

**GROUND WATER MONITORING  
ANNUAL SUMMARY REPORT**

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Lakewood Mall  
10509 Gravelly Lake Drive SW  
Lakewood, Washington

Prepared for

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# Contents

Introduction.....	1
Site Location and Description .....	1
Previous Site Investigations.....	5
Ground Water Monitoring Summary.....	7
Sample Locations and Methods.....	9
Sample Analyses.....	11
Results.....	13
Ground Water Flow .....	13
Field Parameters and Observations .....	13
Ground Water Analytical Results.....	13
Conclusions and Recommendations .....	23
References.....	25
Appendix A Field Procedures	
Appendix B Laboratory Analytical Reports and Data Quality Assurance Summary Review	

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## Tables

Table 1. Historical ground water surface elevation data from monitoring wells at Lakewood Mall site, Lakewood, Washington.....	14
Table 2. Historical ground water field parameters at MW-1s, MW-1m, MW-1d, MW-2d, and MW-3 through MW-5, Lakewood Mall site, Lakewood, Washington. ....	15
Table 3. HVOC results for ground water samples collected at the Lakewood Mall ( $\mu\text{g/L}$ ). ....	16

## Figures

Figure 1. Vicinity map of Lakewood Mall, Lakewood, Washington.....	2
Figure 2. Site map and sampling locations at Lakewood Mall Lakewood, Washington. ....	3
Figure 3. HVOC concentrations in ground water and inferred ground water flow gradient, July 21 and September 15, 2001.....	17
Figure 4. HVOC concentrations in ground water and inferred ground water flow gradient, February 12, 2001, Lakewood Mall, Lakewood, Washington.....	18
Figure 5. HVOC concentrations in ground water and inferred ground water flow gradient, May 17, 2001, Lakewood Mall, Lakewood, Washington.....	19
Figure 6. HVOC concentrations in ground water and inferred ground water flow gradient, August 15, 2001, Lakewood Mall, Lakewood, Washington. ....	20
Figure 7. HVOC concentrations in ground water and inferred ground water flow gradient, November 15, 2001, Lakewood Mall, Lakewood, Washington. ....	21

## Introduction

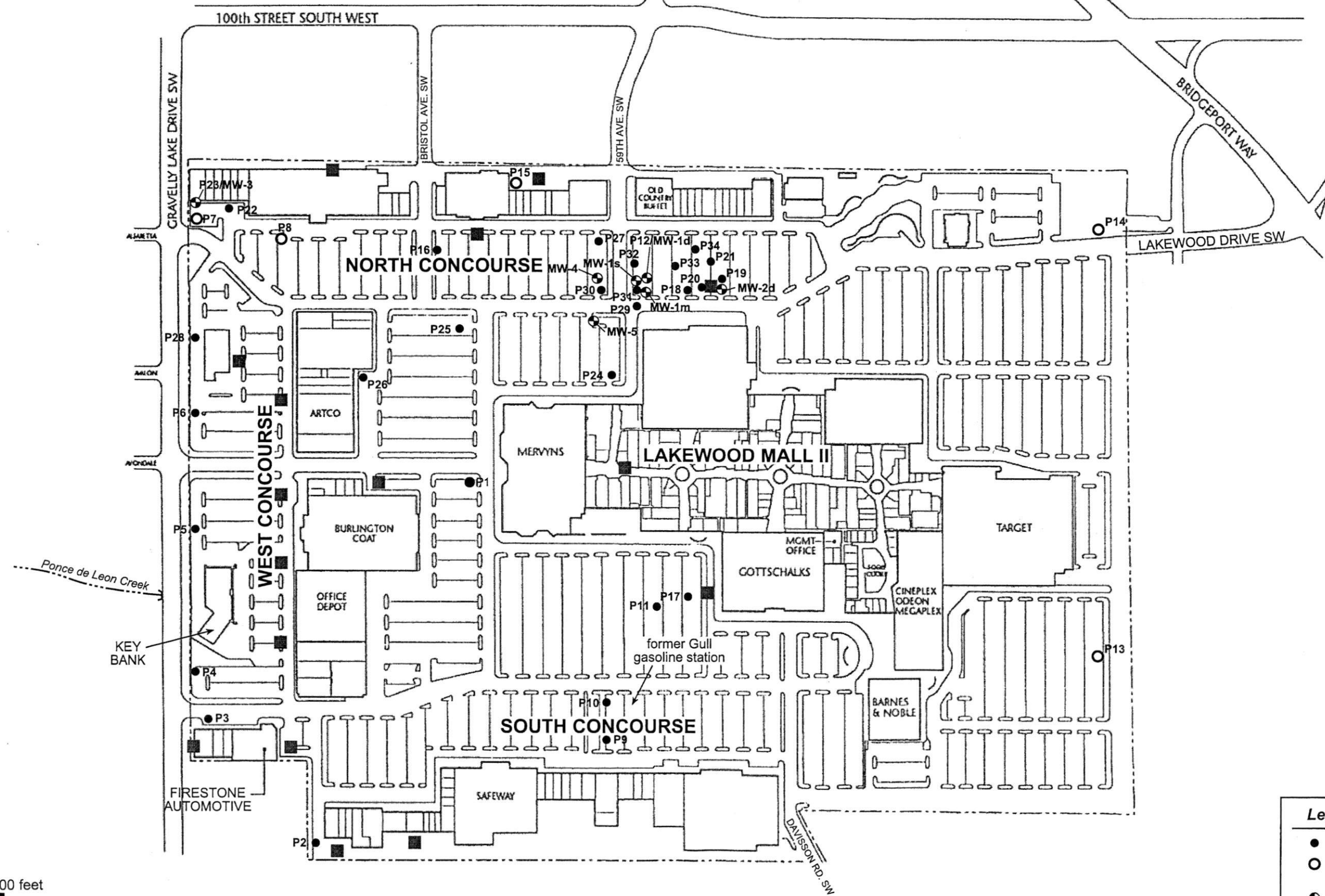
This report summarizes the results of ground water monitoring and sampling activities conducted at the Lakewood Mall site located in Lakewood, Washington as part of a ground water monitoring program associated with release of perchloroethylene (PCE) from a historic dry cleaning establishment. The purpose of the program is to assess whether residual PCE and degradation by-product contamination in ground water is migrating from the source area and if concentrations are decreasing with time. This report describes the sampling locations, collection methods, and analyses conducted for the first year of quarterly sampling events starting July 2000, and presents the analytical results and conclusions.

## Site Location and Description

The Lakewood Mall site is located at 10509 Gravelly Lake Drive SW in the city of Lakewood, Washington, approximately 6 miles southwest of downtown Tacoma (Figure 1). The 100 acre mall property currently is undergoing extensive renovations and redevelopment for the Lakewood Towne Center. Prior to redevelopment, the mall property was divided into two components (Figure 2):

- Lakewood Mall I, composed of eleven separate buildings, was the former Villa Plaza shopping center constructed in 1957, with renovations to the buildings made in 1986 and 1989. This portion of the mall was subdivided into three sections, referred to as the North, West, and South Concourses. The original East Concourse was demolished in 1989 to make way for the Lakewood Mall II complex. The eastern half of the original South Concourse was demolished earlier this year to make way for the new Lakewood City Hall building. The North and West Concourses are being extensively renovated at this time.
  
- Lakewood Mall II replaced the East Concourse and consisted of five large individual department store buildings connected by an enclosed mall, constructed in 1989. In addition, the Lakewood Mall II includes a Barnes & Noble bookstore building and a 12-screen Cineplex Odeon movie theater complex, both constructed in 1996. Currently, most of Lakewood Mall II has been demolished, with the Target and Gottschalks department store buildings, the movie theater complex and the bookstore remaining.





0 300 feet  
Approximate scale

**Legend**

- Probe boring location
- Probe boring location (no sample collected)
- ⊙ Monitoring well location
- Septic tank location

Figure 2. Site map and sampling locations at Lakewood Mall, Lakewood, Washington.

