taken to reduce the mass of carbon tetrachloride in the soil column beneath the 200 West Area pending the final cleanup activities associated with the 200-ZP-1 and 200-ZP-2 Operable Units.*

The purpose statement above can be formulated as four RAOs:

- Mitigate the threat to site workers
- Mitigate the threat to public health
- Mitigate the threat to the environment caused by the migration of contaminants from the soil into groundwater
- Reduce the mass of carbon tetrachloride in the soil.

5.1 MITIGATE THREAT TO SITE WORKERS

In the area remediated using SVE, concentrations of carbon tetrachloride vapor in the vadose zone have been significantly reduced, as measured at the SVE system inlet and at individual extraction wells and monitoring probes. However, carbon tetrachloride is still present in the vadose zone. Concentrations are typically higher in the fine-grained layers where use of SVE has been less successful at removing carbon tetrachloride. Concentrations may also be higher in the coarse-grained layers in areas that have not been swept by the airflow pathways established through use of the existing well network. As observed during drilling of well 299-W15-46 very close to the 216-Z-9 Trench in 2003 and 2004, carbon tetrachloride vapors still may be encountered during characterization activities such as well drilling. Because the potential for worker exposure still is present, only limited progress has been achieved toward mitigating risk to site workers. Site workers have been protected before and during the ERA and will also be protected after the ERA through proper conduct of operations, monitoring, and the use of engineering controls and personal protective equipment.

5.2 MITIGATE THREAT TO PUBLIC HEALTH

Protection of public health has occurred by the institution of controls preventing public access to contaminated areas and continued monitoring of those areas. The action memorandum also identified a concern that carbon tetrachloride vapors could migrate offsite in an independent direction from groundwater flow (EPA and Ecology 1992). The primary concern was related to vapor migration to wells and agricultural areas in the Cold Creek Valley, west of the 200 West Area.

None of the groundwater samples collected from wells located west of the extended 200 West Area indicate that carbon tetrachloride vapor is migrating westward offsite. All analyses to date have yielded nondetect results. If additional upgradient vadose zone wells were installed, other direct measurements could be made for carbon tetrachloride vapor concentrations to the west.

At this time, based on groundwater data, there is no indication that carbon tetrachloride vapor is posing a threat to the public.

Use of institutional controls to limit direct public access to the site and continued monitoring of contaminated areas are still needed to ensure protection of the public health. This RAO will continue until both the vadose zone and the groundwater have been remediated.

5.3 MITIGATE THREAT TO THE ENVIRONMENT CAUSED BY MIGRATION OF CONTAMINANTS FROM THE SOIL INTO GROUNDWATER

Initiation of the ERA was based on the assumption that contamination in the vadose zone posed a continuing threat to groundwater and that if no expedited action were taken, the groundwater quality would continue to degrade. This RAO is considered to have been met if the carbon tetrachloride concentration gradient between the vadose zone and groundwater indicates that the vadose zone contamination is no longer degrading groundwater quality. The potential for transport of carbon tetrachloride between the soil vapor and the groundwater was evaluated using Henry's Law as a guideline. Henry's Law describes the equilibrium partitioning of a compound between the aqueous and vapor phases.

In 1994, carbon tetrachloride vapor concentrations ranging from approximately 100 to 2,400 ppmv were measured during SVE operations in 216-Z-9 site wells with open intervals near the groundwater. The in situ carbon tetrachloride soil vapor concentration measured near the water table during installation of well 299-W15-218 at the 216-Z-9 site in 1993 was 10,400 ppmv. The carbon tetrachloride groundwater concentration measured at the same time at well 299-W15-218 was 6,500 μg/L. At this well in 1993, the measured vapor concentration was an order of magnitude higher than the equilibrium vapor concentration (approximately 1,000 ppmv) predicted using Henry's Law and the measured groundwater concentration. In 1994, carbon tetrachloride vapor concentrations ranging from 150 to 600 ppmv were measured during SVE operations in 216-Z-1A wells with open intervals near the groundwater. At this time, the carbon tetrachloride groundwater concentration was approximately 2,100 μg/L in well 299-W18-1. In some locations, the measured vapor concentrations were higher than the equilibrium vapor concentration (approximately 300 ppmv) predicted using Henry's Law and the measured groundwater concentration.

Carbon tetrachloride vapor concentrations measured near the groundwater during the 1996-1997 rebound study were compared to groundwater concentration data collected from nearby groundwater wells as part of the 200-ZP-1 pump-and-treat project. At both the 216-Z-9 and 216-Z-1A sites, the measured vapor concentrations were an order of magnitude less than the equilibrium vapor concentrations predicted using Henry's Law and site groundwater concentrations. Based on this comparison, the carbon tetrachloride concentration gradient in 1997 would drive contaminants from the groundwater to the vadose zone (Rohay 1997).

Between 1990 and 2005, the carbon tetrachloride concentrations at the top of the unconfined aquifer underlying the primary carbon tetrachloride source cribs have been reduced (Figure 5-1). This reduction has likely resulted from the dual application of SVE remediation in the vadose zone and pump-and-treat remediation in the groundwater in the vicinity of the source cribs.

One RAO for the pump-and-treat remediation is the reduction of the carbon tetrachloride groundwater concentration below 2,000 μg/L. This goal for groundwater has been met in the 216-Z-1A area and nearly achieved in the 216-Z-9 area. Concentrations in groundwater

extraction well 299-W15-32 (and replacement well 299-W15-47) near the 216-Z-9 site have declined from approximately 8,000 μg/L in 1997 to concentrations of 1,000 to 3,000 μg/L in 2005 (DOE-RL 2006). Concentrations in groundwater monitoring well 299-W18-1, west of the 216-Z-1A site, have declined from approximately 1,700 μg/L in 1997 to 50 μg/L in 2005 (DOE-RL 2006). A new groundwater monitoring well, 299-W18-16, was installed east of the 216-Z-1A site in FY05. The average carbon tetrachloride concentration in groundwater from this well was 540 μg/L in 2005 (DOE-RL 2006).

Maximum carbon tetrachloride vapor concentrations measured near the groundwater during FY05 rebound monitoring and SVE restart at the 216-Z-9 site ranged from 22 to 27 ppmv. These measured concentrations, which were similar to the deep vapor concentrations measured in this area in the 1996-1997 rebound study (5 to 60 ppmv), are still an order of magnitude less than the equilibrium vapor concentration (150 to 450 ppmv) predicted using Henry's Law and the 216-Z-9 groundwater concentration measured in FY05. The maximum carbon tetrachloride vapor concentrations measured near the groundwater during FY05 at the 216-Z-1A site were 25 ppmv. These measured concentrations are similar to the deep vapor concentrations measured in this area during the 1996-1997 rebound study (10 to 50 ppmv). The FY05 concentrations are slightly higher than the equilibrium vapor concentration (10 ppmv) predicted using Henry's Law and the 216-Z-1A groundwater concentration measured at well 299-W18-1 in FY05. A vapor concentration of 25 ppmv would be in equilibrium with a groundwater concentration of approximately 160 μg/L, which is an order of magnitude below the RAO for pump-and-treat remediation. The relatively low carbon tetrachloride concentration in groundwater west of the 216-Z-1A site may be the result, at least in part, of ingress of cleaner, treated water injected upgradient of this site as part of pump-and-treat operations for the 200-ZP-1 OU. The FY05 vapor concentration is lower than the equilibrium vapor concentration (approximately 85 ppmv) predicted using Henry's Law and the 216-Z-1A groundwater concentration measured at well 299-W18-16 in FY05.

The reduction of carbon tetrachloride vapor concentrations in the area remediated using SVE has reduced the threat to groundwater, based on the calculation using Henry's Law. However, as carbon tetrachloride concentrations in both groundwater and vadose zone change, the direction of movement between these media may change based on the concentration gradients.

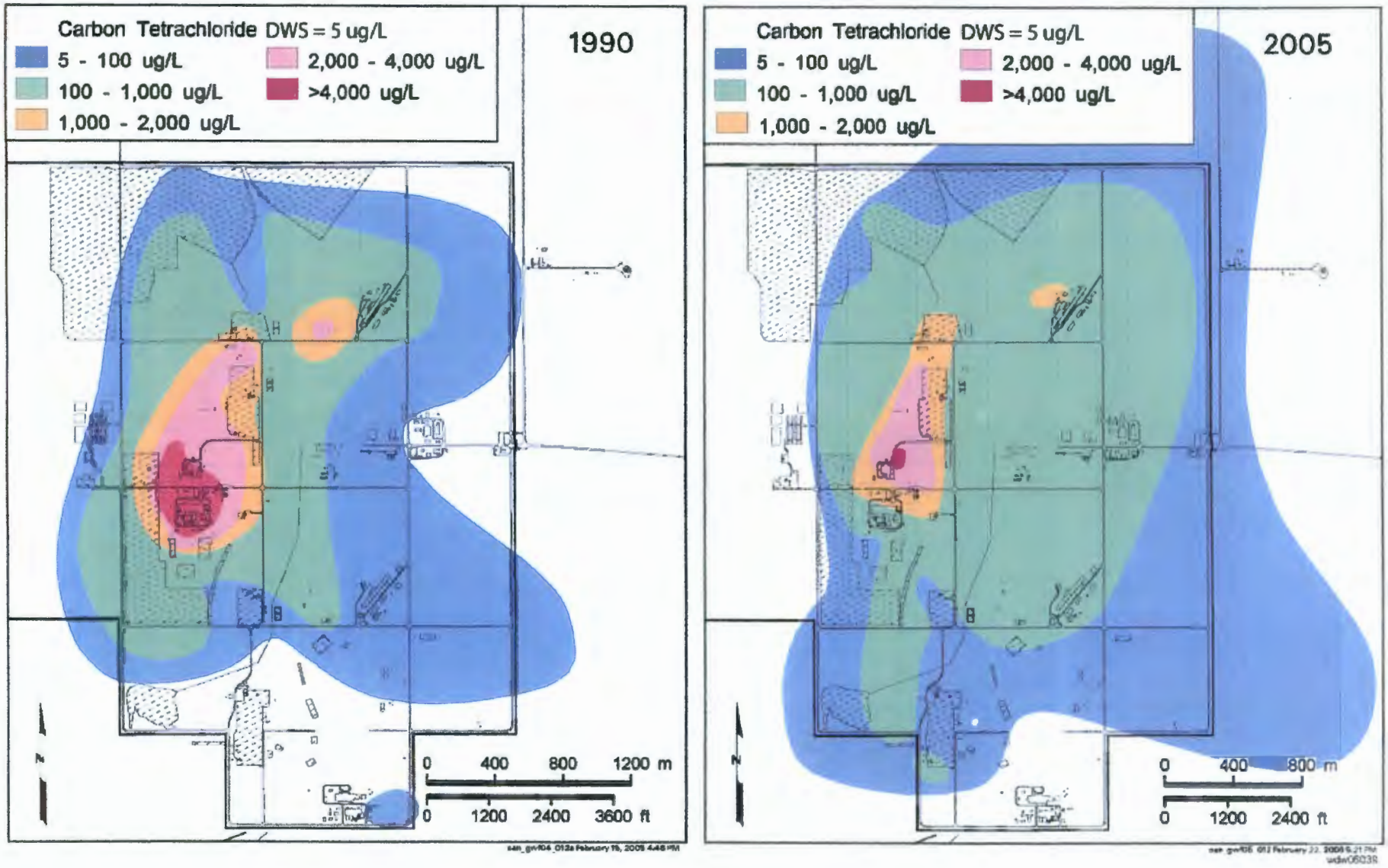
5.4 REDUCE MASS OF CARBON TETRACHLORIDE IN THE SOIL

Two distinct phases are commonly observed during in situ remediation projects. The first phase is generally characterized by higher rates of mass removal while the readily available volatile contaminant is being swept out of the higher permeability zones. With continued extraction, concentrations decrease more slowly as the supply of volatile contaminant becomes limited by desorption and diffusion of the contaminant from micropores and/or lower permeability soil. In this second phase, diffusion controls contaminant migration. The history of mass recovery using SVE at the carbon tetrachloride source cribs reflects these two phases typical to SVE operations (Figure 2-8).

Although additional carbon tetrachloride can be recovered using SVE, the rate of removal has been decreasing. The decline in the rate of removal can be attributed primarily to diffusion-dominated extraction, but it has also been affected by the reduction in SVE system capacity (i.e., from a total of 85 m^3/min to 14.2 m^3/min), the reduction in the yearly duration of extraction operations (i.e., from 12 months each year to 6 months each year), and potentially the continued

use of the same airflow pathways established by using the same set of extraction wells. Because of the reduction of carbon tetrachloride mass in the soil, it is reasonable to conclude that the much higher percentage of extracted mass has been removed from the larger pore spaces, contributing to achieving this RAO.

Figure 5-1. Comparison of the Carbon Tetrachloride Plume Beneath the 200 West Area at the Top of the Unconfined Aquifer.[a]



[a] From *Hanford Site Groundwater Monitoring for Fiscal Year 2005* (PNNL 2006b).

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6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Operation of the SVE systems between 1991 and 2005 has resulted in removal of 78,710 kg of carbon tetrachloride (approximately 10.4% of the estimated original inventory) from the vadose zone underlying the primary carbon tetrachloride disposal sites.

The SVE system has been operated for 6 months each year since 1998 (with the exception of 2000, when it was not operated). Operations during each of these years have removed approximately 0.1% or less of the original estimated inventory of carbon tetrachloride. Although this percentage is small compared to the 10% removed before 1998, it still constitutes an annual average extraction of approximately 0.5 metric tons of carbon tetrachloride from the vadose zone. With the readily accessible carbon tetrachloride removed, mass removal (in terms of mass removed per operation time) is more efficient with intermittent SVE operation, which allows the carbon tetrachloride vapor concentration in the higher flow zone to increase while the system is not operating.

The passive SVE systems have removed approximately 70 kg of carbon tetrachloride from the vadose zone between October 1999 and September 2005. Mass removal per year using the passive systems has remained fairly constant.

Reduction in vapor concentrations and carbon tetrachloride mass during SVE operations has contributed to progress in achieving the ERA objectives of mitigating the threat to site workers, public health, and the environment caused by the migration of carbon tetrachloride vapors through the soil column and into the groundwater. Monitoring data indicate that carbon tetrachloride vapor concentrations have decreased significantly in the deep vadose zone overlying groundwater in the areas of the disposal sites. However, as carbon tetrachloride concentrations in both the deep vadose zone and the groundwater change, the direction of carbon tetrachloride movement between these media may change based on the concentration gradients. Monitoring data near the vadose zone/groundwater interface are sparse.

6.2 RECOMMENDATIONS

The following recommendations are made to maximize the effectiveness of SVE operations and monitoring and to provide information to support a final Record of Decision:

- Continue operation of the active SVE system in a cyclic manner to remove carbon tetrachloride from the vadose zone. Cyclic operations (i.e., alternating operations between the 216-Z-9 and 216-Z-1A sites) are recommended because mass removal (in terms of mass removed per operation time) is more efficient with intermittent SVE operation; however, longer operating time will remove additional mass. Therefore, consider operating the system for a longer duration each year to maximize the mass removal.
- Examine options for returning to continuous SVE operations to enhance current mass-reduction efforts in areas adjacent to the source cribs. An additional SVE system will be needed if continuous operations are resumed at both the 216-Z-9 and 216-Z-1A sites.

- Evaluate the overall condition and limitations of the existing SVE system. The SVE system currently being used is more than 10 years old. Because of the time and effort required to maintain the aging components of this system and the likelihood that SVE operations will continue, the purchase of selected new components or a new system is recommended.
- Examine treatability test scenarios (e.g., the use of steam injection and/or air sparging) in combination with SVE to support final remedial actions. The focus of the treatability tests would be to evaluate methods to drive the carbon tetrachloride from the finer grained materials to enhance removal using SVE.
- Continue operation of the passive SVE systems.
- Continue monthly monitoring.
- Consider adding additional extraction points in the source crib area. For example, extraction rods that were installed in 1993 using a cone penetrometer could be tested for use with the SVE system. Wells that will be drilled by Vista Engineering Technologies, LLC, as part of the Alternatives for Carbon Tetrachloride Source Term Location (DNAPL) investigation (DOE-RL 2004b) could potentially be completed as vapor extraction wells. Additional extraction points could be used for vapor extraction of the silt layer identified at a depth of 19.8 m during the drilling of well 299-W15-46. Use of additional extraction points will alter the subsurface airflow pathways. Carbon tetrachloride concentrations extracted using these new airflow pathways can be used to evaluate the carbon tetrachloride remediation using SVE.

7.0 SOIL VAPOR EXTRACTION SYSTEM COST DATA

Actual project costs for the 200-PW-1 SVE system can be used to determine the labor costs associated with each specific activity over a given period of time. Table 7-1 provides the burdened costs, by activity, for the 200-PW-1 SVE system for FY05. Specific activities are described below:

- **Design:** Includes environmental and operations engineering support to design activities required to support SVE system upgrades, modifications, and all other design documentation.
- **Operations and maintenance:** Represents facility supplies, labor, and craft supervision costs associated with operating and maintaining the equipment. It also includes costs associated with routine characterization of on-line wells and engineering support as required during the course of SVE system operations and periodic maintenance.
- **Performance monitoring:** Includes monthly soil vapor sampling, analysis, and reporting, as required by the annual SVE system operating plan. It also includes preparation of this annual performance evaluation report.
- **Project support:** Includes project management, planning, and other administrative support required during the course of SVE operations during FY05.
- **Waste management:** Represents the estimated cost for the management of GAC at the 200-PW-1 OU in accordance with applicable laws for suspect hazardous, toxic, and regulated wastes. It includes waste designation sampling and analysis.

These project costs for operation of the 200-PW-1 SVE system in FY05 are displayed by percent of total costs in the pie chart in Figure 7-1. Based on the FY05 costs and yearly production rates of 1,790 million L of vapor treated and 362 kg of carbon tetrachloride removed, the FY05 treatment costs equate to $0.00021/L of vapor treated and $1.02/kg of carbon tetrachloride removed (Figure 7-2).

Figure 7-1. Cost Breakdown for 200-PW-1 Operable Unit Soil Vapor Extraction Operations in Fiscal Year 2005.

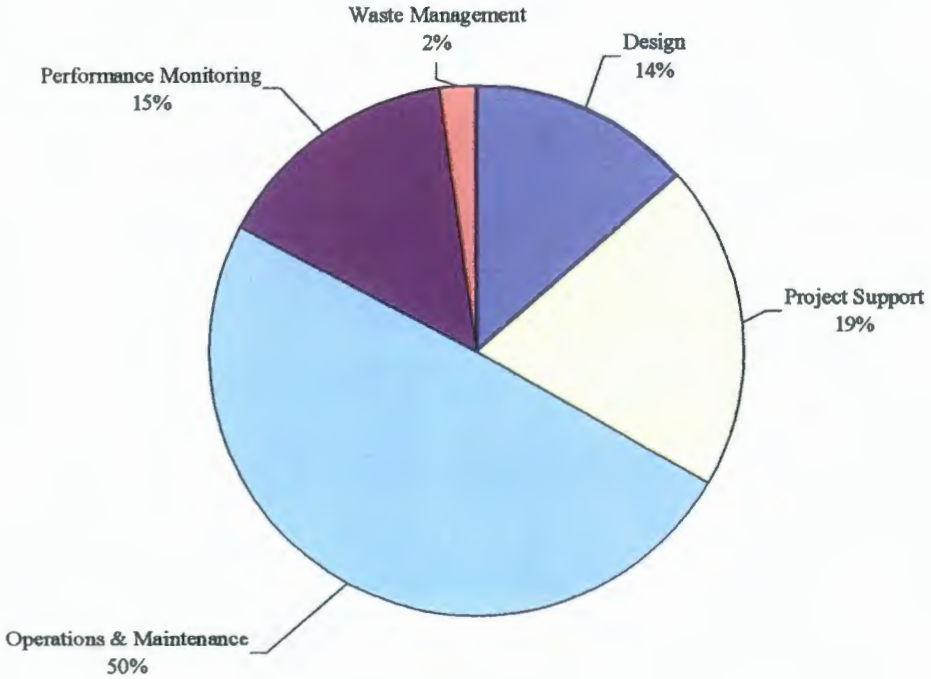

Figure 7-2. Cost for Removal of Carbon Tetrachloride in Fiscal Year 2005 Using Soil Vapor Extraction.

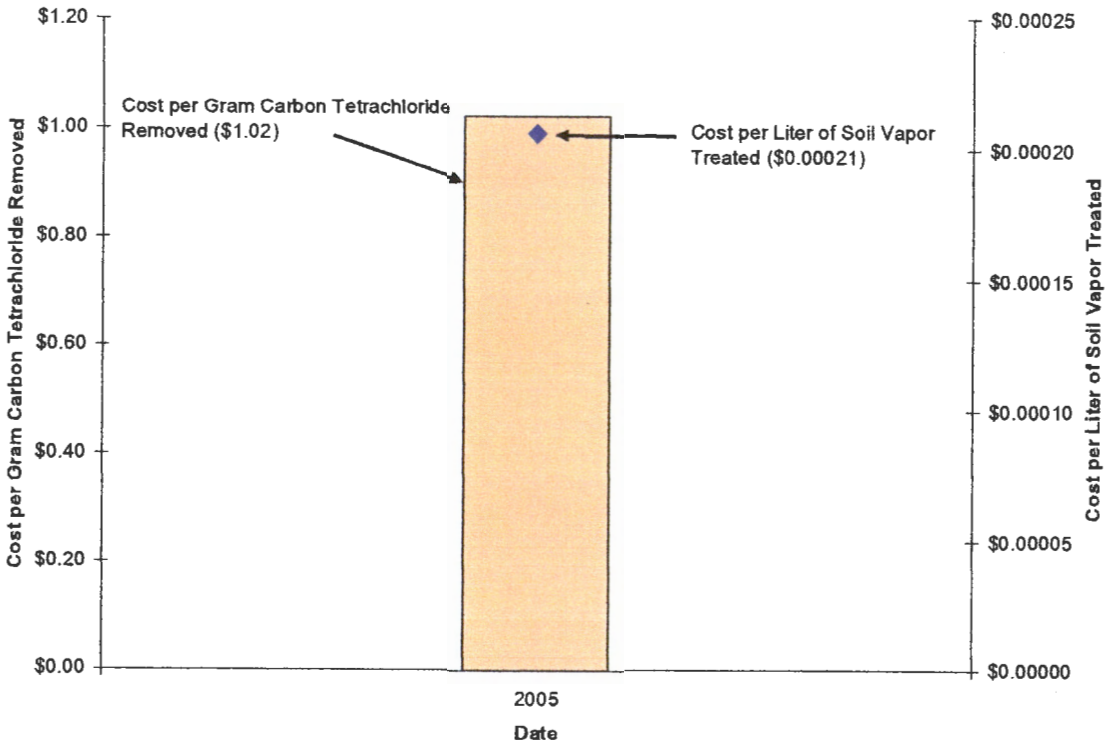

Table 7-1. Costs for Operation of 200-PW-1 Soil Vapor Extraction System, Fiscal Year 2005

Activity	Actual Costs (in $1,000's)
Design	$72.1
Operations and maintenance	$183.8
Performance monitoring	$55.6
Project support	$72.1
Waste management	$7.9
Total	**$370.4**

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APPENDIX A

FISCAL YEAR 2005 DAILY SOIL VAPOR EXTRACTION DATA

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Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
03/31/05		15.5	15.5	15.5	7,659.7	7.1	7.1	0.0	0.0
04/01/05	41.9	24.0	24.0	39.5	9,375.3	13.5	20.6	3.6	3.6
04/02/05	56.3	24.0	24.0	63.5	9,392.0	13.5	34.1	4.8	8.4
04/03/05	65.5	24.0	24.0	87.5	9,262.9	13.3	47.5	5.5	13.8
04/04/05	73.0	24.0	24.0	111.5	8,035.4	11.6	59.1	5.3	19.2
04/05/05	76.0	24.0	24.0	135.5	8,383.3	12.1	71.1	5.8	24.9
04/06/05	86.5	24.0	24.0	159.5	10,100.9	14.5	85.7	7.9	32.8
04/07/05	74.4	24.0	24.0	183.5	10,083.5	14.5	100.2	6.8	39.6
04/08/05	73.3	24.0	24.0	207.5	9,984.3	14.4	114.6	6.6	46.3
04/09/05	75.6	24.0	24.0	231.5	9,994.7	14.4	129.0	6.8	53.1
04/10/05	74.7	24.0	24.0	255.5	10,076.2	14.5	143.5	6.8	60.0
04/11/05	70.9	24.0	24.0	279.5	10,033.4	14.4	157.9	6.4	66.4
04/12/05	67.5	24.0	24.0	303.5	9,922.6	14.3	172.2	6.1	72.5
04/13/05	65.3	24.0	24.0	327.5	10,020.3	14.4	186.6	5.9	78.4
04/14/05	62.0	24.0	24.0	351.5	9,996.1	14.4	201.0	5.6	84.0
04/15/05	56.7	24.0	24.0	375.5	10,032.6	14.4	215.5	5.1	89.2
04/16/05	60.2	24.0	24.0	399.5	9,913.1	14.3	229.8	5.4	94.6
04/17/05	66.4	24.0	24.0	423.5	9,882.9	14.2	244.0	5.9	100.5
04/18/05	69.4	24.0	24.0	447.5	9,914.0	14.3	258.3	6.2	106.7
04/19/05	66.8	24.0	24.0	471.5	9,814.1	14.1	272.4	5.9	112.7
04/20/05	67.5	24.0	24.0	495.5	9,800.8	14.1	286.5	6.0	118.7
04/21/05	70.4	24.0	24.0	519.5	9,813.6	14.1	300.6	6.3	124.9

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
04/22/05	63.9	24.0	24.0	543.5	9,705.9	14.0	314.6	5.6	130.6
]04/23/05	63.6	24.0	24.0	567.5	9,847.4	14.2	328.8	5.7	136.2
04/24/05	61.1	24.0	24.0	591.5	9,786.5	14.1	342.9	5.4	141.7
04/25/05	59.6	24.0	24.0	615.5	9,768.3	14.1	357.0	5.3	146.9
04/26/05	52.7	24.0	24.0	639.5	10,024.7	14.4	371.4	4.8	151.7
04/27/05	46.1	24.0	24.0	663.5	10,389.5	15.0	386.4	4.3	156.1
04/28/05	44.2	24.0	24.0	687.5	10,465.5	15.1	401.4	4.2	160.2
04/29/05	42.9	24.0	24.0	711.5	10,503.9	15.1	416.5	4.1	164.3
04/30/05	41.8	24.0	24.0	735.5	10,464.2	15.1	431.6	4.0	168.3
05/01/05	41.1	24.0	24.0	759.5	10,402.5	15.0	446.6	3.9	172.2
05/02/05	40.2	24.0	24.0	783.5	10,437.7	15.0	461.6	3.8	176.0
05/03/05	39.6	24.0	24.0	807.5	10,366.5	14.9	476.6	3.7	179.7
05/04/05	37.2	24.0	24.0	831.5	10,436.3	15.0	491.6	3.5	183.2
05/05/05	35.9	24.0	24.0	855.5	10,165.0	14.6	506.2	3.3	186.5
05/06/05	37.8	24.0	24.0	879.5	10,281.8	14.8	521.0	3.5	190.0
05/07/05	37.7	24.0	24.0	903.5	10,304.7	14.8	535.9	3.5	193.6
05/08/05	37.6	24.0	24.0	927.5	10,430.1	15.0	550.9	3.6	197.1
05/09/05	35.9	24.0	24.0	951.5	10,414.7	15.0	565.9	3.4	200.5
05/10/05	35.8	24.0	24.0	975.5	10,496.8	15.1	581.0	3.4	203.9
05/11/05	33.9	24.0	24.0	999.5	10,242.7	14.7	595.7	3.1	207.0
05/12/05	34.4	24.0	24.0	1,023.5	10,350.0	14.9	610.7	3.2	210.3
05/13/05	33.4	24.0	24.0	1,047.5	10,337.9	14.9	625.5	3.1	213.4

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
05/14/05	32.2	24.0	24.0	1,071.5	10,349.4	14.9	640.4	3.0	216.4
05/15/05	31.7	24.0	24.0	1,095.5	10,507.3	15.1	655.6	3.0	219.4
05/16/05	31.6	24.0	24.0	1,119.5	10,497.9	15.1	670.7	3.0	222.4
05/17/05	31.5	24.0	24.0	1,143.5	10,549.0	15.2	685.9	3.0	225.5
05/18/05	31.4	24.0	24.0	1,167.5	10,387.1	15.0	700.8	3.0	228.4
05/19/05	30.6	24.0	24.0	1,191.5	10,449.8	15.0	715.9	2.9	231.3
05/20/05	28.2	24.0	24.0	1,215.5	10,413.2	15.0	730.9	2.7	234.0
05/21/05	28.0	24.0	24.0	1,239.5	10,441.5	15.0	745.9	2.7	236.6
05/22/05	27.5	24.0	24.0	1,263.5	10,382.1	15.0	760.9	2.6	239.2
05/23/05	27.3	24.0	24.0	1,287.5	10,312.6	14.9	775.7	2.6	241.8
05/24/05	26.7	24.0	24.0	1,311.5	10,291.0	14.8	790.5	2.5	244.2
05/25/05	26.2	24.0	24.0	1,335.5	10,310.3	14.8	805.4	2.4	246.7
05/26/05	26.0	24.0	24.0	1,359.5	10,258.7	14.8	820.2	2.4	249.1
05/27/05	26.0	24.0	24.0	1,383.5	10,109.4	14.6	834.7	2.4	251.5
05/28/05	26.0	24.0	24.0	1,407.5	9,960.3	14.3	849.1	2.3	253.8
05/29/05	26.0	24.0	24.0	1,431.5	9,939.5	14.3	863.4	2.3	256.2
05/30/05	26.0	24.0	24.0	1,455.5	9,942.8	14.3	877.7	2.3	258.5
05/31/05	26.0	24.0	24.0	1,479.5	10,010.8	14.4	892.1	2.4	260.9
06/01/05	26.0	24.0	24.0	1,503.5	10,079.5	14.5	906.6	2.4	263.2
06/02/05	26.0	24.0	24.0	1,527.5	10,058.1	14.5	921.1	2.4	265.6
06/03/05	26.0	24.0	24.0	1,551.5	10,044.8	14.5	935.6	2.4	268.0
06/04/05	26.0	24.0	24.0	1,575.5	10,042.0	14.5	950.0	2.4	270.3

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
06/05/05	26.0	24.0	24.0	1,599.5	10,138.6	14.6	964.6	2.4	272.7
06/06/05	26.0	24.0	24.0	1,623.5	10,150.9	14.6	979.2	2.4	275.1
06/07/05	26.0	24.0	24.0	1,647.5	10,127.4	14.6	993.8	2.4	277.5
06/08/05	26.0	24.0	24.0	1,671.5	10,300.5	14.8	1,008.7	2.4	279.9
06/09/05	26.0	24.0	24.0	1,695.5	10,367.4	14.9	1,023.6	2.4	282.4
06/10/05	26.0	12.0	24.0	1,707.5	10,452.4	7.5	1,031.1	1.2	283.6
06/11/05		0.0	24.0	1,707.5	0.0	0.0	1,031.1	0.0	283.6
06/12/05		0.0	24.0	1,707.5	0.0	0.0	1,031.1	0.0	283.6
06/13/05	26.0	5.5	24.0	1,713.0	9,619.1	3.2	1,034.3	0.5	284.1
06/14/05	26.0	7.0	24.0	1,720.0	9,662.9	4.1	1,038.3	0.7	284.8
06/15/05	26.0	6.0	24.0	1,726.0	10,268.4	3.7	1,042.0	0.6	285.4
06/16/05	26.0	7.3	24.0	1,733.3	10,236.5	4.5	1,046.5	0.7	286.1
06/17/05	26.0	7.7	24.0	1,740.9	9,453.8	4.3	1,050.8	0.7	286.8
06/18/05		0.0	24.0	1,740.9	0.0	0.0	1,050.8	0.0	286.8
06/19/05		0.0	24.0	1,740.9	0.0	0.0	1,050.8	0.0	286.8
06/20/05	26.0	7.0	24.0	1,747.9	9,155.4	3.8	1,054.7	0.6	287.5
06/21/05	26.0	7.0	24.0	1,754.9	9,145.3	3.8	1,058.5	0.6	288.1
06/22/05	26.0	7.3	24.0	1,762.2	9,914.7	4.3	1,062.8	0.7	288.8
06/23/05	26.0	7.3	24.0	1,769.4	9,005.7	3.9	1,066.7	0.6	289.4
06/24/05	26.0	7.3	24.0	1,776.7	9,331.5	4.1	1,070.8	0.7	290.1
06/25/05		0.0	24.0	1,776.7	0.0	0.0	1,070.8	0.0	290.1
06/26/05		0.0	24.0	1,776.7	0.0	0.0	1,070.8	0.0	290.1

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
06/27/05	26.0	7.0	24.0	1,783.7	9,500.3	4.0	1,074.8	0.7	290.8
06/28/05	26.0	7.5	24.0	1,791.2	9,272.8	4.2	1,079.0	0.7	291.4
06/29/05	26.0	8.0	24.0	1,799.2	9,426.9	4.5	1,083.5	0.7	292.2
06/30/05	26.0	7.0	24.0	1,806.2	9,199.1	3.9	1,087.4	0.6	292.8
07/01/05	26.0	6.5	24.0	1,812.7	9,310.8	3.6	1,091.0	0.6	293.4
07/02/05		0.0	24.0	1,812.7	0.0	0.0	1,091.0	0.0	293.4
07/03/05		0.0	24.0	1,812.7	0.0	0.0	1,091.0	0.0	293.4
07/04/05		0.0	24.0	1,812.7	0.0	0.0	1,091.0	0.0	293.4
07/05/05	26.0	7.0	24.0	1,819.7	9,053.3	3.8	1,094.8	0.6	294.0
07/06/05	26.0	7.0	24.0	1,826.7	9,198.9	3.9	1,098.7	0.6	294.7
07/07/05	26.0	2.0	24.0	1,828.7	9,473.6	1.1	1,099.8	0.2	294.8
07/08/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/09/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/10/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/11/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/12/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/13/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/14/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/15/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/16/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/17/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8
07/18/05		0.0	24.0	1,828.7	0.0	0.0	1,099.8	0.0	294.8

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
07/19/05	26.0	6.0	24.0	1,834.7	9,120.3	3.3	1,103.1	0.5	295.4
07/20/05		0.0	24.0	1,834.7	0.0	0.0	1,103.1	0.0	295.4
07/21/05		0.0	24.0	1,834.7	0.0	0.0	1,103.1	0.0	295.4
07/22/05		0.0	24.0	1,834.7	0.0	0.0	1,103.1	0.0	295.4
07/23/05		0.0	24.0	1,834.7	0.0	0.0	1,103.1	0.0	295.4
07/24/05		0.0	24.0	1,834.7	0.0	0.0	1,103.1	0.0	295.4
07/25/05	26.0	5.0	24.0	1,839.7	9,034.5	2.7	1,105.8	0.4	295.8
07/26/05	26.0	5.0	24.0	1,844.7	9,074.1	2.7	1,108.5	0.4	296.3
07/27/05		0.0	24.0	1,844.7	0.0	0.0	1,108.5	0.0	296.3
07/28/05		0.0	24.0	1,844.7	0.0	0.0	1,108.5	0.0	296.3
07/29/05	25.1	5.0	24.0	1,849.7	8,490.2	2.5	1,111.1	0.4	296.7
07/30/05		0.0	24.0	1,849.7	0.0	0.0	1,111.1	0.0	296.7
07/31/05		0.0	24.0	1,849.7	0.0	0.0	1,111.1	0.0	296.7
08/01/05		0.0	24.0	1,849.7	0.0	0.0	1,111.1	0.0	296.7
08/02/05	16.3	6.5	24.0	1,856.2	9,180.1	3.6	1,114.6	0.4	297.0
08/03/05	4.3	7.0	24.0	1,863.2	10,178.9	4.3	1,118.9	0.1	297.2
08/04/05	11.6	5.0	24.0	1,868.2	9,564.0	2.9	1,121.8	0.2	297.4
08/05/05		0.0	24.0	1,868.2	0.0	0.0	1,121.8	0.0	297.4
08/06/05		0.0	24.0	1,868.2	0.0	0.0	1,121.8	0.0	297.4
08/07/05		0.0	24.0	1,868.2	0.0	0.0	1,121.8	0.0	297.4
08/08/05	14.5	2.5	24.0	1,870.7	9,364.4	1.4	1,123.2	0.1	297.5
08/09/05	16.2	5.3	24.0	1,875.9	9,155.4	2.9	1,126.1	0.3	297.8

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
08/10/05	12.8	6.0	24.0	1,881.9	9,198.4	3.3	1,129.4	0.3	298.1
08/11/05	14.9	7.8	24.0	1,889.7	8,862.3	4.1	1,133.5	0.4	298.4
08/12/05	17.0	6.0	24.0	1,895.7	5,647.5	2.0	1,135.5	0.2	298.7
08/13/05		0.0	24.0	1,895.7	0.0	0.0	1,135.5	0.0	298.7
08/14/05		0.0	24.0	1,895.7	0.0	0.0	1,135.5	0.0	298.7
08/15/05	13.4	6.8	24.0	1,902.4	7,437.2	3.0	1,138.5	0.3	298.9
08/16/05	11.8	6.8	24.0	1,909.2	5,638.1	2.3	1,140.8	0.2	299.1
08/17/05	12.9	4.5	24.0	1,913.7	5,933.1	1.6	1,142.4	0.1	299.2
08/18/05	12.3	6.3	24.0	1,919.9	5,588.2	2.1	1,144.5	0.2	299.4
08/19/05	16.0	6.5	24.0	1,926.4	5,764.1	2.2	1,146.8	0.2	299.6
08/20/05		0.0	24.0	1,926.4	0.0	0.0	1,146.8	0.0	299.6
08/21/05		0.0	24.0	1,926.4	0.0	0.0	1,146.8	0.0	299.6
08/22/05	11.3	7.0	24.0	1,933.4	5,943.5	2.5	1,149.3	0.2	299.8
08/23/05	15.0	8.0	24.0	1,941.4	5,959.4	2.9	1,152.1	0.3	300.1
08/24/05	12.9	7.3	24.0	1,948.7	5,812.5	2.5	1,154.7	0.2	300.3
08/25/05	13.8	17.3	24.0	1,965.9	5,798.4	6.0	1,160.7	0.5	300.8
08/26/05	15.0	24.0	24.0	1,989.9	5,830.2	8.4	1,169.1	0.8	301.6
08/27/05	15.0	24.0	24.0	2,013.9	5,786.1	8.3	1,177.4	0.8	302.4
08/28/05	15.0	24.0	24.0	2,037.9	5,795.6	8.3	1,185.7	0.8	303.1
08/29/05	15.9	24.0	24.0	2,061.9	5,954.7	8.6	1,194.3	0.9	304.0
08/30/05	15.8	24.0	24.0	2,085.9	5,942.4	8.6	1,202.9	0.8	304.9
08/31/05	15.0	24.0	24.0	2,109.9	5,925.6	8.5	1,211.4	0.8	305.7