## Previous Site Investigations

Since the Lakewood Mall site characterization project began in the summer of 2000, Herrera Environmental Consultants, Inc. (Herrera) has prepared and provided the following deliverables to Perkins Coie, LLP (legal counsel for the previous property owner—Wells Fargo) and MBK Northwest, Inc. (property owner of the mall since July 2001):

Date	Deliverables
February 2001	Phase II Environmental Site Assessment
March 2001	Ground Water Quarterly Status Report (first quarter)
June 2001	Ground Water Quarterly Status Report (second quarter)
October 2001	Ground Water Quarterly Status Report (third quarter)

Analytical results of samples collected during these field investigations indicate that a dry cleaner solvent, perchloroethylene (PCE), was detected in ground water across the northwest portion of the site. The main source area has been identified by the presence of elevated PCE and its degradation byproducts in shallow ground water near the former East Concourse building, which was occupied by a dry cleaner between 1968 and 1987. As part of site characterization activities, 34 temporary push probes and seven permanent ground water monitoring wells were installed across the northwest portion of the mall property to assess contaminant concentrations and migration from the source area (Figure 2). The wells include:

- MW-1s (shallow), MW-1m (mid depth), and MW-1d (deep) in the source area
- MW-2d (deep) upgradient of the source area
- MW-3 (shallow) at the northwest property boundary (approximately 1,300 feet downgradient of the source area)
- MW-4 (shallow) immediately downgradient of the source area
- MW-5 (shallow) immediately downgradient of the source area.

Subsurface soil sampling conducted at six probe locations across the source area found no evidence of residual contamination in the vadose zone; no soil removal or treatment was conducted.

## **Ground Water Monitoring Summary**

Monitoring and sampling of ground water from seven wells has been conducted at the Lakewood Mall site on a quarterly or annual basis following site characterization efforts conducted in July and September 2000. Samples were collected on a quarterly basis at wells MW-1s, MW-3, MW-4, and MW-5 on the following dates: July 21 and September 15, 2000; and February 12, May 17, August 15, and November 15, 2001. Samples were collected on an annual basis from deeper wells MW-1m, MW-1d, and MW-2d during the September 15, 2000 and the November 15, 2001 quarterly sampling events. Each event consisted of measuring water levels at all seven wells and collecting ground water samples at selected wells for analysis of halogenated volatile organic constituents associated with dry cleaning solvents, and determining ground water quality trends, including potential contaminant migration based on analytical results and field observations.

A detailed description of field procedures, including sample collection, handling, and decontamination, is presented in Appendix A of this report. Laboratory analytical reports for ground water samples collected from these wells and a data quality assurance review of all analytical data for each sampling event are provided in Appendix B. Results of this first year of quarterly ground water monitoring are described in the following sections.

## Sample Locations and Methods

Seven ground water monitoring wells are located across the northwest portion of the mall property, as follows:

- Monitoring wells MW-1s (screened from 10 to 15 feet), MW-1m (screened from 23 to 25.5 feet), and MW-1d (screened from 45.5 to 48 feet) were installed within 5 feet of each other at the source area to assess the presence of PCE at shallow depth, mid-depth, and the base of the unconfined aquifer.
- Monitoring well MW-2d (screened from 55 to 57.5 feet) was installed approximately 200 feet east and upgradient from the main dry cleaning source area to assess background ground water quality at the base of the aquifer.
- Monitoring well MW-3 (screened from 25.5 to 28 feet) was installed at the northwest corner of the mall to assess ground water quality at the property boundary and near the existing dry cleaning facility in Building N1.
- Monitoring wells MW-4 (screened from 11 to 16 feet) and MW-5 (screened from 11 to 16 feet) were installed downgradient approximately 100 feet west and 150 feet southwest, respectively, from the main dry cleaning source area to determine extent of PCE contamination in shallow ground water.

For each sampling event, ground water samples were collected from the wells using a low-flow purge method with dedicated polyethylene tubing and a peristaltic pump. Wells were first purged at a rate less than 1 liter per minute or at a purge rate that did not increase the rate of drawdown more than 0.5 feet from static water level. If drawdown was greater than 0.5 feet, the well was purged a minimum of three well casing volumes prior to sample collection. Field parameters, including water temperature, pH, and specific conductivity were recorded during purging; samples were collected after parameter readings had stabilized. Water samples were collected from the same polyethylene tubing used for purging directly into sample containers provided by the laboratory, then labeled and placed into a chilled cooler prior to and during delivery to the laboratory for analysis.

## Sample Analyses

Samples collected from each sampling event were analyzed for evidence of dry cleaning solvents by OnSite Environmental, Inc. of Redmond, Washington using U.S. Environmental Protection Agency test method 8260B for analysis of halogenated volatile organic compounds (HVOCs).

Results of ground water samples collected from the seven wells during the July/September 2000 site characterization efforts, including the laboratory analytical report package, are presented in *Phase II Environmental Site Assessment—Lakewood Mall I & II* (Herrera 2001). Complete laboratory analytical packages for February, May, August, and November 2001 sampling events, including chain-of-custody records and data quality assurance reviews, are presented in Appendix B of this report. All data are summarized and evaluated in the results section of this report.

## Results

### Ground Water Flow

Ground water surface elevation data collected from each monitoring event since July and September 2000 site characterization efforts are presented in Table 1. Ground water surface elevation data collected from monitoring events between July 2000 and November 2001 are illustrated in Figures 3 through 7. Based on interpretation of ground water surface elevation data collected during each monitoring event, ground water flow direction generally is toward the west, with an average hydraulic gradient of less than 0.01 feet per foot. The seasonal ground water flow direction and gradient appear consistent throughout the year.

### Field Parameters and Observations

Ground water field parameters recorded from the July 2000 to November 2001 sampling events are presented in Table 2. All seven wells were purged at each sampling event using the low flow purge method at purge rates ranging from 0.16 to 0.40 liters per minute.

### Ground Water Analytical Results

Ground water analytical results from the July 2000 to November 2001 sampling events are presented in Table 3 and illustrated on Figures 3 through 7. Contaminants of concern found at the Lakewood Mall site include:

- PCE—perchloroethylene or tetrachloroethylene
- TCE—trichloroethylene
- cis DCE—cis 1,2-dichloroethylene
- trans DCE—trans 1,2-dichloroethylene
- 1,1 DCE—1,1-dichloroethene
- 1,1 DCA—1,1-dichloroethane
- 1,4 DCB—1,4-dichlorobenzene
- Vinyl chloride
- Chloroform

Results from each sampling event are compared to established method A and B ground water cleanup levels for PCE and related constituents listed in the Washington State Department of Ecology Model Toxics Control Act (MTCA) cleanup regulation. All data generated for the five monitoring events are considered acceptable for use; data quality assurance reviews are provided in Appendix B.

**Table 1. Historical ground water surface elevation data from monitoring wells at Lakewood Mall site, Lakewood, Washington.**

Monitoring Well Identification	Date Sounded	Reference Point Elevation <sup>a</sup> (feet)	Depth to Water <sup>b</sup> (feet)	Water Level Elevation (feet)
MW-1s	9/15/00	93.33	12.32	81.01
	2/12/01		11.00	82.33
	5/17/01		10.91	82.42
	8/15/01		12.28	81.05
	11/15/01		10.62	82.71
MW-1m	7/21/00	93.39	11.44	81.95
	9/15/00		12.37	81.02
	2/12/01		11.05	82.34
	5/17/01		10.95	82.44
	8/15/01		12.42	80.97
MW-1d	11/15/01	93.56	10.68	82.71
	7/21/00		11.63	81.93
	9/15/00		12.57	80.99
	2/12/01		11.25	82.31
	5/17/01		11.16	82.40
MW-2d	8/15/01	92.20	12.52	81.04
	11/15/01		10.85	82.71
	7/21/00		10.64	81.56
	2/12/01		9.58	82.62
	5/17/01		9.47	82.73
MW-3	8/15/01	97.06	10.90	81.30
	11/15/01		9.22	82.98
	7/21/00		17.09	79.97
	2/12/01		16.79	80.27
	5/17/01		16.76	80.30
MW-4	8/15/01	94.82	17.67	79.39
	11/15/01		16.39	80.67
	9/15/00		13.92	80.90
	2/12/01		12.61	82.21
	5/17/01		12.50	82.32
MW-5	8/15/01	94.37	13.86	80.96
	11/15/01		12.22	82.60
	9/15/00		13.52	80.85
	2/12/01		12.24	82.13
	5/17/01		12.13	82.24
	8/15/01		13.43	80.94
	11/15/01		11.88	82.49

<sup>a</sup> Elevations of reference points (top of well casing were surveyed relative to a temporary datum with an assigned elevation of 100.00 feet.

<sup>b</sup> Depth to water measurements were taken from reference point marks on top of well casing.

**Table 2. Historical ground water field parameters at MW-1s, MW-1m, MW-1d, MW-2d, and MW-3 through MW-5, Lakewood Mall site, Lakewood, Washington.**

Monitoring Well Identification	Date Sampled	Water Temperature °C	pH	Specific Conductivity micromhos/cm	Purge Rate liters/min.
MW-1s	9/15/00	15.7	6.20	348	0.26
	2/12/01	12.0	6.16	177	0.27
	5/17/01	12.3	6.07	282	0.28
	8/15/01	15.1	6.06	282	0.25
	11/15/01	14.6	5.90	190	0.25
MW-1m	7/21/00	14.5	6.13	110	0.35
	11/15/01	13.6	5.83	118	0.25
MW-1d	7/21/00	13.9	6.18	119	0.42
	11/15/01	12.9	5.85	115	0.25
MW-2d	7/21/00	13.8	6.81	144	0.40
	11/15/01	12.5	5.94	119	0.26
MW-3	7/12/00	14.4	6.28	125	0.30
	2/12/01	11.7	6.18	101	0.22
	5/17/01	12.3	6.20	138	0.16
	8/15/01	13.3	6.21	151	0.19
	11/15/01	13.6	5.97	122	0.21
MW-4	9/15/00	15.3	6.05	165	0.28
	2/12/01	11.7	5.93	109	0.18
	5/17/01	12.2	5.88	160	0.22
	8/15/01	14.9	5.90	165	0.24
	11/15/01	14.5	5.63	142	0.26
MW-5	9/15/00	15.3	6.13	162	0.28
	2/12/01	11.6	6.13	101	0.27
	5/17/01	12.8	6.08	139	0.20
	8/15/01	14.8	6.07	149	0.27
	11/15/01	14.0	5.77	137	0.27

Field parameter values reflect the last readings recorded prior to sample collection.

**Table 3. HVOC results for ground water samples collected at the Lakewood Mall (µg/L).**

Well identification	Date sampled	PCE	TCE	cis DCE	trans DCE	1,1-DCE	1,1-DCA	Vinyl chloride	1,4-DCB	Chloroform
<i>MTCA method A cleanup level<sup>a</sup></i>		5	5	na	na	na	na	0.2	na	na
<i>MTCA method B cleanup level<sup>b</sup></i>		0.858	3.98	80	160	0.0729	800	0.0292	1.82	7.17
MW-1s	9/15/00	2.2	19	670	14	0.76	6.1	52	0.25	1.3
	2/12/01	1.2	15	390	8.2	0.37	3.1	47	(0.20)	(0.20)
	5/17/01	2.3	18	600	10	0.64	5.5	41	0.30	(0.20)
	8/15/01	1.7	14	490	8.3	0.56	4.2	40	(0.20)	(0.20)
	11/15/01	0.51	9.1	320	6.4	0.47	2.3	59	0.21	(0.20)
MW-1m	7/21/00	0.80	0.45	5.0	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.87	(0.20)	0.95	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-1d	7/21/00	0.50	(0.20)	0.29	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.64	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-2d	7/21/00	0.73	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/16/01	1.2	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-3	7/21/00	0.69	(0.20)	1.1	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	2/12/01	0.66	(0.20)	0.23	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	5/17/01	0.64	(0.20)	1.3	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	8/15/01	0.66	(0.20)	0.88	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.57	(0.20)	0.73	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
MW-4	9/15/00	1.6	4.9	120	2.8	(0.20)	1.0	(0.20)	(0.20)	(0.20)
	2/12/01	1.0	2.3	48	0.90	(0.20)	0.22	(0.20)	(0.20)	(0.20)
	5/17/01	1.0	3.4	100	1.6	(0.20)	1.0	(0.20)	(0.20)	(0.20)
	8/15/01	0.97	2.9	70	1.1	(0.20)	0.68	(0.20)	(0.20)	(0.20)
	11/15/01	0.99	1.6	35	0.57	(0.20)	0.29	(0.20)	(0.20)	(0.20)
MW-5	9/15/00	1.2	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	2/12/01	0.70	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	5/17/01	0.62	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	8/15/01	0.88	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
	11/15/01	0.90	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)

Values in **boldface** type indicate constituent detected above the established MTCA method A or method B cleanup level.

(0.20) Analyte was not detected above the enclosed practical quantitation limit indicated.

na Established ground water cleanup level for this constituent is not available.

<sup>a</sup> Ecology 2001a, Publication no. 94-06.

<sup>b</sup> Ecology 2001b, Publication no. 94-145.

Shaded values represent results of the most recent sampling event.

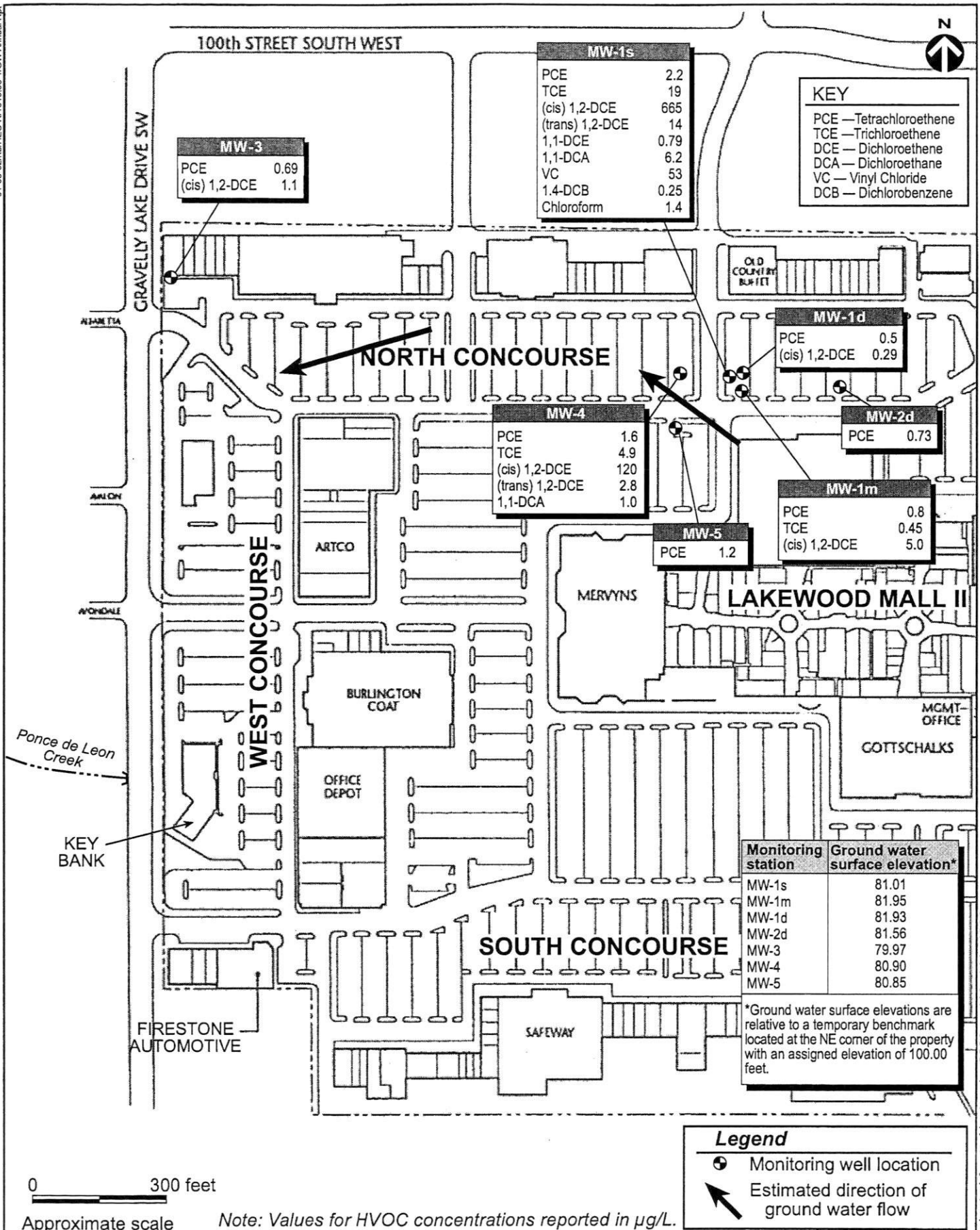
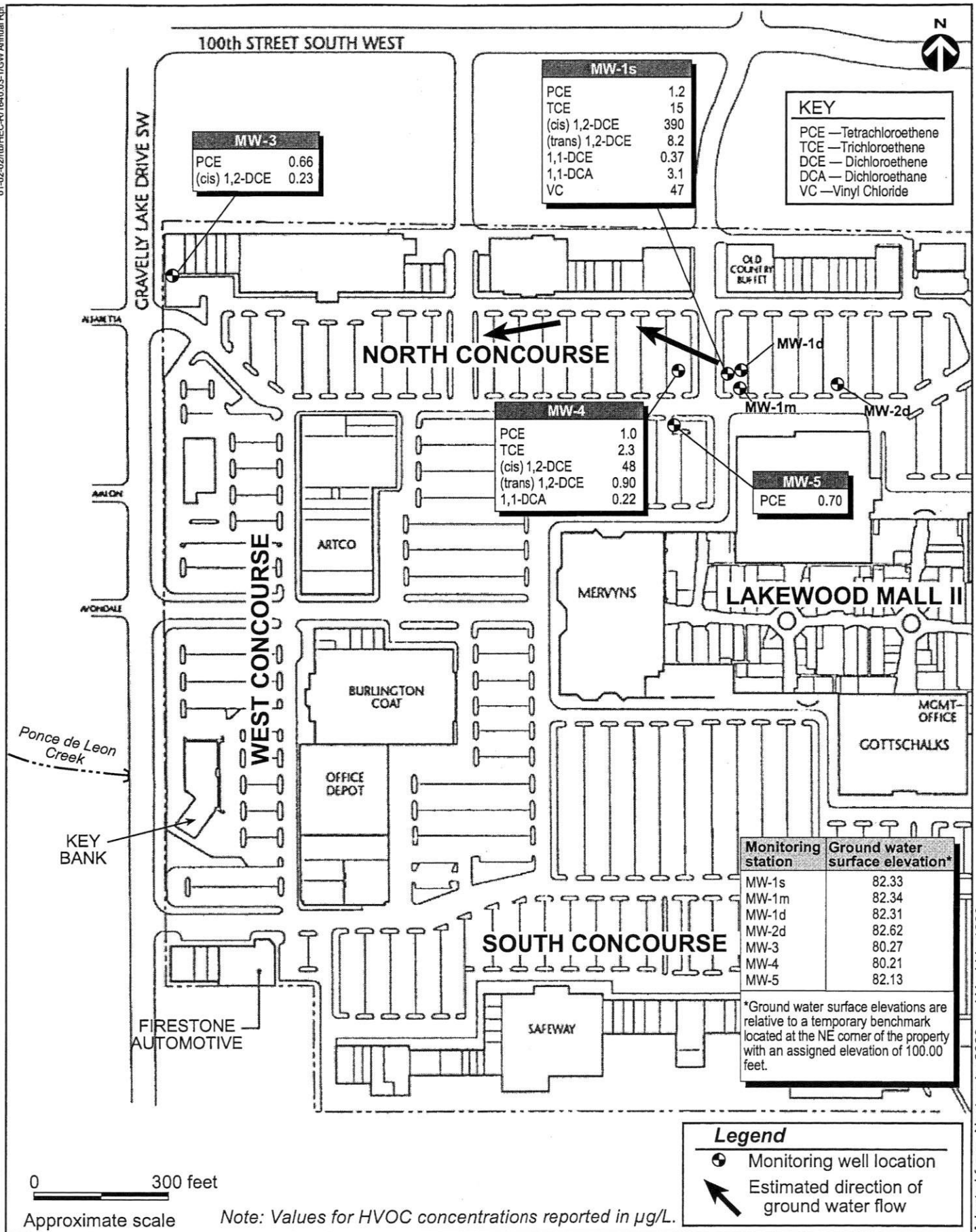