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
09/01/05	15.0	24.0	24.0	2,133.9	5,895.8	8.5	1,219.9	0.8	306.5
09/02/05	15.5	24.0	24.0	2,157.9	5,886.6	8.5	1,228.4	0.8	307.3
09/03/05	16.0	24.0	24.0	2,181.9	5,948.0	8.6	1,236.9	0.9	308.1
09/04/05	15.7	24.0	24.0	2,205.9	6,351.3	9.1	1,246.1	0.9	309.0
09/05/05	15.4	24.0	24.0	2,229.9	6,781.4	9.8	1,255.8	0.9	310.0
09/06/05	15.3	24.0	24.0	2,253.9	8,635.7	12.4	1,268.3	1.2	311.2
09/07/05	15.4	24.0	24.0	2,277.9	8,822.6	12.7	1,281.0	1.2	312.4
09/08/05	16.0	24.0	24.0	2,301.9	8,956.9	12.9	1,293.9	1.3	313.7
09/09/05	16.8	24.0	24.0	2,325.9	9,073.8	13.1	1,306.9	1.4	315.1
09/10/05	17.0	24.0	24.0	2,349.9	9,134.0	13.2	1,320.1	1.4	316.5
09/11/05	16.1	24.0	24.0	2,373.9	9,195.9	13.2	1,333.3	1.3	317.8
09/12/05	15.3	24.0	24.0	2,397.9	9,209.2	13.3	1,346.6	1.3	319.1
09/13/05	16.9	24.0	24.0	2,421.9	9,355.6	13.5	1,360.1	1.4	320.6
09/14/05	17.0	24.0	24.0	2,445.9	9,470.7	13.6	1,373.7	1.5	322.0
09/15/05	16.7	24.0	24.0	2,469.9	9,452.8	13.6	1,387.3	1.4	323.5
09/16/05	16.7	24.0	24.0	2,493.9	9,452.8	13.6	1,400.9	1.4	324.9
09/17/05	16.5	24.0	24.0	2,517.9	9,427.0	13.6	1,414.5	1.4	326.3
09/18/05	15.6	24.0	24.0	2,541.9	9,635.6	13.9	1,428.4	1.4	327.7
09/19/05	15.5	24.0	24.0	2,565.9	9,692.7	14.0	1,442.3	1.4	329.0
09/20/05	15.5	24.0	24.0	2,589.9	9,396.6	13.5	1,455.9	1.3	330.3
09/21/05	15.5	24.0	24.0	2,613.9	9,647.0	13.9	1,469.8	1.4	331.7
09/22/05	15.4	24.0	24.0	2,637.9	9,608.0	13.8	1,483.6	1.3	333.0

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
09/23/05	15.7	24.0	24.0	2,661.9	9,586.4	13.8	1,497.4	1.4	334.4
09/24/05	15.7	24.0	24.0	2,685.9	9,565.0	13.8	1,511.2	1.4	335.8
09/25/05	15.6	24.0	24.0	2,709.9	9,601.5	13.8	1,525.0	1.4	337.1
09/26/05	14.7	24.0	24.0	2,733.9	9,613.3	13.8	1,538.9	1.3	338.4
09/27/05	15.6	24.0	24.0	2,757.9	9,227.1	13.3	1,552.1	1.3	339.7
09/28/05	15.4	24.0	24.0	2,781.9	9,506.9	13.7	1,565.8	1.3	341.0
09/29/05	14.4	24.0	24.0	2,805.9	9,502.3	13.7	1,579.5	1.2	342.3
09/30/05	16.0	24.0	24.0	2,829.9	9,186.8	13.2	1,592.7	1.3	343.6
10/01/05	17.0	24.0	24.0	2,853.9	9,440.2	13.6	1,606.3	1.5	345.0
10/02/05	16.3	24.0	24.0	2,877.9	9,422.8	13.6	1,619.9	1.4	346.4
10/03/05	15.3	24.0	24.0	2,901.9	9,350.2	13.5	1,633.4	1.3	347.7
10/04/05	15.3	24.0	24.0	2,925.9	8,282.9	11.9	1,645.3	1.1	348.9
10/05/05	15.1	24.0	24.0	2,949.9	9,140.0	13.2	1,658.5	1.2	350.1
10/06/05	13.5	24.0	24.0	2,973.9	7,041.1	10.1	1,668.6	0.9	351.0
10/07/05	13.8	24.0	24.0	2,997.9	6,039.9	8.7	1,677.3	0.8	351.7
10/08/05	14.6	24.0	24.0	3,021.9	6,046.9	8.7	1,686.0	0.8	352.5
10/09/05	15.3	24.0	24.0	3,045.9	5,898.9	8.5	1,694.5	0.8	353.4
10/10/05	14.4	24.0	24.0	3,069.9	5,857.7	8.4	1,702.9	0.8	354.1
10/11/05	13.7	24.0	24.0	3,093.9	5,780.6	8.3	1,711.3	0.7	354.8
10/12/05	13.4	24.0	24.0	3,117.9	5,922.1	8.5	1,719.8	0.7	355.6
10/13/05	14.1	24.0	24.0	3,141.9	7,787.3	11.2	1,731.0	1.0	356.5
10/14/05	14.1	24.0	24.0	3,165.9	10,060.3	14.5	1,745.5	1.3	357.8

Table A-1. Daily Soil Vapor Extraction Data. (10 sheets)

Date	Carbon Tetrachloride (ppmv)	Daily Operating Hours (hrs)	Daily Operating Hours Available (hrs)	Year-to-Date Operating Hours (hrs)	Daily Flow Rate (L/min)	Daily Volume Treated (million L)	Year-to-Date Volume Treated (million L)	Daily Mass Extracted (kg)	Year-to-Date Mass Extracted (kg)
10/15/05	15.5	24.0	24.0	3,189.9	10,378.5	14.9	1,760.4	1.5	359.3
10/16/05	15.3	24.0	24.0	3,213.9	10,473.4	15.1	1,775.5	1.5	360.8
10/17/05	13.9	24.0	24.0	3,237.9	10,424.5	15.0	1,790.5	1.3	362.1
10/18/05	14.4	9.5	24.0	3,247.4	10,483.9	6.0	1,796.5	0.5	362.6

ppmv = parts per million by volume

APPENDIX B

FISCAL YEAR 2005 SOIL VAPOR EXTRACTION WELL CHARACTERIZATION DATA

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Table B-1. Fiscal Year 2005 Soil Vapor Extraction Well Characterization Data.

Z-1A Well/Interval	Date	Vacuum (kPa)	Flow (m^3/min)	CCl_4 (ppmv)	CCl_4 Flux (kg/day)	$CHCl_3$ (ppmv)	CH_2Cl_2 (ppmv)	MEK (ppmv)	Comments
299-W18-89	10/11/2005	2.0	2.3	13.0	3.2	1.44	1.68	0.413	
299-W18-165	08/02/2005	4.0	1.8	0.0	0.0	4.23	2.38	172	Assume MEK is 0.172 ppmv.
299-W18-165	10/11/2005	0.6	0.3	10.8	0.3	0.653	0.725	0.168	
299-W18-166	08/02/2005	3.7	1.4	15.7	2.4	2.22	3.90	538	Assume MEK is 0.538 ppmv.
299-W18-166	10/11/2005	0.7	0.3	6.0	0.2	0.979	1.33	0.298	
299-W18-167	08/02/2005	2.2	4.9	20.3	10.8	1.69	2.06	565	Assume MEK is 0.565 ppmv.
299-W18-167	10/11/2005	0.6	1.4	19.4	2.8	1.41	2.53	0.338	
299-W18-168	08/02/2005	2.5	0.4	27.1	1.2	1.85	1.15	473	Assume MEK is 0.473 ppmv.
299-W18-168	10/11/2005	0.5	0.3	7.1	0.2	0.965	1.41	0.295	
299-W18-174	08/02/2005	4.7	0.4	20.5	0.9	1.57	1.73	467	Assume MEK is 0.467 ppmv.
299-W18-174	10/11/2005	2.7	0.3	6.0	0.2	0.977	1.08	0.326	
299-W18-248	10/11/2005	2.5	0.3	17.4	0.5	1.33	1.85	0.296	

CCl_4 = carbon tetrachloride
MEK = methyl ethyl ketone
ppmv = parts per million by volume

Table B-2. 216-Z-1A Site Soil Vapor Extraction Well Characterization Data, Fiscal Year 2005. (5 sheets)

Z-9 Well/Interval	Date/Time	Vacuum (kPa)	Flow (m^3/min)	CCl_4 (ppmv)	CCl_4 Flux (kg/day)	$CHCl_3$ (ppmv)	CH_2Cl_2 (ppmv)	MEK (ppmv)	Comments
299-W15-8L	05/05/05 11:40	Added on-line							
299-W15-8L	05/05/05 11:52	8.0	0.2	16.3	0.4	1.60	2.55	0.417	
299-W15-8L	05/05/05 13:05	8.5	0.2	16.7	0.4	1.70	2.24	0.453	
299-W15-8L	05/05/05 14:25	8.5	0.2	17.5	0.4	1.63	1.98	0.370	
299-W15-8L	05/06/05 07:14	8.7	0.2	19.4	0.5	1.38	1.30	0.215	
299-W15-8L	05/06/05 09:06	9.0	0.2	20.4	0.5	1.85	3.10	0.444	
299-W15-8L	05/06/05 11:02	8.5	0.2	18.8	0.5	1.61	2.07	0.364	
299-W15-8L	05/06/05 13:05	8.5	0.3	20.7	0.6	1.67	2.03	0.365	
299-W15-8L	05/11/05	8.5	0.3	20.1	0.6	1.75	2.06	0.494	
299-W15-8L	05/20/05	9.0	0.2	17.1	0.4	1.23	0.932	0.317	
299-W15-8L	05/24/05	8.0	0.3	16.6	0.5	1.38	0.835	0.450	
299-W15-8L	06/01/05	8.5	0.3	17.1	0.5	1.42	1.22	0.398	
299-W15-8L	06/08/05	5.2	0.3	18.1	0.5	1.40	0.955	0.477	
299-W15-8L	06/15/05	4.0	0.3	17.8	0.5	1.74	1.98	0.553	
299-W15-8L	06/22/05	4.0	0.7	62.5	4.4	4.08	6.31	0.841	
299-W15-8U	05/05/05 11:40	Added on-line							
299-W15-8U	05/05/05 11:56	7.7	0.8	63.3	5.2	3.59	5.36	0.787	
299-W15-8U	05/05/05 13:01	8.0	0.7	73.2	5.1	4.30	5.99	0.818	
299-W15-8U	05/05/05 14:29	8.0	0.7	80.3	5.6	4.29	6.08	0.767	
299-W15-8U	05/06/05 07:11	8.2	0.7	92.9	6.5	4.74	6.70	0.654	
299-W15-8U	05/06/05 09:03	8.2	0.5	167	9.7	6.09	10.0	1.10	106 ppmv on low CCl_4 B filter.
299-W15-8U	05/06/05 10:58	7.7	0.7	161	11.3	5.64	8.33	1.02	101 ppmv on low CCl_4 B filter.

Table B-2. 216-Z-1A Site Soil Vapor Extraction Well Characterization Data, Fiscal Year 2005. (5 sheets)

Z-9 Well/Interval	Date/Time	Vacuum (kPa)	Flow (m^3/min)	CCl_4 (ppmv)	CCl_4 Flux (kg/day)	$CHCl_3$ (ppmv)	CH_2Cl_2 (ppmv)	MEK (ppmv)	Comments
299-W15-8U	05/06/05 13:02	7.7	0.5	170	9.8	5.87	8.45	1.02	109 ppmv on low CCl_4 B filter.
299-W15-8U	05/11/05	8.2	0.7	191	14.5	6.99	9.77	1.56	111 ppmv on low CCl_4 B filter.
299-W15-8U	05/20/05	8.7	0.7	91.3	6.4	5.27	7.41	0.972	
299-W15-8U	05/24/05	7.7	0.7	81.6	5.7	5.38	7.17	1.25	
299-W15-8U	06/01/05	8.0	0.5	75.6	4.4	5.07	6.86	1.09	
299-W15-8U	06/08/05	5.0	0.3	74.3	2.5	5.03	6.41	1.17	
299-W15-8U	06/15/05	4.0	0.3	74.1	2.5	5.24	7.73	1.25	
299-W15-8U	06/22/05	4.0	0.3	2.2	0.1	1.08	1.17	0.395	
299-W15-82	04/12/05	23.7	0.2	18.1	0.4	1.44	0.544	0.409	
299-W15-82	04/20/05	23.7	0.3	15.7	0.4	1.60	1.34	0.496	
299-W15-82	04/26/05	13.9	0.3	7.1	0.2	2.02	2.40	0.806	
299-W15-82	05/04/05	14.9	0.3	3.9	0.1	1.84	1.90	0.724	
299-W15-82	05/11/05	11.2	0.3	7.3	0.2	1.96	1.14	0.723	
299-W15-82	05/20/05	12.5	0.3	1.8	0.0	0.762	0	0.283	
299-W15-82	05/24/05	11.5	1.2	2.0	0.3	0.937	0	0.384	
299-W15-82	06/01/05	11.5	0.3	1.6	0.0	0.949	0.071	0.434	
299-W15-86	04/26/05	8.7	1.6	79.2	13.3	4.58	7.36	1.14	
299-W15-86	05/04/05	9.0	1.8	50.5	9.5	3.31	5.77	0.918	
299-W15-86	05/11/05	7.5	1.4	47.1	7.3	2.97	4.13	0.766	
299-W15-86	05/20/05	7.5	1.4	45.8	7.1	2.36	3.49	0.472	
299-W15-86	05/24/05	7.5	1.3	38.7	5.5	2.56	3.1	0.669	
299-W15-86	06/01/05	7.5	1.4	41.6	6.5	2.49	3.35	0.565	
299-W15-86	06/08/05	4.5	0.8	39.1	3.2	2.55	3.18	0.733	

Table B-2. 216-Z-1A Site Soil Vapor Extraction Well Characterization Data, Fiscal Year 2005. (5 sheets)

Z-9 Well/Interval	Date/Time	Vacuum (kPa)	Flow (m^3/min)	CCl_4 (ppmv)	CCl_4 Flux (kg/day)	$CHCl_3$ (ppmv)	CH_2Cl_2 (ppmv)	MEK (ppmv)	Comments
299-W15-86	06/15/05	4.0	0.9	35.0	3.3	2.38	3.57	0.649	
299-W15-86	06/22/05	4.2	0.9	34.2	3.2	2.63	4.16	0.674	
299-W15-95L	04/12/05	7.5	4.0	21.5	9.3	1.66	3.36	0.382	
299-W15-95L	04/20/05	12.5	4.8	21.9	11.3	1.81	3.79	0.477	
299-W15-95L	04/26/05	8.5	4.0	22.7	9.8	2.89	5.80	1.02	
299-W15-95L	05/04/05	8.7	3.7	17.3	6.8	1.97	4.36	0.484	
299-W15-95L	05/11/05	5.7	3.1	17.7	6.0	2.02	4.92	0.537	
299-W15-95L	05/20/05	7.5	3.3	17.6	6.3	1.80	4.43	0.444	
299-W15-95L	05/24/05	6.7	3.4	18.1	6.6	2.11	5.18	0.574	
299-W15-95L	06/01/05	7.5	3.4	15.9	5.9	1.90	4.20	0.527	
299-W15-95L	06/08/05	4.2	2.8	15.6	4.7	1.81	4.33	0.468	
299-W15-95L	06/15/05	4.0	2.4	15.8	4.1	1.74	4.38	0.524	
299-W15-95L	06/22/05	4.0	2.7	4.3	1.3	1.21	1.67	0.431	
299-W15-95U	04/12/05	11.2	3.6	41.0	15.7	2.44	2.45	0.509	
299-W15-95U	04/20/05	13.0	4.4	159.0	74.5	5.15	7.47	0.931	
299-W15-95U	04/26/05	9.0	3.3	145.0	50.8	5.81	7.38	1.42	
299-W15-95U	05/04/05	8.7	3.3	59.0	20.7	3.93	5.88	0.861	
299-W15-95U	05/11/05	6.2	2.4	25.8	6.8	2.54	3.09	0.616	
299-W15-95U	05/20/05	7.5	3.2	13.2	4.6	1.60	1.20	0.403	
299-W15-95U	05/24/05	7.2	3.0	11.0	3.5	1.83	1.77	0.564	
299-W15-95U	06/01/05	7.5	3.2	8.3	2.9	1.53	1.36	0.457	
299-W15-95U	06/08/05	4.2	2.7	1.4	0.4	1.07	0.369	0.424	
299-W15-95U	06/15/05	4.0	2.1	9.0	2.1	1.62	1.52	0.530	

Table B-2. 216-Z-1A Site Soil Vapor Extraction Well Characterization Data, Fiscal Year 2005. (5 sheets)

Z-9 Well/Interval	Date/Time	Vacuum (kPa)	Flow (m^3/min)	CCl_4 (ppmv)	CCl_4 Flux (kg/day)	$CHCl_3$ (ppmv)	CH_2Cl_2 (ppmv)	MEK (ppmv)	Comments
299-W15-95U	06/22/05	4.0	2.4	8.3	2.2	1.89	2.00	0.665	
299-W15-217	04/12/05	12.5	1.6	255.0	42.7	7.34	13.3	1.16	
299-W15-217	04/20/05	11.0	1.7	22.4	4.0	1.79	0.742	0.471	
299-W15-217	04/26/05	9.5	1.4	84.7	13.1	5.54	8.66	1.31	
299-W15-217	05/04/05	9.2	1.4	73.8	11.5	4.59	7.46	1.0	
299-W15-217	05/11/05	8.0	1.2	95.5	12.5	5.23	7.62	0.995	
299-W15-217	05/20/05	8.0	1.3	85.6	12.2	4.51	6.34	0.761	
299-W15-217	05/24/05	7.5	1.1	74.4	8.8	4.44	6.02	0.859	
299-W15-217	06/01/05	7.7	1.1	8.3	1.0	1.10	2.13	0.349	
299-W15-217	06/08/05	5.0	0.4	62.4	2.8	3.82	5.20	0.804	
299-W15-217	06/15/05	4.0	1.1	52.9	6.3	3.57	4.75	0.773	299-W15-217 found valved out.
299-W15-217	06/22/05	4.5	0.7	58.9	4.1	4.02	5.85	0.926	
299-W15-218L	04/26/05	9.0	1.4	17.3	2.7	2.56	4.39	0.957	
299-W15-218L	05/04/05	9.0	1.4	23.2	3.6	2.25	5.52	0.667	
299-W15-218L	05/11/05	7.5	1.2	19.8	2.6	2.10	4.50	0.573	
299-W15-218L	05/20/05	8.0	1.4	15.0	2.3	1.41	2.30	0.354	
299-W15-218L	05/24/05	7.5	1.2	11.7	1.5	1.45	2.61	0.421	
299-W15-218L	06/01/05	7.5	1.3	16.3	2.3	1.88	3.39	0.580	
299-W15-218L	06/08/05	5.0	0.9	19.9	1.9	2.25	4.61	0.651	
299-W15-218L	06/15/05	5.0	0.8	18.3	1.5	2.13	4.59	0.734	
299-W15-218L	06/22/05	5.0	0.9	17.0	1.6	2.64	5.14	0.946	
299-W15-218U	06/08/05	4.0	1.6	17.1	2.9	2.12	4.04	0.668	
299-W15-218U	06/15/05	4.0	1.6	15.9	2.8	2.09	4.07	0.750	