Figure 3. HVOC concentrations in ground water and inferred ground water flow direction, July 21 and September 15, 2000, Lakewood Mall, Lakewood, Washington.



**Figure 4. HVOC concentrations in ground water and inferred ground water flow direction, February 12, 2001, Lakewood Mall, Lakewood, Washington.**

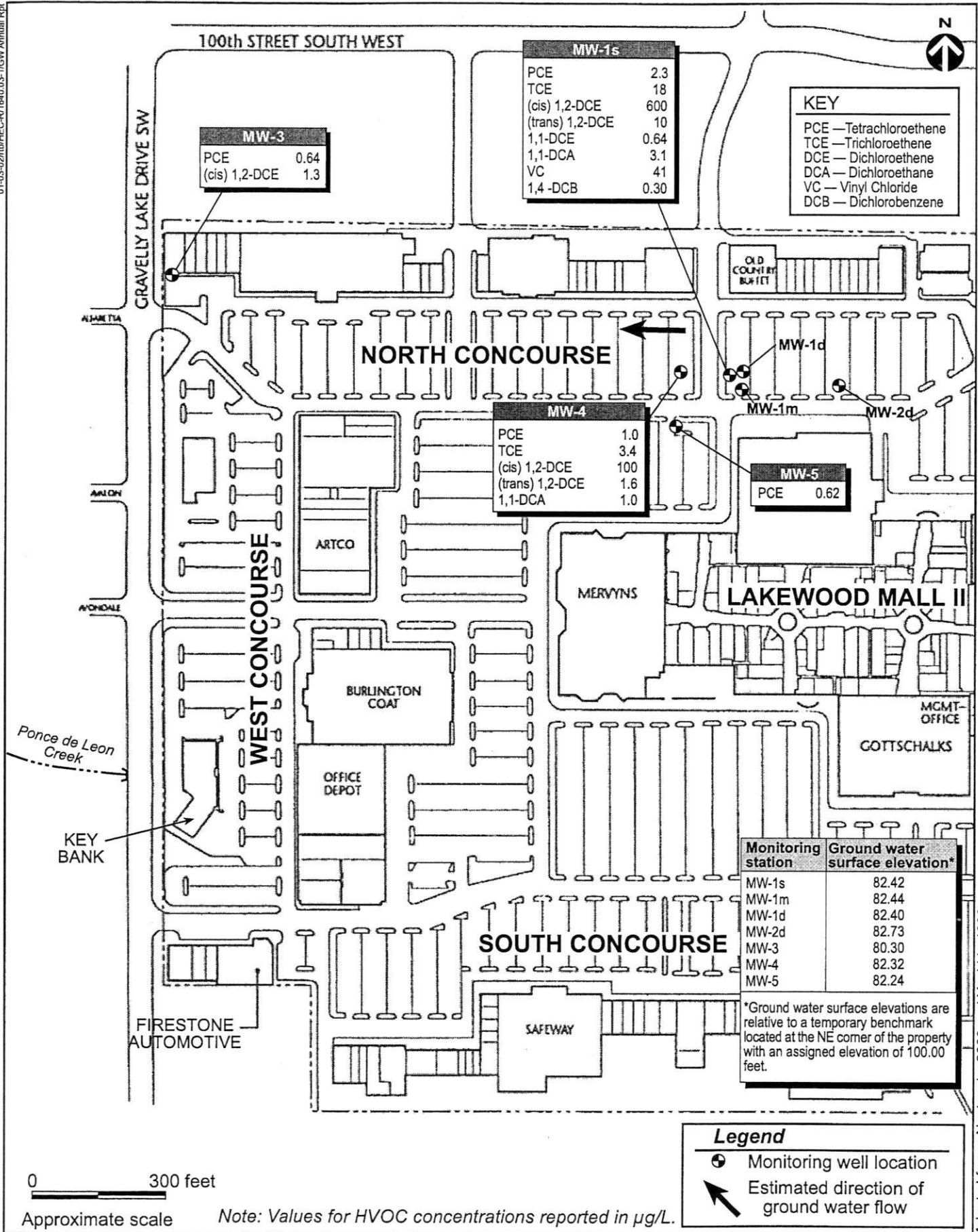
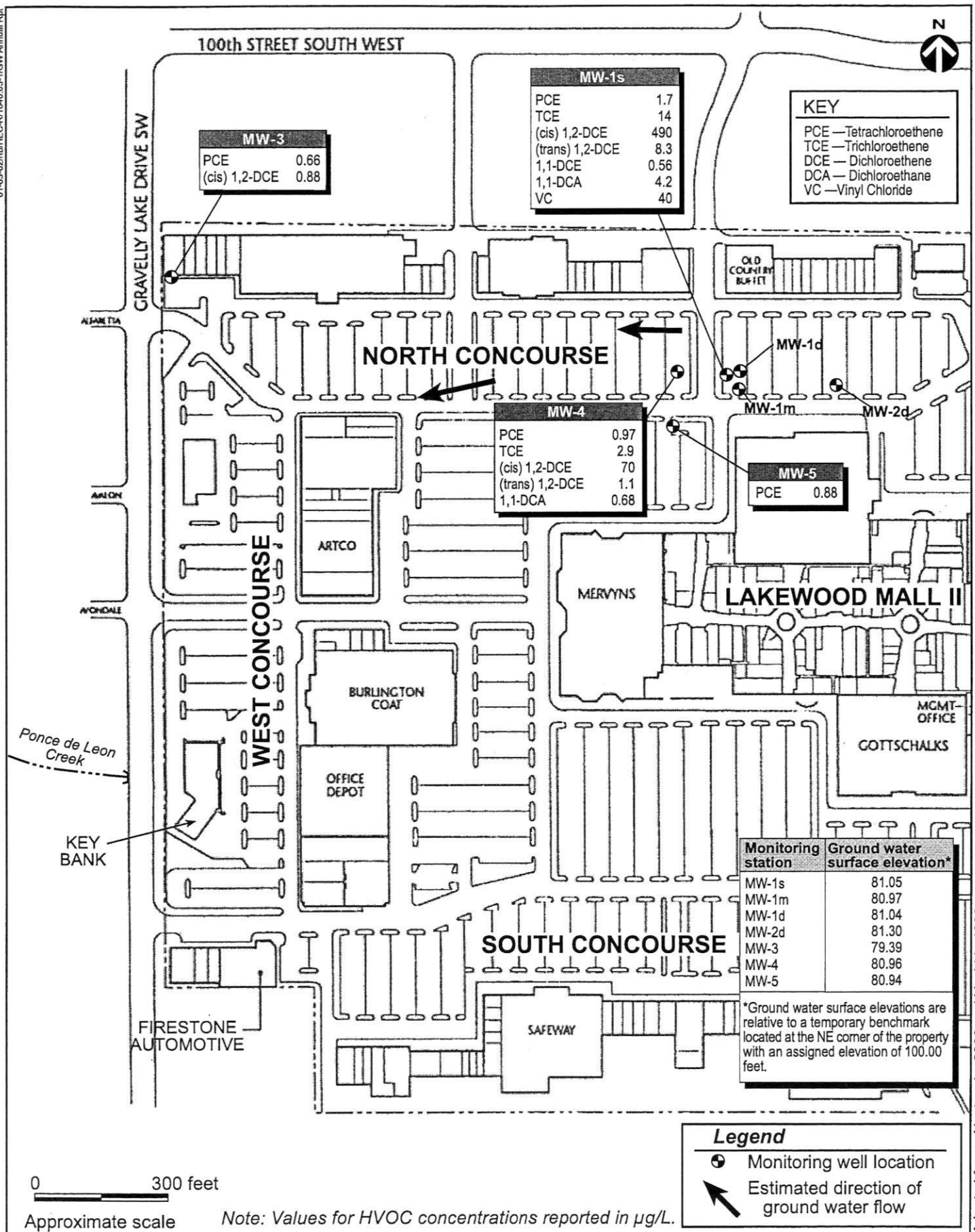


Figure 5. HVOC concentrations in ground water and inferred ground water flow direction, May 17, 2001, Lakewood Mall, Lakewood, Washington.



Adapted from: Nastansky 2000 and Yoshida 1986

**Figure 6. HVOC concentrations in ground water and inferred ground water flow direction, August 15, 2001, Lakewood Mall, Lakewood, Washington.**

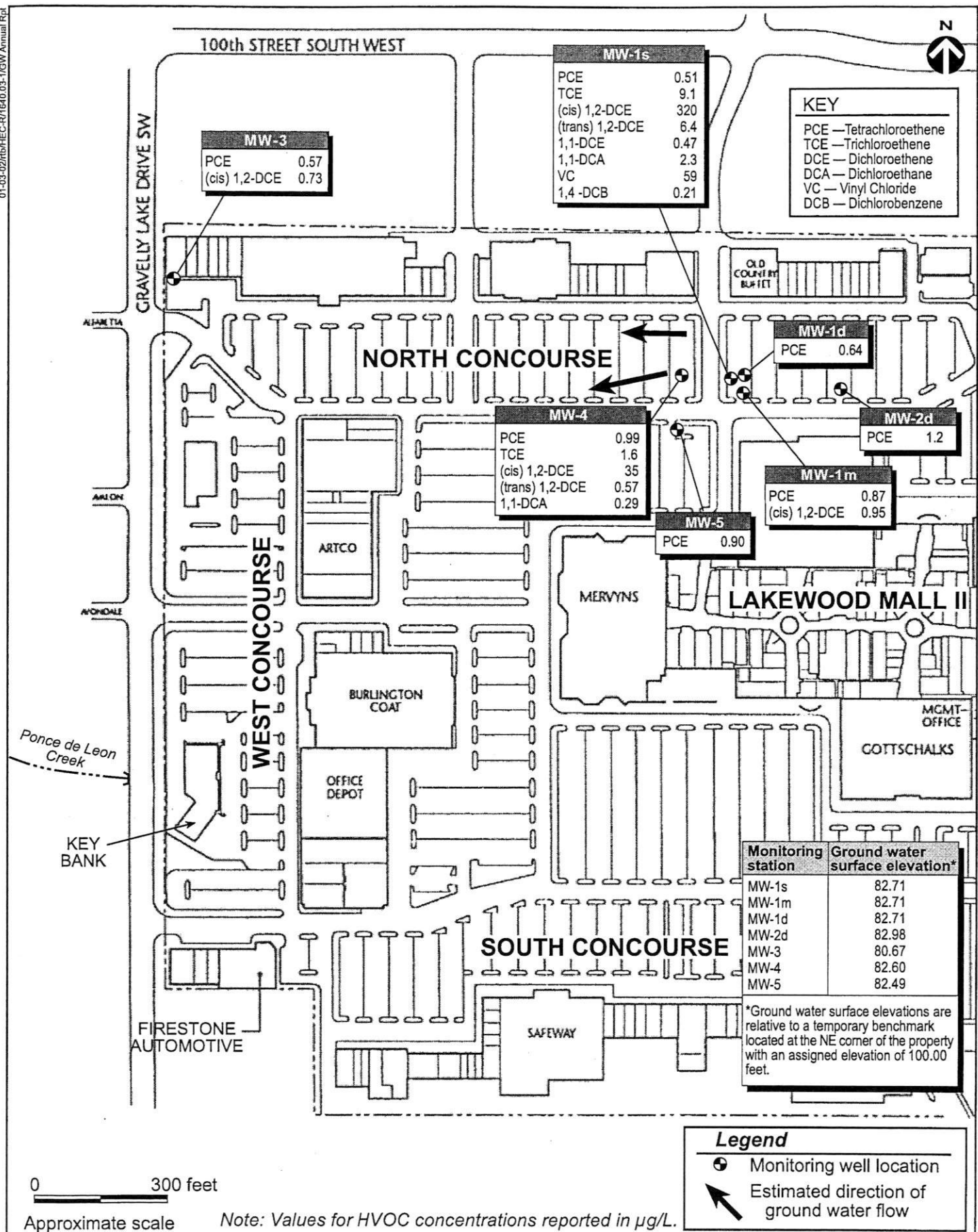


Figure 7. HVOC concentrations in ground water and inferred ground water flow direction, November 15, 2001, Lakewood Mall, Lakewood, Washington.

Overall, concentrations of most contaminants of concern have decreased compared to concentrations detected in samples collected at the beginning of the monitoring program. The highest concentrations of each contaminant continue to be found in the source area, represented by shallow well MW-1s; concentrations of most contaminants of concern detected in this well have decreased since sampling began a year ago. However, vinyl chloride detected at MW-1s in November 2001 has increased to the highest concentration detected in this well since sampling began a year ago. PCE concentrations detected in samples collected from deeper wells MW-1m, MW-1d, and MW-2d increased slightly over the year; TCE and cis DCE concentrations fell. Model Toxics Control Act (MTCA) method A and B cleanup levels continue to be exceeded by four compounds in the source area. No exceedences were identified for any compounds downgradient of the source area in the six remaining wells during the November 2001 sampling event.

## Conclusions and Recommendations

Monitoring and analytical results from five sampling events since the monitoring program began in July/September 2000 indicate continued presence of residual PCE contamination in ground water, particularly within the source area. PCE and biodegradation by-products exceeding MTCA method A and B cleanup ground water levels continue to be found near the water table, with low PCE concentrations found at the deeper wells. PCE degradation has occurred in the source area at shallow depth, as indicated by the increased concentration of vinyl chloride and presence of other PCE degradation byproducts detected in shallow well MW-1s. PCE has spread downgradient across the northwest quadrant of the Lakewood Mall site at levels below MTCA method A and B criteria; degradation by-products do not appear to be forming or migrating away from the source area.