Table B-2. 216-Z-1A Site Soil Vapor Extraction Well Characterization Data, Fiscal Year 2005. (5 sheets)

Z-9 Well/Interval	Date/Time	Vacuum (kPa)	Flow (m^3/min)	CCl_4 (ppmv)	CCl_4 Flux (kg/day)	$CHCl_3$ (ppmv)	CH_2Cl_2 (ppmv)	MEK (ppmv)	Comments
299-W15-218U	06/22/05	4.0	1.7	15.3	2.7	2.43	4.54	0.825	
299-W15-220L	06/09/05	6.2	0.8	14.0	1.2	1.43	1.34	0.390	
299-W15-220L	06/15/05	5.7	0.8	14.1	1.2	1.65	1.94	0.634	
299-W15-220L	06/22/05	5.5	0.8	14.4	1.2	1.98	2.43	0.722	
299-W15-220U	06/08/05	5.0	2.4	11.9	3.1	1.30	0.682	0.486	
299-W15-220U	06/15/05	5.0	2.2	0.0	0.0	0.569	0.297	0.238	
299-W15-220U	06/22/05	4.5	2.1	14.5	3.3	2.00	2.35	0.739	

CCl_4 = carbon tetrachloride
MEK = methyl ethyl ketone
ppmv = parts per million by volume

APPENDIX C

FISCAL YEAR 2005 PASSIVE SOIL VAPOR EXTRACTION DATA

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Table C-1. Passive Soil Vapor Extraction Well Monitoring Data. (4 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W18-6L	63	6	11/15/04 13:05	20.30	1.0 U	1.0 U	2.75	129,000	
299-W18-6L	63	6	12/29/04 12:08	21.20	1.0 U	1.0 U	2.52	12500	
299-W18-6L	63	6	12/29/04 12:08	21.20	1.0 U	1.0 U	1.91	12,500	Duplicate.
299-W18-6L	63	6	01/21/05 13:58	21.10	1.0 U	1.0 U	3.17	10,700	
299-W18-6L	63	6	02/28/05 13:52	18.40	1.0 U	1.0 U	2.31	11,900	
299-W18-6L	63	6	02/28/05 13:52	18.50	1.0 U	1.0 U	3.03	11,100	Duplicate.
299-W18-6L	63	6	03/18/05 12:16	22.90	1.0 U	1.0 U	2.43	6,570	
299-W18-6L	63	6	05/05/05 12:34	23.20	1.0 U	1.0 U	2.88	12,300	
299-W18-6L	63	6	05/31/05 14:48	17.00	1.0 U	1.0 U	1.0 U	10,700	
299-W18-6L	63	6	08/17/05 13:20	15.00	1.0 U	1.0 U	2.73	14,300	
299-W18-6L	63	6	09/26/05 13:17	24.40	1.0 U	1.0 U	2.47	7,780	
299-W18-7	60	6	11/15/04 14:05	21.60	1.0 U	1.0 U	3.12	10,400	
299-W18-7	60	6	12/29/04 11:54	20.80	1.0 U	1.0 U	1.61	12100	
299-W18-7	60	6	01/21/05 13:47	6.78	1.0 U	1.0 U	1.91	10,100	
299-W18-7	60	6	01/21/05 13:47	6.76	1.0 U	1.0 U	1.65	10,200	Duplicate.
299-W18-7	60	6	02/28/05 13:36	24.60	1.0 U	1.0 U	2.16	11,600	
299-W18-7	60	6	03/18/05 11:18	23.10	1.0 U	1.0 U	2.63	6,270	
299-W18-7	60	6	05/05/05 11:50	21.90	1.0 U	1.0 U	2.87	12,300	
299-W18-7	60	6	05/31/05 14:40	4.97	1.0 U	1.0 U	1.50	8,920	
299-W18-7	60	6	08/17/05 13:06	1.0 U	1.0 U	1.0 U	1.0 U	13,900	
299-W18-7	60	6	09/26/05 13:05	1.0 U	1.0 U	1.0 U	1.0 U	7,910	
299-W18-7	60	6	09/26/05 13:05	1.0 U	1.0 U	1.0 U	1.0 U	7,910	Duplicate.

Table C-1. Passive Soil Vapor Extraction Well Monitoring Data. (4 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W18-10L	56	6	11/15/04 14:15	4.01	1.0 U	1.0 U	1.23	11,900	
299-W18-10L	56	6	12/29/04 13:23	10.00	1.0 U	1.0 U	1.42	11,400	
299-W18-10L	56	6	01/21/05 11:04	5.87	1.0 U	1.0 U	1.16	16,700	
299-W18-10L	56	6	02/28/05 14:55	11.60	1.0 U	1.0 U	2.08	13,100	
299-W18-10L	56	6	03/18/05 14:36	12.20	1.0 U	1.0 U	1.40	7,200	
299-W18-10L	56	6	05/05/05 16:06	7.59	1.0 U	1.0 U	2.31	12,100	
299-W18-10L	56	6	05/31/05 15:26	2.80	1.0 U	1.0 U	1.0 U	9,520	
299-W18-10L	56	6	08/17/05 13:57	1.0 U	1.0 U	1.0 U	1.0 U	14,400	
299-W18-10L	56	6	09/26/05 18:01	9.15	1.0 U	1.0 U	1.20	10,300	
299-W18-11L	61	6	11/15/04 16:45	4.79	1.0 U	1.0 U	1.62	11200	
299-W18-11L	61	6	12/29/04 12:54	6.91	1.0 U	1.0 U	1.08	8,510	
299-W18-11L	61	6	01/21/05 10:34	2.45	1.0 U	1.0 U	1.22	8,640	
299-W18-11L	61	6	02/28/05 14:36	2.77	1.0 U	1.0 U	1.0 U	13,500	
299-W18-11L	61	6	03/18/05 14:44	7.31	1.0 U	1.0 U	1.45	7,090	
299-W18-11L	61	6	05/05/05 16:00	6.69	1.0 U	1.0 U	2.09	12,600	
299-W18-11L	61	6	05/31/05 15:20	1.62	1.0 U	1.0 U	1.0 U	10,990	
299-W18-11L	61	6	08/17/05 14:06	1.16	1.0 U	1.0 U	1.21	13,800	
299-W18-11L	61	6	09/26/05 17:57	9.00	1.0 U	1.0 U	1.0 U	8,410	
299-W18-12	60	6	11/15/04 16:55	1.72	1.0 U	1.0 U	1.10	11,700	
299-W18-12	60	6	12/29/04 13:04	8.07	1.0 U	1.0 U	1.0 U	12,900	
299-W18-12	60	6	01/21/05 10:44	1.0 U	1.0 U	1.0 U	1.0 U	8,520	
299-W18-12	60	6	02/28/05 14:43	5.15	1.0 U	1.0 U	1.0 U	13,200	
299-W18-12	60	6	03/18/05 14:49	9.93	1.0 U	1.0 U	1.07	7,090	

Table C-1. Passive Soil Vapor Extraction Well Monitoring Data. (4 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W18-12	60	6	05/05/05 16:17	5.63	1.0 U	1.0 U	1.20	12,500	
299-W18-12	60	6	05/31/05 15:33	1.0 U	1.0 U	1.0 U	1.28	8,940	
299-W18-12	60	6	08/17/05 14:15	1.85	1.0 U	1.0 U	1.0 U	13,900	
299-W18-12	60	6	09/26/05 18:05	2.42	1.0 U	1.0 U	1.0 U	9,850	
299-W18-246L	52	6	11/15/04 13:15	21.10	1.0 U	1.0 U	1.49	12,500	
299-W18-246L	52	6	12/29/04 12:18	20.70	1.0 U	1.0 U	1.0 U	11,600	
299-W18-246L	52	6	01/21/05 14:07	16.80	1.0 U	1.0 U	2.05	10,600	
299-W18-246L	52	6	02/28/05 13:57	19.70	1.0 U	1.0 U	1.52	11,700	
299-W18-246L	52	6	03/18/05 12:27	22.00	1.0 U	1.0 U	1.01	6,800	
299-W18-246L	52	6	05/05/05 13:14	21.10	1.0 U	1.0 U	1.36	12,200	
299-W18-246L	52	6	05/31/05 14:56	8.08	1.0 U	1.0 U	1.21	10,200	
299-W18-246L	52	6	08/17/05 13:28	25.30	1.0 U	1.0 U	1.88	14,300	
299-W18-246L	52	6	09/26/05 13:23	9.50	1.0 U	1.0 U	1.0 U	7,710	
299-W18-247L	51	6	11/15/04 14:30	1.0 U	1.0 U	1.0 U	1.48	10,900	
299-W18-247L	51	6	12/29/04 13:15	4.59	1.0 U	1.0 U	1.40	11,200	
299-W18-247L	51	6	01/21/05 10:53	1.0 U	1.0 U	1.0 U	1.11	8,620	
299-W18-247L	51	6	02/28/05 14:49	4.43	1.0 U	1.0 U	1.0 U	13,300	
299-W18-247L	51	6	03/18/05 14:56	6.35	1.0 U	1.0 U	1.76	7,510	
299-W18-247L	51	6	05/05/05 16:24	6.39	1.0 U	1.0 U	1.90	12,900	
299-W18-247L	51	6	05/31/05 15:40	1.0 U	1.0 U	1.0 U	1.0 U	8,560	
299-W18-247L	51	6	08/17/05 14:24	7.81	1.0 U	1.0 U	2.07	13,700	
299-W18-247L	51	6	08/17/05 14:24	7.84	1.0 U	1.0 U	2.24	13,800	Duplicate.
299-W18-247L	51	6	09/26/05 17:37	2.23	1.0 U	1.0 U	1.0 U	9,440	

Table C-1. Passive Soil Vapor Extraction Well Monitoring Data. (4 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W18-252L	53	6	11/15/04 13:37	13.30	1.0 U	1.0 U	2.01	12,400	
299-W18-252L	53	6	12/29/04 12:33	16.80	1.0 U	1.0 U	1.0 U	14,800	
299-W18-252L	53	6	01/21/05 14:17	1.36	1.0 U	1.0 U	1.41	9,830	
299-W18-252L	53	6	02/28/05 14:07	14.40	1.0 U	1.0 U	1.23	12,000	
299-W18-252L	53	6	03/18/05 12:42	18.00	1.0 U	1.0 U	1.61	6,600	
299-W18-252L	53	6	03/18/05 12:42	17.00	1.0 U	1.0 U	1.41	6,730	Duplicate.
299-W18-252L	53	6	05/05/05 13:27	11.30	1.0 U	1.0 U	2.00	12,400	
299-W18-252L	53	6	05/05/05 13:27	11.20	1.0 U	1.0 U	1.71	12,400	Duplicate.
299-W18-252L	53	6	05/31/05 15:03	1.0 U	1.0 U	1.0 U	1.0 U	8,330	
299-W18-252L	53	6	05/31/05 15:03	1.0 U	1.0 U	1.0 U	1.17	8,570	Duplicate.
299-W18-252L	53	6	08/17/05 13:38	1.0 U	1.0 U	1.0 U	1.59	14,100	
299-W18-252L	53	6	09/26/05 13:29	16.90	1.0 U	1.0 U	1.19	7,970	

bgs = below ground surface
CCl_4 = carbon tetrachloride
MEK = methyl ethyl ketone
ppmv = parts per million by volume

Table C-2. Carbon Tetrachloride Concentration Standard Analyses.

Carbon Tetrachloride Concentration Standard (ppmv)	Carbon Tetrachloride Concentration Analyzed (ppmv)	Date Analyzed	Time Analyzed	B&K Serial Number
25.5	23.3	11/15/04	18:10	1715232
25.5	23.4	11/15/04	18:46	1715232
25.5	22.8	12/29/04	13:49	1715232
25.5	23.0	12/29/04	14:41	1715232
25.5	23.7	01/21/05	14:39	1715232
25.5	23.7	01/21/05	15:37	1715232
25.5	22.9	02/28/05	15:18	1715232
25.5	23.0	02/28/05	16:10	1715232
25.5	22.6	03/18/05	19:13	1715232
25.5	22.5	03/18/05	20:06	1715232
25.37	22.4	05/05/05	16:46	1715232
25.37	22.7	05/05/05	18:39	1715232
25.37	22.2	05/31/05	16:27	1715232
25.37	22.3	05/31/05	17:20	1715232
25.37	22.4	08/17/05	17:32	1715232
25.37	22.3	08/17/05	18:22	1715232
25.37	22.3	09/26/05	18:17	1715232
25.37	22.2	09/26/05	20:05	1715232

B&K = Brüel & Kjaer
ppmv = parts per million by volume

Table C-3. Blank Analyses.

Sample Location	Sample Date	Sample Time	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)
Blank	11/15/04	18:08	1.0 U	1.0 U	1.0 U	1.0 U	9,560
Blank	11/15/04	18:48	1.0 U	1.0 U	1.0 U	1.0 U	9,710
Blank	12/29/04	13:47	1.0 U	1.0 U	1.0 U	1.0 U	7,510
Blank	12/29/04	14:43	1.0 U	1.0 U	1.0 U	1.0 U	8,060
Blank	01/21/05	14:37	1.0 U	1.0 U	1.0 U	1.0 U	8,100
Blank	01/21/05	15:39	1.0 U	1.0 U	1.0 U	1.0 U	8,630
Blank	02/28/05	15:16	1.0 U	1.0 U	1.0 U	1.0 U	9,520
Blank	02/28/05	16:12	1.0 U	1.0 U	1.0 U	1.0 U	9,340
Blank	03/18/05	19:11	1.0 U	1.0 U	1.0 U	1.0 U	8,390
Blank	03/18/05	20:08	1.0 U	1.0 U	1.0 U	1.0 U	7,840
Blank	05/05/05	16:44	1.0 U	1.0 U	1.0 U	1.32	8,930
Blank	05/05/05	18:41	1.0 U	1.0 U	1.0 U	1.0 U	9,200
Blank	05/31/05	16:25	1.0 U	1.0 U	1.0 U	1.0 U	7,980
Blank	05/31/05	17:22	1.0 U	1.0 U	1.0 U	1.0 U	7,680
Blank	08/17/05	17:30	1.0 U	1.0 U	1.0 U	1.0 U	12,100
Blank	08/17/05	18:24	1.0 U	1.0 U	1.0 U	1.0 U	11,500
Blank	09/26/05	18:15	1.0 U	1.0 U	1.0 U	1.0 U	3,910
Blank	09/26/05	20:07	1.0 U	1.0 U	1.0 U	1.0 U	5,840

CCl_4 = carbon tetrachloride
MEK = methyl ethyl ketone
ppmv = parts per million by volume

APPENDIX D

FISCAL YEAR 2005 SOIL VAPOR MONITORING DATA

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Table D-1. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-1A/216-Z-18/216-Z-12 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comments
CPT-4E / 25 ft	8	2	05/05/05 13:40	0.025	2.37	0.00	0.00	2.33	12,800	
CPT-4E / 25 ft	8	2	05/26/05 12:48	0.040	1.94	0.00	0.00	1.58	8,010	
CPT-4E / 25 ft	8	2	06/23/05 14:12	0.027	1.82	0.00	0.00	2.47	9,080	
CPT-4E / 25 ft	8	2	08/04/05 11:35	0.015	1.48	0.00	1.09	2.46	7,970	
CPT-4E / 25 ft	8	2	08/19/05 10:32	0.002	1.28	0.00	0.00	1.60	10,200	
CPT-4E / 25 ft	8	2	08/19/05 10:32	0.002	1.26	0.00	0.00	1.51	10,300	Duplicate.
CPT-4E / 25 ft	8	2	09/26/05 13:35	0.040	0.00	0.00	0.00	0.00	7,960	
CPT-32/ 25 ft	8	2	11/17/04 09:41	-0.005	0.00	0.00	0.00	0.00	7,410	
CPT-32/ 25 ft	8	2	12/28/04 13:20	0.025	1.70	0.00	0.00	0.00	7,110	
CPT-32/ 25 ft	8	2	01/19/05 11:36	0.012	2.70	0.00	0.00	1.35	8,760	
CPT-32/ 25 ft	8	2	02/24/05 11:47	0.017	5.49	0.00	0.00	1.52	6,700	
CPT-32/ 25 ft	8	2	03/18/05 12:36	0.025	8.01	0.00	0.00	1.85	6,530	
CPT-32/ 25 ft	8	2	05/05/05 13:07	0.020	8.62	0.00	0.00	3.69	11,700	
CPT-32/ 25 ft	8	2	05/26/05 12:27	0.030	6.55	0.00	0.00	1.54	7,320	
CPT-32/ 25 ft	8	2	06/23/05 13:55	0.020	6.76	0.00	1.04	2.21	8,950	
CPT-30/ 28 ft	9	2	11/17/04 09:45	-0.005	0.00	0.00	0.00	0.00	7,360	
CPT-30/ 28 ft	9	2	12/28/04 13:25	0.003	1.25	0.00	0.00	0.00	6,490	
CPT-30/ 28 ft	9	2	01/19/05 11:42	0.022	1.48	0.00	0.00	0.00	8,880	
CPT-30/ 28 ft	9	2	02/24/05 11:53	0.022	1.60	0.00	0.00	0.00	7,040	
CPT-30/ 28 ft	9	2	03/18/05 12:50	0.017	0.00	0.00	0.00	1.00	6,650	
CPT-30/ 28 ft	9	2	05/05/05 13:23	0.020	0.00	0.00	0.00	1.82	11,900	
CPT-30/ 28 ft	9	2	05/26/05 12:34	0.020	0.00	0.00	0.00	1.44	7,270	
CPT-30/ 28 ft	9	2	06/23/05 14:05	0.022	0.00	0.00	1.04	2.14	9,410	
CPT-30/ 28 ft	9	2	06/23/05 13:55	0.020	0.00	0.00	1.11	2.24	8,850	Duplicate.
CPT-13A/ 30 ft	9	2	11/17/04 13:19	0.017	3.03	0.00	0.00	0.00	11,300	
CPT-13A/ 30 ft	9	2	12/28/04 14:19	0.015	0.00	0.00	0.00	0.00	6,530	
CPT-13A/ 30 ft	9	2	01/19/05 14:05	0.010	7.12	0.00	0.00	0.00	8,770	