To further evaluate the presence of PCE and its degradation byproducts within the source area and across the northwest quadrant of the site, we recommend continuing the current monitoring program:

- Quarterly monitoring of wells MW-1s, MW-3, MW-4, and MW-5 for halogenated VOCs analysis
- Annual monitoring of deeper wells MW-1m, MW-1d, and MW-2d for halogenated VOCs analysis.

The release of PCE was associated with a dry cleaner that ceased operation in 1987. Over the last 14 years, significant concentrations of TCE, DCE, and vinyl chloride remain in shallow ground water within a small source-area footprint. Interpretation of long-term concentration trends will require continued monitoring across the site.

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**APPENDIX A**

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**Field Procedures**

## Field Procedures

This appendix documents procedures used to perform the ground water monitoring program described in this report. The discussion includes information on the following subjects:

- Ground water sampling procedures
- Sample jars, sample handling, and chain-of-custody procedures
- Field equipment decontamination procedures
- Disposal of investigative-derived waste water

Field procedures for this monitoring program were implemented in general accordance with U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology-established sample handling protocols.

The quarterly ground water monitoring and sampling program consisted of collecting ground water samples from seven wells at the site for laboratory analysis. Field procedures for performing this work are presented in the following sections.

### Sample Designation

Ground water samples collected from monitoring wells were denoted using the prefix “MW-“ preceding the sample number. The letters ‘s,’ ‘m,’ and ‘d’ denoted the shallow, mid-depth, and deep monitoring wells followed by the sample number. For example:

- MW-3 denotes the ground water sample collected at monitoring well location 3.
- MW-2d denotes the ground water sample collected at deep monitoring well location 2.
- Quality control samples were submitted blindly (i.e., not identified as quality control samples) to the analytical laboratory. Quality control samples were given a fictitious sample name (e.g., MW-6 denotes the duplicate ground water sample collected at shallow monitoring well location 1s).

## Sampling Procedures

### Ground Water Sampling

Ground water samples were collected from all seven monitoring wells using a low-flow purge method utilizing dedicated polyethylene tubing and a peristaltic pump at the surface according to the following procedure:

1. Remove the well monument cover and inspect the condition of the well and surrounding area. Note observations in the field notebook and well sampling log. Unlock and remove the well casing plug.
2. Using an electronic water level meter, measure the static ground water level to the nearest 0.01 feet. Take measurements relative to the notched survey mark at the top of the PVC well casing. Record the date, time, and measurements in the field notebook and well sampling log.
3. Lower the flexible polyethylene tubing into the well with the tube intake located in the middle or slightly above the middle of the screened interval. This will ensure that most of the water pumped will be drawn directly from the formation, with little mixing of casing water or disturbance to the sampling zone.
4. Begin purging the well using the peristaltic pump at a rate less than 1 liter per minute. Monitor the water level and adjust the purge rate to ensure that the drawdown does not exceed 0.5 feet of the static water level. If the drawdown continues to drop below 0.5 feet of the static water level despite lowering the pumping rate, then purge the well a minimum of three well casing volumes prior to sample collection. Once water level has stabilized at the adjusted purge rate, begin measuring pH, water temperature, specific conductivity, turbidity, and the water level in 5-minute intervals. Record the amount of water purged, field measurements, and time collected in the field notebook and well sampling log.
5. Samples are collected when field readings have stabilized within 10 percent of the last set of readings. Samples are collected from the same polyethylene tubing used for purging directly into sample containers provided by the analytical laboratory. Care must be taken to ensure that no bubbles or headspace are present. Immediately upon filling, each container is securely capped, labeled, and placed into a chilled cooler for storage prior to and during delivery to the analytical laboratory. The date and time of each sample collected is recorded in the field notebook and on the chain-of-custody form.
6. Dedicated tubing used for purging and sampling ground water from each well is pulled out and discarded into a plastic garbage bag to be disposed of to a solid waste disposal facility.

## Decontamination Procedures

Decontamination was performed on all sampling equipment potentially exposed to contaminated ground water prior to leaving each area of concern. All sampling equipment, except for polyethylene tubing, was decontaminated prior to entry in the field. In addition, chemical-resistant gloves worn by sample handlers were changed between sampling locations.

### Decontamination of Ground Water Sampling Equipment

The electronic water level indicator and pH, conductivity, and turbidity meters were rinsed with deionized water between uses at different sampling locations. New polyethylene tubing was used at each monitoring well location and each sampling event.

## Sample Handling

All samples collected during this investigation were handled according to the procedures described in this section.

### Sample Containers and Labeling

Samples were placed in containers supplied by the analytical laboratory appropriate for the analyses to be performed. Sample container labels were completed at the time of collection using a permanent waterproof pen or marker. Sample labels included the following information:

- Project name
- Sample identification (including site designation and sample number)
- Date and time of collection
- Initials of sampling personnel
- General analysis to be performed.

### Sample Storage

Immediately following sample collection, sample containers were placed into a chilled cooler for storage prior to and during delivery to the analytical laboratory. Care was taken to ensure that sample holding times were not exceeded during periods of storage. Sample containers were placed into plastic Ziploc bags to protect labels from moisture in the cooler.

### Chain of Custody

Following collection, sample information was recorded on a chain-of-custody form. The purpose of this record is to account for the possession (or custody) of each sample from the time it is collected until laboratory testing and reporting is complete. The signature of each person in

possession of the samples must be recorded on the chain-of-custody form. Information recorded on the chain-of-custody record included the following:

- Project name and location
- Project number
- Names of project manager and sampling personnel
- Sample identification
- Sample matrix (water)
- Date and time of collection (for each sample)
- Analysis requested (for each sample)
- Number of sample containers (for each sample)
- Signature of sampling personnel, the date, and time (for each person releasing or accepting sample custody).

### **Sample Shipment and Delivery**

Ground water samples collected during each sampling event were hand-delivered to OnSite Environmental analytical laboratory in Redmond, Washington.

### **Sample Documentation**

All sampling activities during this investigation were documented in a dedicated field notebook. The notebook was labeled with the project name, project identification number, dates of field activities, and name of the field coordinator. All relevant activities were recorded in the field notebook during the period of the field investigation. Entries into the field notebook were made in permanent ink. Corrections were made by placing a single line through the original entry accompanied by the initials of the person entering the correction. At a minimum, information in the field notebook included:

- Date and atmospheric conditions
- Major activities to be performed
- Names of sampling personnel present
- Time of arrival at site, set-up, sample collection, and completion at each sample station
- General condition of sampling area
- Any unusual events or occurrences.

## **Disposal of Investigation-Derived Waste**

### **Disposal of Incidental Trash**

Incidental trash generated during this investigation (including discarded gloves, paper towels, used polyethylene tubing) was placed in plastic trash bags and disposed of as solid waste into a dumpster at Herrera's office in Seattle, Washington.

### **Purge Water Disposal**

Development and purge water generated during each sampling event were secured either in a 20- or a 55-gallon drum that was temporarily stored in a mechanical room located in Building N3. All development and purge water generated from each sampling event was collected and transported by Emerald Services, Inc. of Seattle, Washington for treatment and disposal as hazardous waste (F002) at Philip Environmental Services Corporation facility in Renton, Washington (EPA Site No. WAH000012971).

**APPENDIX B**

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Laboratory Analytical Reports and Data  
Quality Assurance Summary Review



**OnSite  
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

February 16, 2001

Peter Jowise  
Herrera Environmental Consultants, Inc.  
2200 6<sup>th</sup> Avenue, Suite 601  
Seattle, WA 98121

Re: Analytical Data for Project C00-01712-000  
Laboratory Reference No. 0102-058

Dear Peter:

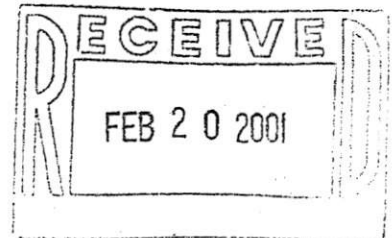
Enclosed are the analytical results and associated quality control data for samples submitted on February 12, 2001.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister  
Project Manager



Enclosures

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B**  
 page 1 of 2

Date Extracted: 2-14-01  
 Date Analyzed: 2-14-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 02-058-01  
 Client ID: MW-1s

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	47		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.37		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	8.2		0.20
1,1-Dichloroethane	3.1		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	390		10
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	15		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.2		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

### HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 02-058-01  
 Client ID: MW-1s

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	73	71-133
Toluene-d8	88	80-151
4-Bromofluorobenzene	90	75-139

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

### HALOGENATED VOLATILES by EPA 8260B

page 1 of 2

Date Extracted: 2-14-01  
 Date Analyzed: 2-14-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 02-058-02  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.23		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.66		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B**  
 page 2 of 2

Lab ID: 02-058-02  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	75	71-133
Toluene-d8	90	80-151
4-Bromofluorobenzene	91	75-139

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

### HALOGENATED VOLATILES by EPA 8260B

page 1 of 2

Date Extracted: 2-14-01  
 Date Analyzed: 2-14-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 02-058-03  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	0.90		0.20
1,1-Dichloroethane	0.22		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	48		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	2.3		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.0		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

### HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 02-058-03  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	76	71-133
Toluene-d8	89	80-151
4-Bromofluorobenzene	96	75-139

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

### HALOGENATED VOLATILES by EPA 8260B

page 1 of 2

Date Extracted: 2-14-01  
 Date Analyzed: 2-14-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 02-058-04  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.70		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B**

page 2 of 2

Lab ID: 02-058-04  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	73	71-133
Toluene-d8	87	80-151
4-Bromofluorobenzene	97	75-139

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B**  
 page 1 of 2

Date Extracted: 2-14-01  
 Date Analyzed: 2-14-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 02-058-05  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	48		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.42		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	8.5		0.20
1,1-Dichloroethane	3.6		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	370		10
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	16		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.2		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B**  
 page 2 of 2

Lab ID: 02-058-05  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.24		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	74	71-133
Toluene-d8	88	80-151
4-Bromofluorobenzene	91	75-139

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

page 1 of 2

Date Extracted: 2-14-01  
 Date Analyzed: 2-14-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: MB0214W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: February 16, 2001  
 Samples Submitted: February 12, 2001  
 Lab Traveler: 02-058  
 Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

page 2 of 2

Lab ID: MB0214W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	73	71-133
Toluene-d8	90	80-151
4-Bromofluorobenzene	88	75-139

Date of Report: February 16, 2001  
Samples Submitted: February 12, 2001  
Lab Traveler: 02-058  
Project: C00-01712-000

**HALOGENATED VOLATILES by EPA 8260B  
SB/SBD QUALITY CONTROL**

Date Extracted: 2-14-01  
Date Analyzed: 2-14-01

Matrix: Water  
Units: ug/L (ppb)

Lab ID: SB0214W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	RPD	Flags
1,1-Dichloroethene	10.0	9.63	96	9.76	98	1.3	
Benzene	10.0	7.23	72	7.43	74	2.8	
Trichloroethene	10.0	11.3	113	11.4	114	0.69	
Toluene	10.0	9.38	94	9.63	96	2.7	
Chlorobenzene	10.0	9.62	96	9.91	99	3.0	



#### DATA QUALIFIERS AND ABBREVIATIONS

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
  - B - The analyte indicated was also found in the blank sample.
  - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
  - D - Data from 1:\_\_\_\_ dilution.
  - E - The value reported exceeds the quantitation range, and is an estimate.
  - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
  - G - Insufficient sample quantity for duplicate analysis.
  - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
  - I - Compound recovery is outside of the control limits.
  - J - The value reported was below the practical quantitation limit. The value is an estimate.
  - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
  - L - The RPD is outside of the control limits.
  - M - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
  - O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.
  - P - The RPD of the detected concentrations between the two columns is greater than 40.
  - Q - Surrogate recovery is outside of the control limits.
  - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
  - T - The sample chromatogram is not similar to a typical \_\_\_\_\_.
  - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
  - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
  - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
  - X - Sample extract treated with a silica gel cleanup procedure.
  - Y - Sample extract treated with an acid cleanup procedure.
  - Z -
- ND - Not Detected at PQL  
MRL - Method Reporting Limit  
PQL - Practical Quantitation Limit  
RPD - Relative Percent Difference





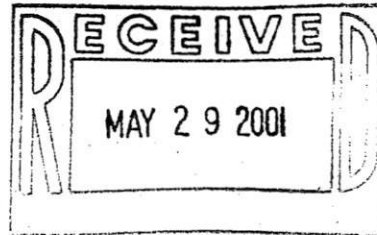
**OnSite  
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

May 25, 2001

Peter Jowise  
Herrera Environmental Consultants, Inc.  
2200 6<sup>th</sup> Avenue, Suite 601  
Seattle, WA 98121

Re: Analytical Data for Project C00-01712-001  
Laboratory Reference No. 0105-130



Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on May 17, 2001.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

  
for David Baumeister  
Project Manager

Enclosures

Date of Report: May 25, 2001  
Samples Submitted: May 17, 2001  
Lab Traveler: 05-130  
Project: C00-01712-001

**HALOGENATED VOLATILES by EPA 8260B**  
Page 1 of 2

Date Extracted: 5-21-01  
Date Analyzed: 5-21-01  
  
Matrix: Water  
Units: ug/L (ppb)  
  
Lab ID: 05-130-01  
Client ID: MW-1s

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	41		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.64		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	10		0.20
1,1-Dichloroethane	5.5		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	600		20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	18		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	2.3		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 05-130-01  
 Client ID: MW-1s

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.30		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	122	71-133
Toluene-d8	94	80-151
4-Bromofluorobenzene	103	75-139

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 5-21-01  
 Date Analyzed: 5-21-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 05-130-02  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	1.3		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.64		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 05-130-02  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	133	71-133
Toluene-d8	93	80-151
4-Bromofluorobenzene	97	75-139

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

**HALOGENATED VOLATILES by EPA 8260B**  
 Page 1 of 2

Date Extracted: 5-21-01  
 Date Analyzed: 5-21-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 05-130-03  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	1.6		0.20
1,1-Dichloroethane	1.0		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	100		20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	3.4		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.0		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 05-130-03  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	125	71-133
Toluene-d8	99	80-151
4-Bromofluorobenzene	104	75-139

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 5-21-01  
 Date Analyzed: 5-21-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 05-130-04  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.62		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 05-130-04  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	124	71-133
Toluene-d8	95	80-151
4-Bromofluorobenzene	101	75-139

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 5-21-01  
 Date Analyzed: 5-21-01

Matrix: Water  
 Units: ug/L (ppb)

Lab ID: 05-130-05  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	40		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.61		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	9.6		0.20
1,1-Dichloroethane	5.2		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	620		20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	18		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	2.3		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 05-130-05  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.27		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	120	71-133
Toluene-d8	95	80-151
4-Bromofluorobenzene	99	75-139

Date of Report: May 25, 2001  
Samples Submitted: May 17, 2001  
Lab Traveler: 05-130  
Project: C00-01712-001

**HALOGENATED VOLATILES by EPA 8260B  
METHOD BLANK QUALITY CONTROL**

Page 1 of 2

Date Extracted: 5-21-01  
Date Analyzed: 5-21-01  
  
Matrix: Water  
Units: ug/L (ppb)  
  
Lab ID: MB0521W1

<b>Compound</b>	<b>Results</b>	<b>Flags</b>	<b>PQL</b>
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: May 25, 2001  
 Samples Submitted: May 17, 2001  
 Lab Traveler: 05-130  
 Project: C00-01712-001

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 2 of 2

Lab ID: MB0521W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.30
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	126	71-133
Toluene-d8	95	80-151
4-Bromofluorobenzene	109	75-139

Date of Report: May 25, 2001  
Samples Submitted: May 17, 2001  
Lab Traveler: 05-130  
Project: C00-01712-001

**HALOGENATED VOLATILES by EPA 8260B  
SB/SBD QUALITY CONTROL**

Date Extracted: 5-21-01  
Date Analyzed: 5-21-01

Matrix: Water  
Units: ug/L (ppb)

Lab ID: SB0521W1

<b>Compound</b>	<b>Spike Amount</b>	<b>SB</b>	<b>Percent Recovery</b>	<b>SBD</b>	<b>Percent Recovery</b>	<b>RPD</b>	<b>Flags</b>
1,1-Dichloroethene	10.0	7.94	79	8.98	90	12	
Benzene	10.0	8.85	89	9.72	97	9.3	
Trichloroethene	10.0	8.75	87	9.66	97	9.9	
Toluene	10.0	7.35	74	8.24	82	11	
Chlorobenzene	10.0	9.57	96	9.43	94	1.5	



## DATA QUALIFIERS AND ABBREVIATIONS

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- D - Data from 1: \_\_\_\_ dilution.
- E - The value reported exceeds the quantitation range, and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- G - Insufficient sample quantity for duplicate analysis.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical \_\_\_\_\_.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a silica gel cleanup procedure.
- Y - Sample extract treated with an acid cleanup procedure.
- Z -
- ND - Not Detected at PQL  
MRL - Method Reporting Limit  
PQL - Practical Quantitation Limit  
RPD - Relative Percent Difference