Table D-1. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-1A/216-Z-18/216-Z-12 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comments
CPT-13A/ 30 ft	9	2	02/24/05 15:28	0.027	2.48	0.00	0.00	0.00	8,670	
CPT-13A/ 30 ft	9	2	03/18/05 14:24	0.045	8.27	0.00	0.00	0.00	6,810	
CPT-13A/ 30 ft	9	2	05/05/05 15:42	0.005	6.63	0.00	0.00	1.02	13,600	
CPT-13A/ 30 ft	9	2	05/26/05 14:27	0.035	1.52	0.00	0.00	0.00	8,610	
CPT-13A/ 30 ft	9	2	06/23/05 16:05	0.037	3.56	0.00	0.00	1.35	11,600	
CPT-13A/ 30 ft	9	2	08/04/05 15:25	0.045	3.87	0.00	1.03	1.99	10,000	
CPT-13A/ 30 ft	9	2	08/19/05 13:55	0.030	3.33	0.00	0.00	0.00	12,300	
CPT-13A/ 30 ft	9	2	09/26/05 17:30	0.020	3.15	0.00	0.00	0.00	9,590	
CPT-7A/ 32 ft	10	2	11/17/04 10:05	0.000	1.53	0.00	0.00	0.00	7,680	
CPT-7A/ 32 ft	10	2	12/28/04 12:54	0.032	2.19	0.00	0.00	0.00	6,550	
CPT-7A/ 32 ft	10	2	01/19/05 11:17	0.022	3.93	0.00	0.00	0.00	8,740	
CPT-7A/ 32 ft	10	2	02/24/05 11:12	0.017	2.90	0.00	0.00	0.00	6,480	
CPT-7A/ 32 ft	10	2	03/18/05 11:07	0.025	4.38	0.00	0.00	0.00	6,110	
CPT-7A/ 32 ft	10	2	05/05/05 11:30	0.015	3.20	0.00	0.00	1.01	12,000	
CPT-7A/ 32 ft	10	2	05/05/05 11:30	0.015	3.13	0.00	0.00	1.13	12,100	Duplicate.
CPT-7A/ 32 ft	10	2	05/26/05 12:11	0.027	2.57	0.00	0.00	0.00	7,840	
CPT-7A/ 32 ft	10	2	06/23/05 12:42	0.022	2.44	0.00	1.44	1.93	8,700	
CPT-7A/ 32 ft	10	2	08/04/05 11:25	0.012	2.34	0.00	1.93	1.87	8,100	
CPT-7A/ 32 ft	10	2	08/19/05 10:26	0.000	2.19	0.00	0.00	0.00	10,500	
CPT-7A/ 32 ft	10	2	09/26/05 12:58	0.037	2.09	0.00	0.00	0.00	7,830	
CPT-7A/ 32 ft	10	2	09/26/05 12:58	0.037	1.98	0.00	0.00	0.00	7,870	Duplicate.
CPT-1A/ 35 ft	11	2	11/17/04 09:55	-0.002	4.73	0.00	0.00	0.00	7,620	
CPT-1A/ 35 ft	11	2	12/28/04 13:36	0.000	14.00	0.00	0.00	1.33	7,610	
CPT-1A/ 35 ft	11	2	01/09/05 11:48	0.005	13.20	1.45	0.00	1.01	8,720	
CPT-1A/ 35 ft	11	2	02/24/05 12:00	0.032	11.30	1.39	0.00	1.04	6,960	
CPT-1A/ 35 ft	11	2	03/18/05 12:58	0.032	4.31	0.00	0.00	1.03	6,160	
CPT-1A/ 35 ft	11	2	05/05/05 14:29	0.020	6.02	1.10	0.00	1.87	12,700	
CPT-1A/ 35 ft	11	2	05/26/05 12:55	0.012	11.10	1.48	0.00	2.31	7,940	

Table D-1. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-1A/216-Z-18/216-Z-12 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comments
CPT-1A/ 35 ft	11	2	06/23/05 14:24	0.045	9.16	1.34	1.18	2.62	9,380	
CPT-1A/ 35 ft	11	2	08/04/05 11:42	0.022	6.57	1.27	1.77	2.57	7,920	
CPT-1A/ 35 ft	11	2	08/04/05 11:42	0.022	6.64	1.03	1.73	2.80	7,930	Duplicate.
CPT-1A/ 35 ft	11	2	08/19/05 10:36	0.007	6.59	0.00	0.00	1.90	10,100	
CPT-1A/ 35 ft	11	2	09/26/05 13:40	0.050	9.21	0.00	0.00	1.15	7,840	
CPT-33/ 40 ft	12	2	05/05/05 15:46	0.005	3.93	0.00	0.00	3.27	13,600	
CPT-33/ 40 ft	12	2	05/26/05 14:15	0.045	1.11	0.00	0.00	2.71	7,990	
CPT-33/ 40 ft	12	2	06/23/05 16:19	0.037	1.90	0.00	1.16	3.12	12,100	
CPT-34/ 40 ft	12	2	05/05/05 15:52	0.030	2.97	0.00	0.00	1.98	12,700	
CPT-34/ 40 ft	12	2	05/26/05 14:11	0.045	1.10	0.00	0.00	1.03	7,970	
CPT-34/ 40 ft	12	2	06/23/05 16:10	0.045	1.87	0.00	1.22	1.56	11,300	
CPT-34/ 40 ft	12	2	08/04/05 15:30	0.040	1.95	0.00	1.01	1.68	10,300	
CPT-34/ 40 ft	12	2	08/19/05 14:01	0.035	1.71	0.00	0.00	0.00	12,700	
CPT-34/ 40 ft	12	2	09/26/05 17:47	0.017	1.38	0.00	0.00	0.00	9,790	
CPT-3872 / 61 ft	19	2	11/17/04 09:05	-0.115	1.14	0.00	0.00	0.00	7,390	
CPT-3872/ 61 ft	19	2	01/19/05 11:24	0.045	5.93	0.00	0.00	1.39	8,740	
CPT-3872/ 61 ft	19	2	02/24/05 11:17	0.015	7.56	0.00	0.00	1.12	6,390	
CPT-3872/ 61 ft	19	2	03/18/05 11:11	0.085	9.91	0.00	0.00	1.45	6,220	
CPT-3872/ 61 ft	19	2	05/05/05 11:37	0.055	11.80	0.00	0.00	3.21	12,200	
CPT-3872/ 61 ft	19	2	05/26/05 12:21	0.107	14.60	0.00	0.00	2.47	7,540	
CPT-3872/ 61 ft	19	2	06/23/05 12:54	0.057	15.50	0.00	1.29	3.11	8,970	
CPT-1A/ 68 ft	21	2	05/05/05 14:31	0.025	6.23	0.00	0.00	1.93	12,800	
CPT-1A/ 68 ft	21	2	05/26/05 12:59	0.095	13.70	1.23	0.00	2.40	8,040	
CPT-1A/ 68 ft	21	2	06/23/05 14:27	0.080	1.97	0.00	0.00	1.63	8,730	
CPT-32/ 70 ft	21	2	05/05/05 13:10	0.107	5.48	0.00	0.00	3.07	12,000	
CPT-32/ 70 ft	21	2	05/26/05 12:30	0.107	3.36	0.00	0.00	2.28	7,290	
CPT-32/ 70 ft	21	2	06/23/05 14:00	0.085	4.54	0.00	1.38	3.75	9,200	

Table D-1. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-1A/216-Z-18/216-Z-12 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comments
299-299-W18-152/ 101 ft	31	2	11/17/04 09:51	-0.132	10.40	0.00	0.00	1.72	7,730	
299-299-W18-152/ 101 ft	31	2	01/19/05 12:05	0.075	14.60	0.00	0.00	1.93	9,100	
299-299-W18-152/ 101 ft	31	2	01/19/05 12:05	0.075	14.60	0.00	0.00	2.09	9,090	Duplicate.
299-299-W18-152/ 101 ft	31	2	02/24/05 12:09	0.072	13.30	0.00	0.00	1.60	7,050	
299-299-W18-152/ 101 ft	31	2	03/18/05 13:03	0.207	16.00	0.00	0.00	1.80	6,590	
299-299-W18-152/ 101 ft	31	2	05/05/05 14:37	0.167	14.80	0.00	0.00	2.87	12,600	
299-299-W18-152/ 101 ft	31	2	05/26/05 13:07	0.199	13.20	0.00	0.00	3.23	7,670	
299-299-W18-152/ 101 ft	31	2	06/23/05 14:32	0.152	13.40	0.00	1.23	2.89	9,260	
299-299-W18-167/ 106 ft	32	2	11/17/04 00:00							Hooked up to SVE; no tubing in well.
299-299-W18-167/ 106 ft	32	2	12/28/04 00:00							Hooked up to SVE; no tubing in well.
299-299-W18-167/ 106 ft	32	3	01/19/05 0 0:00							No tubing in well.
299-299-W18-167/ 106 ft	32	3	02/24/05 12:39	0.087	37.40	0.00	0.00	2.08	7,410	
299-299-W18-167/ 106 ft	32	3	02/24/05 12:39	0.087	37.40	0.00	0.00	2.06	7,430	Duplicate.
299-299-W18-167/ 106 ft	32	3	03/18/05 11:45	0.179	20.40	1.52	1.59	1.15	6,160	
299-299-W18-167/ 106 ft	32	3	05/05/05 13:01	0.172	26.70	0.00	1.28	2.79	12,100	
299-299-W18-167/ 106 ft	32	3	05/26/05 11:45	0.137	20.20	1.25	1.38	2.11	6,980	

Table D-1. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-1A/216-Z-18/216-Z-12 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comments
299-299-W18-167/ 106 ft	32	3	06/23/05 13:15	0.085	196.00	1.60	2.04	5.69	8,930	
CPT-4F / 109 ft	33	3	05/05/05 14:20	0.199	7.80	0.00	0.00	2.56	12,000	Difficult to sample; low flow.
CPT-4F / 109 ft	33	3	05/26/05 12:42	0.169	7.72	0.00	0.00	1.43	7,380	Difficult to sample; low flow.
CPT-4F / 109 ft	33	3	05/26/05 12:42	0.169	8.60	0.00	0.00	1.82	7,970	Duplicate.
CPT-4F / 109 ft	33	3	06/23/05 14:18	0.122	11.90	0.00	1.10	2.20	9,590	
299-W18-165/ 109 ft	33	3	11/17/04 00:00							Hooked up to SVE; no tubing in well.
299-W18-165/ 109 ft	33	3	12/28/04 00:00							Hooked up to SVE; no tubing in well.
299-W18-165/ 109 ft	33	3	01/19/05 00:00							No tubing in well.
299-W18-165/ 109 ft	33	3	02/24/05 12:54	0.117	35.20	0.00	0.00	2.71	7,700	
299-W18-165/ 109 ft	33	3	03/18/05 12:03	0.194	15.00	0.00	0.00	1.82	6,310	
299-W18-165/ 109 ft	33	3	03/18/05 12:03	0.194	15.00	0.00	0.00	1.78	6,360	Duplicate.
299-W18-165/ 109 ft	33	3	05/05/05 12:56	0.162	22.20	1.13	0.00	3.52	11,800	
299-W18-165/ 109 ft	33	3	05/26/05 11:39	0.125	30.80	0.00	0.00	3.77	7020	
299-W18-165/ 109 ft	33	3	06/23/05 13:17	0.030	10.40	0.00	1.15	2.35	8,240	
299-W18-249/ 130 ft	40	3	11/17/04 00:00							No tubing in well.
299-W18-249/ 130 ft	40	3	12/28/04 14:31	0.346	51.50	0.00	0.00	1.13	6,760	
299-W18-249/ 130 ft	40	3	12/28/04 14:31	0.346	51.40	0.00	0.00	1.42	6,760	Duplicate.
299-W18-249/ 130 ft	40	3	01/19/05 14:12	0.147	52.20	0.00	0.00	1.56	10,200	
299-W18-249/ 130 ft	40	3	02/24/05 15:36	-0.431	33.70	0.00	0.00	0.00	11,800	
299-W18-249/ 130 ft	40	3	03/18/05 14:30	0.314	64.90	0.00	0.00	1.80	6,920	
299-W18-249/ 130 ft	40	3	05/05/05 16:12	0.209	55.30	1.06	1.27	1.91	11,900	
299-W18-249/ 130 ft	40	3	05/26/05 14:21	0.247	36.50	1.24	1.94	1.97	7,950	
299-W18-249/ 130 ft	40	3	06/23/05 16:15	0.207	36.80	1.19	2.55	2.32	11,700	
299-W18-248/131 ft	40	3	11/17/04 00:00							No tubing in well.

Table D-1. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-1A/216-Z-18/216-Z-12 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comments
299-W18-248/131 ft	40	3	12/28/04 00:00							No tubing in well.
299-W18-248/ 131 ft	40	3	01/19/05 00:00							No tubing in well.
299-W18-248/ 131 ft	40	3	02/24/05 11:34	0.022	70.50	1.00	0.00	1.16	6,610	
299-W18-248/ 131 ft	40	3	03/18/05 11:33	0.239	249.00	3.35	2.42	0.00	6,230	
299-W18-248/ 131 ft	40	3	05/05/05 11:49	0.154	173.00	2.14	1.70	2.38	11,700	
299-W18-248/ 131 ft	40	3	05/26/05 12:16	0.209	169.00	0.00	1.42	2.49	7,420	
299-W18-248/ 131 ft	40	3	06/23/05 13:01	0.022	155.00	1.09	1.57	3.16	8,920	

NOTE: Concentrations recorded in this table as 0.0 ppmv were measured as < 1.0 ppmv.
bgs = below ground surface
CCl_4 = carbon tetrachloride
ppmv = parts per million by volume
SVE = soil vapor extraction

Table D-2. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-9 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-4E / 25 ft	8	2	05/05/05 13:40	0.025	2.37	1.0 U	1.0 U	2.33	12,800	
CPT-4E / 25 ft	8	2	05/26/05 12:48	0.040	1.94	1.0 U	1.0 U	1.58	8,010	
CPT-4E / 25 ft	8	2	06/23/05 14:12	0.027	1.82	1.0 U	1.0 U	2.47	9,080	
CPT-4E / 25 ft	8	2	08/04/05 11:35	0.015	1.48	1.0 U	1.09	2.46	7,970	
CPT-4E / 25 ft	8	2	08/19/05 10:32	0.002	1.28	1.0 U	1.0 U	1.60	10,200	
CPT-4E / 25 ft	8	2	08/19/05 10:32	0.002	1.26	1.0 U	1.0 U	1.51	10,300	Duplicate.
CPT-4E / 25 ft	8	2	09/26/05 13:35	0.040	1.0 U	1.0 U	1.0 U	1.0 U	7,960	
CPT-32/ 25 ft	8	2	11/17/04 09:41	-0.005	1.0 U	1.0 U	1.0 U	1.0 U	7,410	
CPT-32/ 25 ft	8	2	12/28/04 13:20	0.025	1.70	1.0 U	1.0 U	1.0 U	7,110	
CPT-32/ 25 ft	8	2	01/19/05 11:36	0.012	2.70	1.0 U	1.0 U	1.35	8,760	
CPT-32/ 25 ft	8	2	02/24/05 11:47	0.017	5.49	1.0 U	1.0 U	1.52	6,700	
CPT-32/ 25 ft	8	2	03/18/05 12:36	0.025	8.01	1.0 U	1.0 U	1.85	6,530	
CPT-32/ 25 ft	8	2	05/05/05 13:07	0.020	8.62	1.0 U	1.0 U	3.69	11,700	
CPT-32/ 25 ft	8	2	05/26/05 12:27	0.030	6.55	1.0 U	1.0 U	1.54	7,320	
CPT-32/ 25 ft	8	2	06/23/05 13:55	0.020	6.76	1.0 U	1.04	2.21	8,950	
CPT-30/ 28 ft	9	2	11/17/04 09:45	-0.005	1.0 U	1.0 U	1.0 U	1.0 U	7,360	
CPT-30/ 28 ft	9	2	12/28/04 13:25	0.003	1.25	1.0 U	1.0 U	1.0 U	6,490	
CPT-30/ 28 ft	9	2	01/19/05 11:42	0.022	1.48	1.0 U	1.0 U	1.0 U	8,880	
CPT-30/ 28 ft	9	2	02/24/05 11:53	0.022	1.60	1.0 U	1.0 U	1.0 U	7,040	
CPT-30/ 28 ft	9	2	03/18/05 12:50	0.017	1.0 U	1.0 U	1.0 U	1.00	6,650	
CPT-30/ 28 ft	9	2	05/05/05 13:23	0.020	1.0 U	1.0 U	1.0 U	1.82	11,900	
CPT-30/ 28 ft	9	2	05/26/05 12:34	0.020	1.0 U	1.0 U	1.0 U	1.44	7,270	
CPT-30/ 28 ft	9	2	06/23/05 14:05	0.022	1.0 U	1.0 U	1.04	2.14	9,410	
CPT-30/ 28 ft	9	2	06/23/05 13:55	0.020	1.0 U	1.0 U	1.11	2.24	8,850	Duplicate.
CPT-13A/ 30 ft	9	2	11/17/04 13:19	0.017	3.03	1.0 U	1.0 U	1.0 U	11,300	
CPT-13A/ 30 ft	9	2	12/28/04 14:19	0.015	1.0 U	1.0 U	1.0 U	1.0 U	6,530	
CPT-13A/ 30 ft	9	2	01/19/05 14:05	0.010	7.12	1.0 U	1.0 U	1.0 U	8,770	

Table D-2. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-9 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-13A/ 30 ft	9	2	02/24/05 15:28	0.027	2.48	1.0 U	1.0 U	1.0 U	8,670	
CPT-13A/ 30 ft	9	2	03/18/05 14:24	0.045	8.27	1.0 U	1.0 U	1.0 U	6,810	
CPT-13A/ 30 ft	9	2	05/05/05 15:42	0.005	6.63	1.0 U	1.0 U	1.02	13,600	
CPT-13A/ 30 ft	9	2	05/26/05 14:27	0.035	1.52	1.0 U	1.0 U	1.0 U	8,610	
CPT-13A/ 30 ft	9	2	06/23/05 16:05	0.037	3.56	1.0 U	1.0 U	1.35	11,600	
CPT-13A/ 30 ft	9	2	08/04/05 15:25	0.045	3.87	1.0 U	1.03	1.99	10,000	
CPT-13A/ 30 ft	9	2	08/19/05 13:55	0.030	3.33	1.0 U	1.0 U	1.0 U	12,300	
CPT-13A/ 30 ft	9	2	09/26/05 17:30	0.020	3.15	1.0 U	1.0 U	1.0 U	9,590	
CPT-7A/ 32 ft	10	2	11/17/04 10:05	0.000	1.53	1.0 U	1.0 U	1.0 U	7,680	
CPT-7A/ 32 ft	10	2	12/28/04 12:54	0.032	2.19	1.0 U	1.0 U	1.0 U	6,550	
CPT-7A/ 32 ft	10	2	01/19/05 11:17	0.022	3.93	1.0 U	1.0 U	1.0 U	8,740	
CPT-7A/ 32 ft	10	2	02/24/05 11:12	0.017	2.90	1.0 U	1.0 U	1.0 U	6,480	
CPT-7A/ 32 ft	10	2	03/18/05 11:07	0.025	4.38	1.0 U	1.0 U	1.0 U	6,110	
CPT-7A/ 32 ft	10	2	05/05/05 11:30	0.015	3.20	1.0 U	1.0 U	1.01	12,000	
CPT-7A/ 32 ft	10	2	05/05/05 11:30	0.015	3.13	1.0 U	1.0 U	1.13	12,100	Duplicate.
CPT-7A/ 32 ft	10	2	05/26/05 12:11	0.027	2.57	1.0 U	1.0 U	1.0 U	7,840	
CPT-7A/ 32 ft	10	2	06/23/05 12:42	0.022	2.44	1.0 U	1.44	1.93	8,700	
CPT-7A/ 32 ft	10	2	08/04/05 11:25	0.012	2.34	1.0 U	1.93	1.87	8,100	
CPT-7A/ 32 ft	10	2	08/19/05 10:26	0.000	2.19	1.0 U	1.0 U	1.0 U	10,500	
CPT-7A/ 32 ft	10	2	09/26/05 12:58	0.037	2.09	1.0 U	1.0 U	1.0 U	7,830	
CPT-7A/ 32 ft	10	2	09/26/05 12:58	0.037	1.98	1.0 U	1.0 U	1.0 U	7,870	Duplicate.
CPT-1A/ 35 ft	11	2	011/17/04 09:55	-0.002	4.73	1.0 U	1.0 U	1.0 U	7,620	
CPT-1A/ 35 ft	11	2	12/28/04 13:36	0.000	14.00	1.0 U	1.0 U	1.33	7,610	
CPT-1A/ 35 ft	11	2	01/09/05 11:48	0.005	13.20	1.45	1.0 U	1.01	8,720	
CPT-1A/ 35 ft	11	2	02/24/05 12:00	0.032	11.30	1.39	1.0 U	1.04	6,960	
CPT-1A/ 35 ft	11	2	03/18/05 12:58	0.032	4.31	1.0 U	1.0 U	1.03	6,160	
CPT-1A/ 35 ft	11	2	05/05/05 14:29	0.020	6.02	1.10	1.0 U	1.87	12,700	
CPT-1A/ 35 ft	11	2	05/26/05 12:55	0.012	11.10	1.48	1.0 U	2.31	7,940	

Table D-2. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-9 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-1A/ 35 ft	11	2	06/23/05 14:24	0.045	9.16	1.34	1.18	2.62	9,380	
CPT-1A/ 35 ft	11	2	08/04/05 11:42	0.022	6.57	1.27	1.77	2.57	7,920	
CPT-1A/ 35 ft	11	2	08/04/05 11:42	0.022	6.64	1.03	1.73	2.80	7,930	Duplicate.
CPT-1A/ 35 ft	11	2	08/19/05 10:36	0.007	6.59	1.0 U	1.0 U	1.90	10,100	
CPT-1A/ 35 ft	11	2	09/26/05 13:40	0.050	9.21	1.0 U	1.0 U	1.15	7,840	
CPT-33/ 40 ft	12	2	05/05/05 15:46	0.005	3.93	1.0 U	1.0 U	3.27	13,600	
CPT-33/ 40 ft	12	2	05/26/05 14:15	0.045	1.11	1.0 U	1.0 U	2.71	7,990	
CPT-33/ 40 ft	12	2	06/23/05 16:19	0.037	1.90	1.0 U	1.16	3.12	12,100	
CPT-34/ 40 ft	12	2	05/05/05 15:52	0.030	2.97	1.0 U	1.0 U	1.98	12,700	
CPT-34/ 40 ft	12	2	05/26/05 14:11	0.045	1.10	1.0 U	1.0 U	1.03	7,970	
CPT-34/ 40 ft	12	2	06/23/05 16:10	0.045	1.87	1.0 U	1.22	1.56	11,300	
CPT-34/ 40 ft	12	2	08/04/05 15:30	0.040	1.95	1.0 U	1.01	1.68	10,300	
CPT-34/ 40 ft	12	2	8/19/05 1 4:01	0.035	1.71	1.0 U	1.0 U	1.0 U	12,700	
CPT-34/ 40 ft	12	2	09/26/05 17:47	0.017	1.38	1.0 U	1.0 U	1.0 U	9,790	
CPT-3872 / 61 ft	19	2	11/17/04 09:05	-0.115	1.14	1.0 U	1.0 U	1.0 U	7,390	
CPT-3872/ 61 ft	19	2	01/19/05 11:24	0.045	5.93	1.0 U	1.0 U	1.39	8,740	
CPT-3872/ 61 ft	19	2	02/24/05 11:17	0.015	7.56	1.0 U	1.0 U	1.12	6,390	
CPT-3872/ 61 ft	19	2	03/18/05 11:11	0.085	9.91	1.0 U	1.0 U	1.45	6,220	
CPT-3872/ 61 ft	19	2	05/05/05 11:37	0.055	11.80	1.0 U	1.0 U	3.21	12,200	
CPT-3872/ 61 ft	19	2	05/26/05 12:21	0.107	14.60	1.0 U	1.0 U	2.47	7,540	
CPT-3872/ 61 ft	19	2	06/23/05 12:54	0.057	15.50	1.0 U	1.29	3.11	8,970	
CPT-1A/ 68 ft	21	2	05/05/05 14:31	0.025	6.23	1.0 U	1.0 U	1.93	12,800	
CPT-1A/ 68 ft	21	2	05/26/05 12:59	0.095	13.70	1.23	1.0 U	2.40	8,040	
CPT-1A/ 68 ft	21	2	06/23/05 14:27	0.080	1.97	1.0 U	1.0 U	1.63	8,730	
CPT-32/ 70 ft	21	2	05/05/05 13:10	0.107	5.48	1.0 U	1.0 U	3.07	12,000	
CPT-32/ 70 ft	21	2	05/26/05 12:30	0.107	3.36	1.0 U	1.0 U	2.28	7,290	
CPT-32/ 70 ft	21	2	06/23/05 14:00	0.085	4.54	1.0 U	1.38	3.75	9,200	
299-W18-152/ 101 ft	31	2	11/17/04 09:51	-0.132	10.40	1.0 U	1.0 U	1.72	7,730	

Table D-2. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-9 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W18-152/ 101 ft	31	2	01/19/05 12:05	0.075	14.60	1.0 U	1.0 U	1.93	9,100	
299-W18-152/ 101 ft	31	2	01/19/05 12:05	0.075	14.60	1.0 U	1.0 U	2.09	9,090	Duplicate.
299-W18-152/ 101 ft	31	2	02/24/05 12:09	0.072	13.30	1.0 U	1.0 U	1.60	7,050	
299-W18-152/ 101 ft	31	2	03/18/05 13:03	0.207	16.00	1.0 U	1.0 U	1.80	6,590	
299-W18-152/ 101 ft	31	2	05/05/05 14:37	0.167	14.80	1.0 U	1.0 U	2.87	12,600	
299-W18-152/ 101 ft	31	2	05/26/05 13:07	0.199	13.20	1.0 U	1.0 U	3.23	7,670	
299-W18-152/ 101 ft	31	2	06/23/05 14:32	0.152	13.40	1.0 U	1.23	2.89	9,260	
299-W18-167/ 106 ft	32	2	11/17/04 00:00							Hooked up to SVE; no tubing in well.
299-W18-167/ 106 ft	32	2	12/28/04 00:00							Hooked up to SVE; no tubing in well.
299-W18-167/ 106 ft	32	3	01/19/05 00:00							No tubing in well.
299-W18-167/ 106 ft	32	3	02/24/05 12:39	0.087	37.40	1.0 U	1.0 U	2.08	7,410	
299-W18-167/ 106 ft	32	3	02/24/05 12:39	0.087	37.40	1.0 U	1.0 U	2.06	7,430	Duplicate.
299-W18-167/ 106 ft	32	3	03/18/05 11:45	0.179	20.40	1.52	1.59	1.15	6,160	
299-W18-167/ 106 ft	32	3	05/05/05 13:01	0.172	26.70	1.0 U	1.28	2.79	12,100	
299-W18-167/ 106 ft	32	3	05/26/05 11:45	0.137	20.20	1.25	1.38	2.11	6,980	
299-W18-167/ 106 ft	32	3	06/23/05 13:15	0.085	196.00	1.60	2.04	5.69	8,930	
CPT-4F / 109 ft	33	3	05/05/05 14:20	0.199	7.80	1.0 U	1.0 U	2.56	12,000	Difficult to sample; low flow.
CPT-4F / 109 ft	33	3	05/26/05 12:42	0.169	7.72	1.0 U	1.0 U	1.43	7,380	Difficult to sample; low flow.
CPT-4F / 109 ft	33	3	05/26/05 12:42	0.169	8.60	1.0 U	1.0 U	1.82	7,970	Duplicate.
CPT-4F / 109 ft	33	3	06/23/05 14:18	0.122	11.90	1.0 U	1.10	2.20	9,590	

Table D-2. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-9 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W18-165/ 109 ft	33	3	11/17/04 00:00							Hooked up to SVE; no tubing in well.
299-W18-165/ 109 ft	33	3	12/28/04 00:00							Hooked up to SVE; no tubing in well.
299-W18-165/ 109 ft	33	3	01/19/05 00:00							No tubing in well.
299-W18-165/ 109 ft	33	3	02/24/05 12:54	0.117	35.20	1.0 U	1.0 U	2.71	7,700	
299-W18-165/ 109 ft	33	3	03/18/05 12:03	0.194	15.00	1.0 U	1.0 U	1.82	6,310	
299-W18-165/ 109 ft	33	3	03/18/05 12:03	0.194	15.00	1.0 U	1.0 U	1.78	6,360	Duplicate.
299-W18-165/ 109 ft	33	3	05/05/05 12:56	0.162	22.20	1.13	1.0 U	3.52	11,800	
299-W18-165/ 109 ft	33	3	05/26/05 11:39	0.125	30.80	1.0 U	1.0 U	3.77	7020	
299-W18-165/ 109 ft	33	3	06/23/05 13:17	0.030	10.40	1.0 U	1.15	2.35	8,240	
299-W18-249/ 130 ft	40	3	11/17/04 00:00							No tubing in well.
299-W18-249/ 130 ft	40	3	12/28/04 14:31	0.346	51.50	1.0 U	1.0 U	1.13	6,760	
299-W18-249/ 130 ft	40	3	12/28/04 14:31	0.346	51.40	1.0 U	1.0 U	1.42	6,760	Duplicate.
299-W18-249/ 130 ft	40	3	01/19/05 14:12	0.147	52.20	1.0 U	1.0 U	1.56	10,200	
299-W18-249/ 130 ft	40	3	02/24/05 15:36	-0.431	33.70	1.0 U	1.0 U	1.0 U	11,800	
299-W18-249/ 130 ft	40	3	03/18/05 14:30	0.314	64.90	1.0 U	1.0 U	1.80	6,920	
299-W18-249/ 130 ft	40	3	05/05/05 16:12	0.209	55.30	1.06	1.27	1.91	11,900	
299-W18-249/ 130 ft	40	3	05/26/05 14:21	0.247	36.50	1.24	1.94	1.97	7,950	
299-W18-249/ 130 ft	40	3	06/23/05 16:15	0.207	36.80	1.19	2.55	2.32	11,700	
299-W18-248/131 ft	40	3	11/17/04 00:00							No tubing in well.
299-W18-248/131 ft	40	3	12/28/04 00:00							No tubing in well.
299-W18-248/ 131 ft	40	3	01/19/05 00:00							No tubing in well.

Table D-2. Monitoring Data for Non-Operational Wells and Probes at the 216-Z-9 Site. (6 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W18-248/ 131 ft	40	3	02/24/05 11:34	0.022	70.50	1.00	1.0 U	1.16	6,610	
299-W18-248/ 131 ft	40	3	03/18/05 11:33	0.239	249.00	3.35	2.42	1.0 U	6,230	
299-W18-248/ 131 ft	40	3	05/05/05 11:49	0.154	173.00	2.14	1.70	2.38	11,700	
299-W18-248/ 131 ft	40	3	05/26/05 12:16	0.209	169.00	1.0 U	1.42	2.49	7,420	
299-W18-248/ 131 ft	40	3	06/23/05 13:01	0.022	155.00	1.09	1.57	3.16	8,920	

bgs = below ground surface
CCl_4 = carbon tetrachloride
ppmv = parts per million by volume

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-17/ 10 ft	3	2	11/17/04 13:03	0.007	5.49	0.00	0.00	1.07	10,600	
CPT-17/ 10 ft	3	2	11/17/04 13:03	0.007	5.47	0.00	0.00	1.17	10,000	Duplicate.
CPT-17/ 10 ft	3	2	12/28/04 14:56	0.002	5.31	0.00	0.00	0.00	6,830	
CPT-17/ 10 ft	3	2	01/19/05 13:50	0.007	6.39	0.00	0.00	1.43	10,400	
CPT-17/ 10 ft	3	2	02/24/05 14:43	0.012	7.10	0.00	0.00	0.00	7,470	
CPT-17/ 10 ft	3	2	03/18/05 14:06	0.015	11.40	0.00	0.00	1.87	6,670	
CPT-17/ 10 ft	3	2	08/04/05 13:37	0.027	2.45	1.03	2.11	2.00	8,450	
CPT-17/ 10 ft	3	2	08/19/05 13:37	0.007	2.09	0.00	0.00	0.00	12,800	
CPT-17/ 10 ft	3	2	09/26/05 00:00							External tubing destroyed; unable to sample.
CPT-18/ 15 ft	5	2	11/17/04 12:47	0.002	0.00	0.00	0.00	0.00	9,860	
CPT-18/ 15 ft	5	2	12/28/04 14:42	0.030	1.46	0.00	0.00	1.02	7,240	
CPT-18/ 15 ft	5	2	01/19/05 13:42	0.010	3.10	0.00	0.00	0.00	10,600	
CPT-18/ 15 ft	5	2	02/24/05 13:36	0.032	0.00	0.00	0.00	0.00	7,640	
CPT-18/ 15 ft	5	2	03/18/05 13:31	0.020	0.00	0.00	0.00	0.00	6,630	
CPT-18/ 15 ft	5	2	08/04/05 13:19	0.035	0.00	0.00	1.89	1.96	9,730	
CPT-18/ 15 ft	5	2	08/19/05 13:21	0.010	0.00	0.00	0.00	0.00	10,100	
CPT-18/ 15 ft	5	2	09/26/05 16:52	0.022	0.00	0.00	0.00	0.00	7,700	
CPT-16/ 25 ft	8	2	11/17/04 11:06	0.007	1.13	0.00	0.00	0.00	8,030	
CPT-16/ 25 ft	8	2	12/28/04 15:23	0.012	4.36	0.00	0.00	0.00	6,870	
CPT-16/ 25 ft	8	2	01/19/05 12:51	0.015	2.30	0.00	0.00	0.00	9,950	
CPT-16/ 25 ft	8	2	02/24/05 13:51	0.015	1.99	0.00	0.00	0.00	7,480	
CPT-16/ 25 ft	8	2	03/18/05 13:22	0.030	1.99	0.00	0.00	0.00	6,600	
CPT-16/ 25 ft	8	2	08/04/05 00:00	0.017	1.20	0.00	2.08	1.94	8,090	
CPT-16/ 25 ft	8	2	08/19/05 10:55	0.010	1.01	0.00	0.00	0.00	10,000	
CPT-16/ 25 ft	8	2	09/26/05 14:09	0.035	1.24	0.00	0.00	0.00	7,980	
CPT-27/ 33 ft	10	2	11/17/04 11:16	0.005	1.33	0.00	0.00	0.00	8,190	
CPT-27/ 33 ft	10	2	12/28/04 15:18	0.012	8.41	0.00	0.00	0.00	6,870	
CPT-27/ 33 ft	10	2	01/19/05 13:01	0.007	2.20	0.00	0.00	1.75	10,100	

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-27/ 33 ft	10	2	02/24/05 14:45	0.100	3.22	0.00	0.00	1.85	7,300	
CPT-27/ 33 ft	10	2	03/18/05 13:39	0.032	2.23	0.00	0.00	1.19	6,630	
CPT-27/ 33 ft	10	2	08/04/05 12:56	0.037	1.21	0.00	1.49	1.92	8,470	
CPT-27/ 33 ft	10	2	08/19/05 11:49	0.022	1.02	0.00	0.00	0.00	11,100	
CPT-27/ 33 ft	10	2	09/26/05 16:02	0.037	1.00	0.00	0.00	0.00	8,300	
CPT-28/ 40 ft	12	2	05/05/05 15:28	0.040	68.30	0.00	0.00	2.99	13,000	
CPT-28/ 40 ft	12	2	05/26/05 14:47	0.070	68.00	0.00	0.00	2.44	8,630	
CPT-28/ 40 ft	12	2	06/23/05 15:53	0.035	5.40	0.00	0.00	0.00	11,500	
CPT-21A/ 45 ft	14	2	05/26/05 14:34	0.110	153.00	0.00	1.09	4.81	8,420	
CPT-21A/ 45 ft	14	2	06/23/05 15:43	0.030	7.89	0.00	1.31	1.30	12,100	
CPT-21A/ 45 ft	14	2	08/04/05 15:09	0.120	167.00	0.00	1.47	4.66	11,200	
CPT-21A/ 45 ft	14	2	08/19/05 13:42	0.037	153.00	0.00	0.00	2.90	12,300	
CPT-21A/ 45 ft	14	2	09/26/05 17:11	0.137	147.00	0.00	0.00	3.27	9,470	
CPT-9A/ 50 ft	15	2	11/17/04 10:44	-0.095	39.40	0.00	0.00	4.01	11,900	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled..
CPT-9A/ 50 ft	15	2	12/28/04 12:42	0.012	48.40	0.00	0.00	4.22	6,460	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	01/19/05 10:52	-0.090	48.40	0.00	0.00	3.97	8,160	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	02/24/05 10:51	0.002	46.40	0.00	0.00	3.96	6,110	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-9A/ 50 ft	15	2	03/18/05 10:45	0.122	50.80	0.00	0.00	4.56	6,260	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	05/05/05 10:57	0.090	50.30	0.00	1.39	5.31	12,000	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	05/26/05 12:02	0.159	53.90	0.00	1.57	5.09	7,270	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	06/23/05 12:12	0.070	49.70	0.00	1.78	5.33	8,080	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	08/04/05 11:17	0.022	50.60	1.16	2.65	5.92	8,120	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	08/19/05 10:12	-0.085	44.00	0.00	0.00	4.46	10,200	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	09/26/05 12:36	0.164	51.80	0.00	0.00	4.09	7,800	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 60 ft	18	2	11/17/04 10:39	0.002	32.40	0.00	0.00	2.75	8,930	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	12/28/04 12:27	0.010	27.50	0.00	0.00	2.40	6,450	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-9A/ 60 ft	18	2	01/19/05 10:45	-0.005	29.20	0.00	0.00	2.65	8,100	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	02/24/05 10:35	0.005	30.60	0.00	0.00	2.06	6,370	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	03/18/05 10:40	0.032	30.70	0.00	0.00	2.76	6,290	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	05/05/05 10:52	0.020	11.60	0.00	0.00	1.82	11,900	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	05/26/05 11:54	0.060	31.80	0.00	0.00	2.84	7,300	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	06/23/05 12:08	0.047	30.50	0.00	1.17	3.38	9,010	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	08/04/05 11:09	0.015	18.30	0.00	1.49	2.85	7,880	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	08/19/05 10:08	-0.005	18.00	0.00	0.00	2.09	9,900	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	09/26/05 12:33	0.052	29.20	0.00	0.00	2.53	7,660	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/60 ft tube depth confirmed and sampled.

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-28/ 60 ft	18	2	06/23/05 15:56	0.075	60.00	0.00	0.00	2.49	11,700	
CPT-9A/ 64 ft	20	2	11/17/04 10:58	0.002	20.10	0.00	0.00	2.48	9,890	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	12/28/04 12:36	0.002	2.84	0.00	0.00	0.00	6,140	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	01/19/05 10:55	0.017	26.10	0.00	0.00	3.08	8,480	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	02/24/05 10:57	0.002	19.80	0.00	0.00	1.71	6,590	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	03/18/05 10:50	0.080	35.40	0.00	0.00	3.23	6,430	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled. CPT-9A/64 ft is still difficult to sample (low flow).
CPT-9A/ 64 ft	20	2	05/05/05 11:04	0.057	31.50	0.00	0.00	3.56	12,100	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	05/26/05 11:58	0.122	39.10	0.00	1.04	3.55	7,310	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	06/23/05 12:17	0.025	36.80	0.00	1.43	4.16	8,950	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-9A/ 64 ft	20	2	08/04/05 11:13	0.027	38.30	0.00	2.23	4.98	8,240	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	08/19/05 10:16	-0.047	36.60	0.00	0.00	3.72	10,400	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	09/26/05 12:39	0.122	38.60	0.00	0.00	3.49	7,940	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-16/ 65 ft	20	2	11/17/04 11:03	-0.012	3.52	0.00	0.00	0.00	8,550	
CPT-16/ 65 ft	20	2	12/28/04 15:25	0.072	6.72	0.00	0.00	0.00	7,240	
CPT-16/ 65 ft	20	2	01/19/05 12:54	0.045	4.89	0.00	0.00	0.00	9,720	
CPT-16/ 65 ft	20	2	02/24/05 13:44	0.134	5.10	0.00	0.00	0.00	7,970	
CPT-16/ 65 ft	20	2	03/18/05 13:26	0.154	5.19	0.00	0.00	0.00	6,840	
CPT-16/ 65 ft	20	2	08/04/05 12:13	0.050	4.72	0.00	1.26	2.00	8,290	
CPT-16/ 65 ft	20	2	08/19/05 10:57	-0.032	4.25	0.00	0.00	0.00	10,900	
CPT-16/ 65 ft	20	2	09/26/05 14:12	0.219	5.51	0.00	0.00	0.00	8,110	
CPT-21A/ 65 ft	20	2	11/17/04 13:08	0.020	79.90	0.00	0.00	3.33	12,000	
CPT-21A/ 65 ft	20	2	12/28/04 15:07	0.172	146.00	0.00	0.00	3.75	7,020	
CPT-21A/ 65 ft	20	2	01/19/05 13:08	0.062	143.00	0.00	0.00	3.76	9,780	
CPT-21A/ 65 ft	20	2	02/24/05 14:51	0.130	161.00	0.00	0.00	3.17	9,390	
CPT-21A/ 65 ft	20	2	03/18/05 14:00	0.137	166.00	0.00	0.00	4.26	6,590	
CPT-21A/ 65 ft	20	2	05/05/05 15:17	0.082	170.00	0.00	0.00	4.60	13,300	

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-21A/ 65 ft	20	2	05/26/05 14:40	0.025	7.44	0.00	0.00	0.00	8,450	
CPT-21A/ 65 ft	20	2	06/23/05 15:46	0.112	147.00	0.00	0.00	4.27	12,100	
CPT-24/ 70 ft	21	2	08/04/05 12:00	0.057	3.91	1.24	2.31	5.35	8,270	
CPT-24/ 70 ft	21	2	08/19/05 10:49	-0.022	3.64	1.49	1.29	3.42	10,700	
CPT-24/ 70 ft	21	2	09/26/05 13:58	0.199	3.78	1.02	1.40	4.20	8,230	
CPT-18/ 75 ft	23	2	08/04/05 13:21	0.192	0.00	1.00	2.43	2.52	9,510	
CPT-18/ 75 ft	23	2	08/19/05 13:23	0.045	0.00	0.00	0.00	1.24	11,300	
CPT-18/ 75 ft	23	2	09/26/05 16:55	0.122	0.00	0.00	0.00	0.00	8,980	
299-W15-82/ 83 ft	25	2	11/17/04 00:00							Hooked up to SVE; no tubing in well.
299-W15-82/ 83 ft	25	2	12/28/04 00:00							Hooked up to SVE; no tubing in well.
299-W15-82/ 83 ft	25	2	01/19/05 00:00							No tubing in well.
299-W15-82/ 83 ft	25	2	02/24/05 14:32	0.204	95.80	1.09	0.00	6.19	8,430	
299-W15-82/ 83 ft	25	2	03/10/05 11:05	-0.055	30.60	2.52	0.00	1.95	10,800	Sampled on 03/10/05 prior to removal of tubing.
299-W15-82/ 83 ft	25	2	08/04/05 12:47	0.087	1.74	0.00	2.52	7.71	8,080	
299-W15-82/ 83 ft	25	2	08/19/05 11:39	0.022	4.94	1.09	0.00	7.32	17,100	
299-W15-82/ 83 ft	25	2	09/26/05 15:54	0.262	7.64	0.00	0.00	5.51	8,090	
CPT-21A/ 86 ft	26	2	11/17/04 13:12	0.020	179.00	0.00	0.00	4.28	11,800	
CPT-21A/ 86 ft	26	2	12/28/04 15:02	0.301	184.00	0.00	0.00	4.41	7,010	
CPT-21A/ 86 ft	26	2	01/19/05 13:12	0.100	191.00	1.06	0.00	3.95	9,740	

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-21A/ 86 ft	26	2	02/24/05 14:53	0.122	209.00	0.00	0.00	3.64	8,070	
CPT-21A/ 86 ft	26	2	03/18/05 13:58	0.234	208.00	0.00	0.00	4.59	6,740	
CPT-21A/ 86 ft	26	2	05/05/05 15:20	0.147	205.00	1.02	0.00	4.56	13,300	
CPT-21A/ 86 ft	26	2	05/26/05 14:43	0.194	204.00	0.00	0.00	4.04	8,480	
CPT-21A/ 86 ft	26	2	06/23/05 15:49	0.174	196.00	0.00	0.00	4.72	11,800	
CPT-21A/ 86 ft	26	2	08/04/05 15:13	0.187	223.00	0.00	1.31	5.40	11,000	
CPT-21A/ 86 ft	26	2	08/19/05 13:45	0.045	187.00	1.10	0.00	3.72	12,200	
CPT-21A/ 86 ft	26	2	09/26/05 17:14	0.269	209.00	0.00	0.00	3.67	9,350	
CPT-28/ 87 ft	27	2	11/17/04 13:15	0.035	231.00	1.47	0.00	2.84	12,400	
CPT-28/ 87 ft	27	2	12/28/04 15:10	0.306	223.00	0.00	0.00	3.71	7,080	
CPT-28/ 87 ft	27	2	01/19/05 13:56	0.105	227.00	1.20	0.00	3.10	9,650	
CPT-28/ 87 ft	27	2	02/24/05 15:23	0.179	245.00	1.27	0.00	2.45	9,470	
CPT-28/ 87 ft	27	2	03/18/05 14:18	0.239	246.00	0.00	0.00	4.35	6,950	
CPT-28/ 87 ft	27	2	05/05/05 15:35	0.149	244.00	1.06	0.00	4.15	13,400	
CPT-28/ 87 ft	27	2	05/26/05 14:50	0.197	238.00	1.12	0.00	3.57	8,990	
CPT-28/ 87 ft	27	2	06/23/05 15:59	0.192	232.00	0.00	0.00	4.73	12,200	
CPT-28/ 87 ft	27	2	08/04/05 15:19	0.187	245.00	0.00	1.03	5.37	11,200	
CPT-28/ 87 ft	27	2	08/19/05 13:50	0.055	216.00	1.05	0.00	3.33	13,900	
CPT-28/ 87 ft	27	2	09/26/05 17:24	0.254	230.00	1.11	0.00	3.03	9,660	
299-W15-8U/ 103 ft	31	2	08/04/05 13:09	0.042	0.00	0.00	1.80	1.97	7,920	
299-W15-8U/ 103 ft	31	2	08/19/05 13:11	-0.110	1.27	0.00	1.08	1.93	8,990	

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W15-8U/ 103 ft	31	2	09/26/05 16:39	0.618	6.81	1.05	0.00	1.62	8,000	
299-W15-217 /114 ft	35	3	01/19/05 00:00							No tubing in well.
299-W15-217 /114 ft	35	3	02/24/05 15:11	0.162	39.60	0.00	0.00	1.22	7,890	
299-W15-217 /114 ft	35	3	03/18/05 14:12	0.239	374.00	2.12	0.00	2.86	7,020	
299-W15-217 /114 ft	35	3	08/04/05 13:14	0.057	11.20	0.00	1.35	3.03	8,190	
299-W15-217 /114 ft	35	3	08/19/05 13:16	0.032	0.00	0.00	0.00	1.26	9,460	
299-W15-217 /114 ft	35	3	09/26/05 16:45	0.130	15.90	0.00	0.00	1.69	8,150	
CPT-24/ 118 ft	36	3	08/04/05 12:03	0.067	20.40	0.00	1.69	5.22	8,410	
CPT-24/ 118 ft	36	3	08/19/05 10:47	-0.105	14.70	0.00	0.00	3.85	11,200	
CPT-24/ 118 ft	36	3	09/26/05 14:01	0.364	23.90	0.00	0.00	4.57	8,240	
299-W15-220SST / 118 ft	36	3	08/04/05 13:29	-0.015	23.10	0.00	1.98	3.19	8,070	
299-W15-220SST/ 118 ft	36	3	08/19/05 11:11	-0.229	21.30	0.00	0.00	1.81	10,200	
299-W15-220SST/ 118 ft	36	3	09/26/05 14:18	0.466	25.20	0.00	0.00	1.68	8,250	
299-W15-95L/ 144 ft	44	4	11/17/04 00:00							Hooked up to SVE; no tubing in well.
299-W15-95L/ 144 ft	44	4	12/28/04 00:00							Hooked up to SVE; no tubing in well.
299-W15-95L/ 144 ft	44	4	01/19/05 00:00							No tubing in well.
299-W15-95L/ 144 ft	44	4	02/24/05 14:24	0.237	26.70	0.00	0.00	4.77	7,780	

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W15-95L/ 144 ft	44	4	03/18/05 13:49	0.553	24.80	0.00	0.00	3.68	6,650	
299-W15-95L/ 144 ft	44	4	08/04/05 12:35	-0.002	2.37	0.00	2.26	3.75	8,040	
299-W15-95L/ 144 ft	44	4	08/19/05 11:24	-0.209	15.90	0.00	0.00	5.76	10,400	
299-W15-95L/ 144 ft	44	4	09/26/05 15:44	0.565	15.80	0.00	0.00	5.25	7,890	
299-W15-220/ 163 ft	50	5	08/04/05 13:23	0.005	13.20	1.02	1.95	2.21	8,170	
299-W15-220/ 163 ft	50	5	08/19/05 11:06	-0.192	12.90	0.00	0.00	2.00	10,300	
299-W15-220/ 163 ft	50	5	09/26/05 14:16	0.433	12.00	0.00	0.00	1.59	8,260	
299-W15-219L/ 175 ft	53	5	08/04/05 13:27	0.042	0.00	0.00	2.21	2.96	9,110	
299-W15-219L/ 175 ft	53	5	08/19/05 13:29	0.010	0.00	0.00	0.00	1.26	9,200	
299-W15-219L/ 175 ft	53	5	09/26/05 17:00	0.204	1.92	0.00	0.00	1.22	8,700	
299-W15-9L/ 176 ft	54	6	11/17/04 00:00							Hooked up to SVE; no tubing in well.
299-W15-9L/ 176 ft	54	6	12/28/04 00:00							Hooked up to SVE; no tubing in well.
299-W15-9L/ 176 ft	54	6	01/19/05 00:00							Hooked up to SVE; no tubing in well.
299-W15-9L/ 176 ft	54	6	02/24/05 14:22	0.239	2.12	3.79	3.27	0.00	7,960	
299-W15-9L/ 176 ft	54	6	03/18/05 13:47							Unable to sample. Tubing had to be removed before the sample could be taken.
299-W15-9L/ 176 ft	54	6	08/04/05 12:40	0.022	0.00	0.00	1.19	2.07	7,850	

Table D-3. Carbon Tetrachloride Concentration Standard Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W15-9L/ 176 ft	54	6	08/19/05 11:32	-0.020	0.00	0.00	0.00	1.06	9,790	
299-W15-9L/ 176 ft	54	6	09/26/05 15:48	0.207	1.64	0.00	0.00	1.03	7,820	
299-W15-84L/ 180 ft	55	6	11/17/04 12:53	-0.451	22.00	0.00	0.00	3.71	11,300	
299-W15-84L/ 180 ft	55	6	12/28/04 14:49	0.418	18.00	0.00	0.00	3.56	6,930	
299-W15-84L/ 180 ft	55	6	01/19/05 13:35	0.384	22.00	0.00	0.00	3.87	9,500	
299-W15-84L/ 180 ft	55	6	02/24/05 15:03	0.187	16.10	0.00	1.75	2.96	8,460	
299-W15-84L/ 180 ft	55	6	03/10/05 11:20	-0.431	23.00	1.44	0.00	2.02	11,300	Sampled on 03/10/05 prior to removal of tubing.
299-W15-84L/ 180 ft	55	6	08/19/05 00:00							Unable to sample. Well in use by Vista Engineering.
299-W15-84L/ 180 ft	55	6	09/26/05 00:00							Unable to sample. Well in use by Vista Engineering.
299-W15-46 / 217 ft	66	6	08/04/05 14:50	0.012	0.00	0.00	1.50	1.75	11,900	
299-W15-46 / 217 ft	66	6	08/19/05 12:55	0.010	0.00	0.00	0.00	0.00	7,950	
299-W15-46 / 217 ft	66	6	09/26/05 16:20	0.386	1.87	0.00	0.00	0.00	8,620	

Note: Concentrations that are recorded in this table as 0.0 ppmv were measured as <1.0 ppmv.
bgs = below ground surface
CCl_4 = carbon tetrachloride
MEK = methyl ethyl ketone
ppmv = parts per million by volume
SVE = soil vapor extraction

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-17/ 10 ft	3	2	11/17/04 13:03	0.007	0.030	5.49	1.0 U	1.0 U	1.07	10,600	
CPT-17/ 10 ft	3	2	11/17/04 13:03	0.007	0.030	5.47	1.0 U	1.0 U	1.17	10,000	Duplicate.
CPT-17/ 10 ft	3	2	12/28/04 14:56	0.002	0.010	5.31	1.0 U	1.0 U	1.0 U	6,830	
CPT-17/ 10 ft	3	2	01/19/05 13:50	0.007	0.03	6.39	1.0 U	1.0 U	1.43	10,400	
CPT-17/ 10 ft	3	2	02/24/05 14:43	0.012	0.050	7.10	1.0 U	1.0 U	1.0 U	7,470	
CPT-17/ 10 ft	3	2	03/18/05 14:06	0.015	0.060	11.40	1.0 U	1.0 U	1.87	6,670	
CPT-17/ 10 ft	3	2	08/04/05 13:37	0.027	0.110	2.45	1.03	2.11	2.00	8,450	
CPT-17/ 10 ft	3	2	08/19/05 13:37	0.007	0.030	2.09	1.0 U	1.0 U	1.0 U	12,800	
CPT-17/ 10 ft	3	2	09/26/05 00:00								External tubing destroyed. Unable to sample.
CPT-18/ 15 ft	5	2	11/17/04 12:47	0.002	0.010	1.0 U	1.0 U	1.0 U	1.0 U	9,860	
CPT-18/ 15 ft	5	2	12/28/04 14:42	0.030	0.120	1.46	1.0 U	1.0 U	1.02	7,240	
CPT-18/ 15 ft	5	2	01/19/05 13:42	0.010	0.04	3.10	1.0 U	1.0 U	1.0 U	10,600	
CPT-18/ 15 ft	5	2	02/24/05 13:36	0.032	0.130	1.0 U	1.0 U	1.0 U	1.0 U	7,640	
CPT-18/ 15 ft	5	2	03/18/05 13:31	0.020	0.080	1.0 U	1.0 U	1.0 U	1.0 U	6,630	
CPT-18/ 15 ft	5	2	08/04/05 13:19	0.035	0.140	1.0 U	1.0 U	1.89	1.96	9,730	
CPT-18/ 15 ft	5	2	08/19/05 13:21	0.010	0.040	1.0 U	1.0 U	1.0 U	1.0 U	10,100	
CPT-18/ 15 ft	5	2	09/26/05 16:52	0.022	0.090	1.0 U	1.0 U	1.0 U	1.0 U	7,700	
CPT-16/ 25 ft	8	2	11/17/04 11:06	0.007	0.030	1.13	1.0 U	1.0 U	1.0 U	8,030	
CPT-16/ 25 ft	8	2	12/28/04 15:23	0.012	0.050	4.36	1.0 U	1.0 U	1.0 U	6,870	
CPT-16/ 25 ft	8	2	01/19/05 12:51	0.015	0.060	2.30	1.0 U	1.0 U	1.0 U	9,950	
CPT-16/ 25 ft	8	2	02/24/05 13:51	0.015	0.060	1.99	1.0 U	1.0 U	1.0 U	7,480	
CPT-16/ 25 ft	8	2	03/18/05 13:22	0.030	0.120	1.99	1.0 U	1.0 U	1.0 U	6,600	
CPT-16/ 25 ft	8	2	08/04/05 00:00	0.017	0.070	1.20	1.0 U	2.08	1.94	8,090	
CPT-16/ 25 ft	8	2	08/19/05 10:55	0.010	0.040	1.01	1.0 U	1.0 U	1.0 U	10,000	
CPT-16/ 25 ft	8	2	09/26/05 14:09	0.035	0.140	1.24	1.0 U	1.0 U	1.0 U	7,980	
CPT-27/ 33 ft	10	2	11/17/04 11:16	0.005	0.020	1.33	1.0 U	1.0 U	1.0 U	8,190	
CPT-27/ 33 ft	10	2	12/28/04 15:18	0.012	0.050	8.41	1.0 U	1.0 U	1.0 U	6,870	
CPT-27/ 33 ft	10	2	01/19/05 13:01	0.007	0.030	2.20	1.0 U	1.0 U	1.75	10,100	

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-27/ 33 ft	10	2	02/24/05 14:45	0.100	0.400	3.22	1.0 U	1.0 U	1.85	7,300	
CPT-27/ 33 ft	10	2	03/18/05 13:39	0.032	0.130	2.23	1.0 U	1.0 U	1.19	6,630	
CPT-27/ 33 ft	10	2	08/04/05 12:56	0.037	0.150	1.21	1.0 U	1.49	1.92	8,470	
CPT-27/ 33 ft	10	2	08/19/05 11:49	0.022	0.090	1.02	1.0 U	1.0 U	1.0 U	11,100	
CPT-27/ 33 ft	10	2	09/26/05 16:02	0.037	0.150	1.00	1.0 U	1.0 U	1.0 U	8,300	
CPT-28/ 40 ft	12	2	05/05/05 15:28	0.040	0.160	68.30	1.0 U	1.0 U	2.99	13,000	
CPT-28/ 40 ft	12	2	05/26/05 14:47	0.070	0.280	68.00	1.0 U	1.0 U	2.44	8,630	
CPT-28/ 40 ft	12	2	06/23/05 15:53	0.035	0.140	5.40	1.0 U	1.0 U	1.0 U	11,500	
CPT-21A/ 45 ft	14	2	05/26/05 14:34	0.110	0.440	153.00	1.0 U	1.09	4.81	8,420	
CPT-21A/ 45 ft	14	2	06/23/05 15:43	0.030	0.120	7.89	1.0 U	1.31	1.30	12,100	
CPT-21A/ 45 ft	14	2	08/04/05 15:09	0.120	0.480	167.00	1.0 U	1.47	4.66	11,200	
CPT-21A/ 45 ft	14	2	08/19/05 13:42	0.037	0.150	153.00	1.0 U	1.0 U	2.90	12,300	
CPT-21A/ 45 ft	14	2	09/26/05 17:11	0.137	0.550	147.00	1.0 U	1.0 U	3.27	9,470	
CPT-9A/ 50 ft	15	2	11/17/04 10:44	-0.095	-0.380	39.40	1.0 U	1.0 U	4.01	11,900	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	12/28/04 12:42	0.012	0.050	48.40	1.0 U	1.0 U	4.22	6,460	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	01/19/05 10:52	-0.090	-0.36	48.40	1.0 U	1.0 U	3.97	8,160	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	02/24/05 10:51	0.002	0.01	46.40	1.0 U	1.0 U	3.96	6,110	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	03/18/05 10:45	0.122	0.49	50.80	1.0 U	1.0 U	4.56	6,260	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-9A/ 50 ft	15	2	05/05/05 10:57	0.090	0.36	50.30	1.0 U	1.39	5.31	12,000	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	05/26/05 12:02	0.159	0.64	53.90	1.0 U	1.57	5.09	7,270	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	06/23/05 12:12	0.070	0.28	49.70	1.0 U	1.78	5.33	8,080	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	08/04/05 11:17	0.022	0.09	50.60	1.16	2.65	5.92	8,120	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	08/19/050 10:12	-0.085	-0.34	44.00	1.0 U	1.0 U	4.46	10,200	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 50 ft	15	2	09/26/05 012:36	0.164	0.66	51.80	1.0 U	1.0 U	4.09	7,800	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 50 ft and sampled.
CPT-9A/ 60 ft	18	2	11/17/04 010:39	0.002	0.01	32.40	1.0 U	1.0 U	2.75	8,930	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	12/28/04 012:27	0.010	0.040	27.50	1.0 U	1.0 U	2.40	6,450	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	01/19/05 010:45	-0.005	-0.020	29.20	1.0 U	1.0 U	2.65	8,100	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-9A/ 60 ft	18	2	02/24/05 010:35	0.005	0.020	30.60	1.0 U	1.0 U	2.06	6,370	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	03/18/05 010:40	0.032	0.130	30.70	1.0 U	1.0 U	2.76	6,290	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	05/05/05 010:52	0.020	0.08	11.60	1.0 U	1.0 U	1.82	11,900	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	05/26/05 11:54	0.060	0.24	31.80	1.0 U	1.0 U	2.84	7,300	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	06/23/05 12:08	0.047	0.190	30.50	1.0 U	1.17	3.38	9,010	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	08/04/05 11:09	0.015	0.06	18.30	1.0 U	1.49	2.85	7,880	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	08/19/05 10:08	-0.005	-0.020	18.00	1.0 U	1.0 U	2.09	9,900	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-9A/ 60 ft	18	2	09/26/05 12:33	0.052	0.210	29.20	1.0 U	1.0 U	2.53	7,660	CPT-9A tubing (all three depths) cut off by construction vehicle. CPT-9A/ 60 ft tube depth confirmed and sampled.
CPT-28/ 60 ft	18	2	06/23/05 15:56	0.075	0.300	60.00	1.0 U	1.0 U	2.49	11,700	

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-9A/ 64 ft	20	2	11/17/04 10:58	0.002	0.010	20.10	1.0 U	1.0 U	2.48	9,890	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	12/28/04 12:36	0.002	0.010	2.84	1.0 U	1.0 U	1.0 U	6,140	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	01/19/05 10:55	0.017	0.070	26.10	1.0 U	1.0 U	3.08	8,480	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	02/24/05 10:57	0.002	0.010	19.80	1.0 U	1.0 U	1.71	6,590	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	03/18/05 10:50	0.080	0.320	35.40	1.0 U	1.0 U	3.23	6,430	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled. CPT-9A/ 64 ft is still difficult to sample (low flow).
CPT-9A/ 64 ft	20	2	05/05/05 11:04	0.057	0.23	31.50	1.0 U	1.0 U	3.56	12,100	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	05/26/05 11:58	0.122	0.49	39.10	1.0 U	1.04	3.55	7,310	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	06/23/05 12:17	0.025	0.1	36.80	1.0 U	1.43	4.16	8,950	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-9A/ 64 ft	20	2	08/04/05 11:13	0.027	0.11	38.30	1.0 U	2.23	4.98	8,240	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	08/19/05 10:16	-0.047	-0.19	36.60	1.0 U	1.0 U	3.72	10,400	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-9A/ 64 ft	20	2	09/26/05 12:39	0.122	0.49	38.60	1.0 U	1.0 U	3.49	7,940	CPT-9A tubing (all three depths) cut off by construction vehicle. One tube measured to depth of 64 ft and sampled.
CPT-16/ 65 ft	20	2	11/17/04 11:03	-0.012	-0.050	3.52	1.0 U	1.0 U	1.0 U	8,550	
CPT-16/ 65 ft	20	2	12/28/04 15:25	0.072	0.29	6.72	1.0 U	1.0 U	1.0 U	7,240	
CPT-16/ 65 ft	20	2	01/19/05 12:54	0.045	0.180	4.89	1.0 U	1.0 U	1.0 U	9,720	
CPT-16/ 65 ft	20	2	02/24/05 13:44	0.134	0.540	5.10	1.0 U	1.0 U	1.0 U	7,970	
CPT-16/ 65 ft	20	2	03/18/05 13:26	0.154	0.620	5.19	1.0 U	1.0 U	1.0 U	6,840	
CPT-16/ 65 ft	20	2	08/04/05 12:13	0.050	0.200	4.72	1.0 U	1.26	2.00	8,290	
CPT-16/ 65 ft	20	2	08/19/05 10:57	-0.032	-0.13	4.25	1.0 U	1.0 U	1.0 U	10,900	
CPT-16/ 65 ft	20	2	09/26/05 14:12	0.219	0.88	5.51	1.0 U	1.0 U	1.0 U	8,110	
CPT-21A/ 65 ft	20	2	11/17/04 13:08	0.020	0.080	79.90	1.0 U	1.0 U	3.33	12,000	
CPT-21A/ 65 ft	20	2	12/28/04 15:07	0.172	0.690	146.00	1.0 U	1.0 U	3.75	7,020	
CPT-21A/ 65 ft	20	2	01/19/05 13:08	0.062	0.250	143.00	1.0 U	1.0 U	3.76	9,780	
CPT-21A/ 65 ft	20	2	02/24/05 14:51	0.130	0.520	161.00	1.0 U	1.0 U	3.17	9,390	
CPT-21A/ 65 ft	20	2	03/18/05 14:00	0.137	0.550	166.00	1.0 U	1.0 U	4.26	6,590	
CPT-21A/ 65 ft	20	2	05/05/05 15:17	0.082	0.33	170.00	1.0 U	1.0 U	4.60	13,300	
CPT-21A/ 65 ft	20	2	05/26/05 14:40	0.025	0.100	7.44	1.0 U	1.0 U	1.0 U	8,450	
CPT-21A/ 65 ft	20	2	06/23/05 15:46	0.112	0.450	147.00	1.0 U	1.0 U	4.27	12,100	

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-24/ 70 ft	21	2	08/04/05 12:00	0.057	0.230	3.91	1.24	2.31	5.35	8,270	
CPT-24/ 70 ft	21	2	08/19/05 10:49	-0.022	-0.090	3.64	1.49	1.29	3.42	10,700	
CPT-24/ 70 ft	21	2	09/26/05 13:58	0.199	0.800	3.78	1.02	1.40	4.20	8,230	
CPT-18/ 75 ft	23	2	08/04/05 13:21	0.192	0.770	1.0 U	1.00	2.43	2.52	9,510	
CPT-18/ 75 ft	23	2	08/19/05 13:23	0.045	0.180	1.0 U	1.0 U	1.0 U	1.24	11,300	
CPT-18/ 75 ft	23	2	09/26/05 16:55	0.122	0.490	1.0 U	1.0 U	1.0 U	1.0 U	8,980	
299-W15-82/ 83 ft	25	2	11/17/04 00:00								Hooked up to SVE; no tubing in well.
299-W15-82/ 83 ft	25	2	12/28/04 00:00								Hooked up to SVE; no tubing in well.
299-W15-82/ 83 ft	25	2	01/19/05 00:00								No tubing in well.
299-W15-82/ 83 ft	25	2	02/24/05 14:32	0.204	0.82	95.80	1.09	1.0 U	6.19	8,430	
299-W15-82/ 83 ft	25	2	03/10/05 11:05	-0.055	-0.220	30.60	2.52	1.0 U	1.95	10,800	Sampled on 03/10/05 prior to removal of tubing.
299-W15-82/ 83 ft	25	2	08/04/05 12:47	0.087	0.350	1.74	1.0 U	2.52	7.71	8,080	
299-W15-82/ 83 ft	25	2	08/19/05 11:39	0.022	0.09	4.94	1.09	1.0 U	7.32	17,100	
299-W15-82/ 83 ft	25	2	09/26/05 15:54	0.262	1.050	7.64	1.0 U	1.0 U	5.51	8,090	
CPT-21A/ 86 ft	26	2	11/17/04 13:12	0.020	0.080	179.00	1.0 U	1.0 U	4.28	11,800	
CPT-21A/ 86 ft	26	2	12/28/04 15:02	0.301	1.21	184.00	1.0 U	1.0 U	4.41	7,010	
CPT-21A/ 86 ft	26	2	01/19/05 13:12	0.100	0.400	191.00	1.06	1.0 U	3.95	9,740	
CPT-21A/ 86 ft	26	2	02/24/05 14:53	0.122	0.490	209.00	1.0 U	1.0 U	3.64	8,070	
CPT-21A/ 86 ft	26	2	03/18/05 13:58	0.234	0.94	208.00	1.0 U	1.0 U	4.59	6,740	
CPT-21A/ 86 ft	26	2	05/05/05 15:20	0.147	0.59	205.00	1.02	1.0 U	4.56	13,300	
CPT-21A/ 86 ft	26	2	05/26/05 14:43	0.194	0.780	204.00	1.0 U	1.0 U	4.04	8,480	
CPT-21A/ 86 ft	26	2	06/23/05 15:49	0.174	0.700	196.00	1.0 U	1.0 U	4.72	11,800	
CPT-21A/ 86 ft	26	2	08/04/05 15:13	0.187	0.750	223.00	1.0 U	1.31	5.40	11,000	
CPT-21A/ 86 ft	26	2	08/19/05 13:45	0.045	0.180	187.00	1.10	1.0 U	3.72	12,200	
CPT-21A/ 86 ft	26	2	09/26/05 17:14	0.269	1.080	209.00	1.0 U	1.0 U	3.67	9,350	
CPT-28/ 87 ft	27	2	11/17/04 13:15	0.035	0.14	231.00	1.47	1.0 U	2.84	12,400	
CPT-28/ 87 ft	27	2	12/28/04 15:10	0.306	1.230	223.00	1.0 U	1.0 U	3.71	7,080	
CPT-28/ 87 ft	27	2	01/19/05 13:56	0.105	0.420	227.00	1.20	1.0 U	3.10	9,650	
CPT-28/ 87 ft	27	2	02/24/05 15:23	0.179	0.720	245.00	1.27	1.0 U	2.45	9,470	

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
CPT-28/ 87 ft	27	2	03/18/05 14:18	0.239	0.96	246.00	1.0 U	1.0 U	4.35	6,950	
CPT-28/ 87 ft	27	2	05/05/05 15:35	0.149	0.600	244.00	1.06	1.0 U	4.15	13,400	
CPT-28/ 87 ft	27	2	05/26/05 14:50	0.197	0.790	238.00	1.12	1.0 U	3.57	8,990	
CPT-28/ 87 ft	27	2	06/23/05 15:59	0.192	0.770	232.00	1.0 U	1.0 U	4.73	12,200	
CPT-28/ 87 ft	27	2	08/04/05 15:19	0.187	0.750	245.00	1.0 U	1.03	5.37	11,200	
CPT-28/ 87 ft	27	2	08/19/05 13:50	0.055	0.220	216.00	1.05	1.0 U	3.33	13,900	
CPT-28/ 87 ft	27	2	09/26/05 17:24	0.254	1.020	230.00	1.11	1.0 U	3.03	9,660	
299-W15-8U / 103 ft	31	2	08/04/05 13:09	0.042	0.170	1.0 U	1.0 U	1.80	1.97	7,920	
299-W15-8U / 103 ft	31	2	08/19/05 13:11	-0.110	-0.440	1.27	1.0 U	1.08	1.93	8,990	
299-W15-8U / 103 ft	31	2	09/26/05 16:39	0.618	2.480	6.81	1.05	1.0 U	1.62	8,000	
299-W15-217/ 114 ft	35	3	01/19/05 00:00								No tubing in well.
299-W15-217/ 114 ft	35	3	02/24/05 15:11	0.162	0.65	39.60	1.0 U	1.0 U	1.22	7,890	
299-W15-217/ 114 ft	35	3	03/18/05 14:12	0.239	0.960	374.00	2.12	1.0 U	2.86	7,020	
299-W15-217/ 114 ft	35	3	08/04/05 13:14	0.057	0.230	11.20	1.0 U	1.35	3.03	8,190	
299-W15-217/ 114 ft	35	3	08/19/05 13:16	0.032	0.130	1.0 U	1.0 U	1.0 U	1.26	9,460	
299-W15-217/ 114 ft	35	3	09/26/05 16:45	0.130	0.520	15.90	1.0 U	1.0 U	1.69	8,150	
CPT-24/ 118 ft	36	3	8/4/05 12:03	0.067	0.270	20.40	1.0 U	1.69	5.22	8,410	
CPT-24/ 118 ft	36	3	8/19/2005 10:47	-0.105	-0.420	14.70	1.0 U	1.0 U	3.85	11,200	
CPT-24/ 118 ft	36	3	9/26/05 14:01	0.364	1.460	23.90	1.0 U	1.0 U	4.57	8,240	
299-W15-220SST / 118 ft	36	3	8/4/05 13:29	-0.015	-0.06	23.10	1.0 U	1.98	3.19	8,070	
299-W15-220SST/ 118 ft	36	3	08/19/05 11:11	-0.229	-0.920	21.30	1.0 U	1.0 U	1.81	10,200	

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W15-220SST/ 118 ft	36	3	09/26/05 14:18	0.466	1.870	25.20	1.0 U	1.0 U	1.68	8,250	
299-W15-95L/ 144 ft	44	4	11/17/04 0:00								Hooked up to SVE; no tubing in well.
299-W15-95L/ 144 ft	44	4	12/28/04 0:00								Hooked up to SVE; no tubing in well.
299-W15-95L/ 144 ft	44	4	01/19/05 0:00								No tubing in well.
299-W15-95L/ 144 ft	44	4	02/24/05 14:24	0.237	0.950	26.70	1.0 U	1.0 U	4.77	7,780	
299-W15-95L/ 144 ft	44	4	03/18/05 13:49	0.553	2.220	24.80	1.0 U	1.0 U	3.68	6,650	
299-W15-95L/ 144 ft	44	4	08/04/05 12:35	-0.002	-0.010	2.37	1.0 U	2.26	3.75	8,040	
299-W15-95L/ 144 ft	44	4	08/19/05 11:24	-0.209	-0.84	15.90	1.0 U	1.0 U	5.76	10,400	
299-W15-95L/ 144 ft	44	4	09/26/05 15:44	0.565	2.270	15.80	1.0 U	1.0 U	5.25	7,890	
299-W15-220/ 163 ft	50	5	08/04/05 13:23	0.005	0.020	13.20	1.02	1.95	2.21	8,170	
299-W15-220/ 163 ft	50	5	08/19/05 11:06	-0.192	-0.770	12.90	1.0 U	1.0 U	2.00	10,300	
299-W15-220/ 163 ft	50	5	09/26/05 14:16	0.433	1.740	12.00	1.0 U	1.0 U	1.59	8,260	
299-W15-219L/ 175 ft	53	5	08/04/05 13:27	0.042	0.170	1.0 U	1.0 U	2.21	2.96	9,110	
299-W15-219L/ 175 ft	53	5	08/19/05 13:29	0.010	0.040	1.0 U	1.0 U	1.0 U	1.26	9,200	
299-W15-219L/ 175 ft	53	5	09/26/05 17:00	0.204	0.820	1.92	1.0 U	1.0 U	1.22	8,700	
299-W15-9L/ 176 ft	54	6	11/17/04 00:00								Hooked up to SVE; no tubing in well.
299-W15-9L/ 176 ft	54	6	12/28/04 00:00								Hooked up to SVE; no tubing in well.

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W15-9L/ 176 ft	54	6	01/19/05 00:00								Hooked up to SVE; no tubing in well.
299-W15-9L/ 176 ft	54	6	02/24/05 14:22	0.239	0.960	2.12	3.79	3.27	1.0 U	7,960	
299-W15-9L/ 176 ft	54	6	03/18/05 13:47								Unable to sample. Tubing had to be removed before the sample could be taken.
299-W15-9L/ 176 ft	54	6	08/04/05 12:40	0.022	0.090	1.0 U	1.0 U	1.19	2.07	7,850	
299-W15-9L/ 176 ft	54	6	08/19/05 11:32	-0.020	-0.08	1.0 U	1.0 U	1.0 U	1.06	9,790	
299-W15-9L/ 176 ft	54	6	09/26/05 15:48	0.207	0.830	1.64	1.0 U	1.0 U	1.03	7,820	
299-W15-84L/ 180 ft	55	6	11/17/04 12:53	-0.451	-1.81	22.00	1.0 U	1.0 U	3.71	11,300	
299-W15-84L/ 180 ft	55	6	12/28/04 14:49	0.418	1.680	18.00	1.0 U	1.0 U	3.56	6,930	
299-W15-84L/ 180 ft	55	6	01/19/05 13:35	0.384	1.540	22.00	1.0 U	1.0 U	3.87	9,500	
299-W15-84L/ 180 ft	55	6	02/24/05 15:03	0.187	0.75	16.10	1.0 U	1.75	2.96	8,460	
299-W15-84L/ 180 ft	55	6	03/10/05 11:20	-0.431	-1.730	23.00	1.44	1.0 U	2.02	11,300	Sampled on 03/10/05 prior to removal of tubing.
299-W15-84L/ 180 ft	55	6	08/19/05 00:00								Unable to sample. Well in use by Vista Engineering.
299-W15-84L/ 180 ft	55	6	09/26/05 00:00								Unable to sample. Well in use by Vista Engineering.

Table D-4. Blank Analyses. (11 sheets)

Sample Location	Depth (m bgs)	Zone	Sample Date/Time	Differential Pressure (kPa)	Differential Pressure (in.w.c.)	CCl_4 (ppmv)	$CHCl_3$ (ppmv)	MEK (ppmv)	CH_2Cl_2 (ppmv)	Water (ppmv)	Comment
299-W15-46 / 217 ft	66	6	08/04/05 14:50	0.012	0.050	1.0 U	1.0 U	1.50	1.75	11,900	
299-W15-46 / 217 ft	66	6	08/19/05 12:55	0.010	0.040	1.0 U	1.0 U	1.0 U	1.0 U	7,950	
299-W15-46 / 217 ft	66	6	09/26/05 16:20	0.386	1.550	1.87	1.0 U	1.0 U	1.0 U	8,620	

bgs = below ground surface
CCl_4 = carbon tetrachloride
MEK = methyl ethyl ketone
ppmv = parts per million by volume
SVE = soil vapor extraction