**OnSite Environmental Inc.**  
 14648 NE 95th Street • Redmond, WA 98052  
 Fax: (425) 885-4603 • Phone: (425) 883-3881

# Chain of Custody

Turnaround Request (in working days) (Check One)  
 Same Day  1 Day  
 2 Day  3 Day  
 Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)  
 (other)

Project Chemist: **DAVID BAUMEISTER**

Laboratory No. \_\_\_\_\_

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-GX/BTEX	NWTPH-DX	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semi-volatiles by 8270C	PAHs by 8270C	PCBs by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH	% Moisture	
1	MW-15	5-17-01	1155	W	3					X										
2	MW-3		1010	W	3					X										
3	MW-4		1315	W	3					X										
4	MW-5		1420	W	3					X										
5	MW-6		1120	W	3					X										

Company: **HERERA ENVIRONMENTAL CONSULTANTS**

Project No.: **COO-01712-001**

Project Name: **LMALLUMON**

Project Manager: **PETER JAWISE**

REINQUISHED BY: *[Signature]* DATE: **5-17-01**

FIRM: **HERERA** TIME: **16:17**

REINQUISHED BY: *[Signature]* DATE: \_\_\_\_\_

FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

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REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

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FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

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REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

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REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

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REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM: \_\_\_\_\_ TIME: \_\_\_\_\_

REVIEWED BY

DATE REVIEWED

RECEIVED BY

DATE

RECEIVED BY

DATE

RECEIVED BY

DATE

COMMENTS:

Chromatographs with final report



**OnSite  
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

August 21, 2001

Peter Jowise  
Herrera Environmental Consultants, Inc.  
2200 6<sup>th</sup> Avenue, Suite 601  
Seattle, WA 98121

Re: Analytical Data for Project C00-01640-003/999-999  
Laboratory Reference No. 0108-127

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 15, 2001.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister  
Project Manager

Enclosures

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 8-16-01  
 Date Analyzed: 8-16-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 08-127-01  
 Client ID: MW-1s

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	40		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.56		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	8.3		0.20
1,1-Dichloroethane	4.2		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	490		20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	14		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.7		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 08-127-01  
 Client ID: MW-1s

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	96	71-133
Toluene, d8	98	80-151
4-Bromofluorobenzene	101	75-139

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 8-17-01  
 Date Analyzed: 8-17-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 08-127-02  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.88		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.66		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

**HALOGENATED VOLATILES by EPA 8260B**

Page 2 of 2

Lab ID: 08-127-02  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	89	71-133
Toluene, d8	98	80-151
4-Bromofluorobenzene	100	75-139

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 8-17-01  
 Date Analyzed: 8-17-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 08-127-03  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	1.1		0.20
1,1-Dichloroethane	0.68		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	70		20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	2.9		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.97		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 08-127-03  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	91	71-133
Toluene, d8	100	80-151
4-Bromofluorobenzene	104	75-139

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 8-17-01  
 Date Analyzed: 8-17-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 08-127-04  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.88		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 08-127-04  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	88	71-133
Toluene, d8	94	80-151
4-Bromofluorobenzene	100	75-139

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 8-17-01  
 Date Analyzed: 8-17-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 08-127-05  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		2.0
Chloromethane	ND		2.0
Vinyl Chloride	35		2.0
Bromomethane	ND		2.0
Chloroethane	ND		2.0
Trichlorofluoromethane	ND		2.0
1,1-Dichloroethene	ND		2.0
Iodomethane	ND		10
Methylene Chloride	ND		10
(trans) 1,2-Dichloroethene	7.1		2.0
1,1-Dichloroethane	3.6		2.0
2,2-Dichloropropane	ND		2.0
(cis) 1,2-Dichloroethene	500		2.0
Bromochloromethane	ND		2.0
Chloroform	ND		2.0
1,1,1-Trichloroethane	ND		2.0
Carbon Tetrachloride	ND		2.0
1,1-Dichloropropene	ND		2.0
1,2-Dichloroethane	ND		2.0
Trichloroethene	13		2.0
1,2-Dichloropropane	ND		2.0
Dibromomethane	ND		2.0
Bromodichloromethane	ND		2.0
2-Chloroethyl Vinyl Ether	ND		10
(cis) 1,3-Dichloropropene	ND		2.0
(trans) 1,3-Dichloropropene	ND		2.0
1,1,2-Trichloroethane	ND		2.0
Tetrachloroethene	ND		2.0
1,3-Dichloropropane	ND		2.0

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

**HALOGENATED VOLATILES by EPA 8260B**  
 Page 2 of 2

Lab ID: 08-127-05  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dibromochloromethane	ND		2.0
1,2-Dibromoethane	ND		2.0
Chlorobenzene	ND		2.0
1,1,1,2-Tetrachloroethane	ND		2.0
Bromoform	ND		10
Bromobenzene	ND		2.0
1,1,2,2-Tetrachloroethane	ND		2.0
1,2,3-Trichloropropane	ND		2.0
2-Chlorotoluene	ND		2.0
4-Chlorotoluene	ND		2.0
1,3-Dichlorobenzene	ND		2.0
1,4-Dichlorobenzene	ND		2.0
1,2-Dichlorobenzene	ND		2.0
1,2-Dibromo-3-chloropropane	ND		10
1,2,4-Trichlorobenzene	ND		2.0
Hexachlorobutadiene	ND		2.0
1,2,3-Trichlorobenzene	ND		2.0

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	93	71-133
Toluene, d8	97	80-151
4-Bromofluorobenzene	100	75-139

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 1 of 2

Date Extracted: 8-16-01  
 Date Analyzed: 8-16-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: MB0816W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	1.5		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 2 of 2

Lab ID: MB0816W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.30
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	95	71-133
Toluene, d8	98	80-151
4-Bromofluorobenzene	102	75-139

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 1 of 2

Date Extracted: 8-17-01  
 Date Analyzed: 8-17-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: MB0817W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	1.1		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: August 21, 2001  
 Samples Submitted: August 15, 2001  
 Lab Traveler: 08-127  
 Project: C00-01640-003/999-999

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 2 of 2

Lab ID: MB0817W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.30
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	90	71-133
Toluene, d8	98	80-151
4-Bromofluorobenzene	100	75-139

Date of Report: August 21, 2001  
Samples Submitted: August 15, 2001  
Lab Traveler: 08-127  
Project: C00-01640-003/999-999

HALOGENATED VOLATILES by EPA 8260B  
SB/SBD QUALITY CONTROL

Date Extracted: 8-16-01  
Date Analyzed: 8-16-01

Matrix: Water  
Units: ug/L (ppb)

Lab ID: SB0816W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	RPD	Flags
1,1-Dichloroethene	10.0	8.51	85	8.30	83	2.5	
Benzene	10.0	9.08	91	8.90	89	2.1	
Trichloroethene	10.0	9.90	99	9.67	97	2.3	
Toluene	10.0	9.47	95	9.31	93	1.7	
Chlorobenzene	10.0	9.46	95	9.27	93	2.1	



## DATA QUALIFIERS AND ABBREVIATIONS

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
  - B - The analyte indicated was also found in the blank sample.
  - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
  - D - Data from 1:\_\_\_\_ dilution.
  - E - The value reported exceeds the quantitation range, and is an estimate.
  - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
  - G - Insufficient sample quantity for duplicate analysis.
  - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
  - I - Compound recovery is outside of the control limits.
  - J - The value reported was below the practical quantitation limit. The value is an estimate.
  - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
  - L - The RPD is outside of the control limits.
  - M - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
  - O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.
  - P - The RPD of the detected concentrations between the two columns is greater than 40.
  - Q - Surrogate recovery is outside of the control limits.
  - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
  - T - The sample chromatogram is not similar to a typical \_\_\_\_\_.
  - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
  - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
  - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
  - X - Sample extract treated with a silica gel cleanup procedure.
  - Y - Sample extract treated with an acid cleanup procedure.
  - Z -
- ND - Not Detected at PQL  
MRL - Method Reporting Limit  
PQL - Practical Quantitation Limit  
RPD - Relative Percent Difference



# OnSite Environmental Inc.

14648 NE 95th Street • Redmond, WA 98052  
 Fax: (425) 885-4603 • Phone: (425) 883-3881

# Chain of Custody

Company: **HERRERA ENVIRONMENTAL CONSULTANTS**

Project No.: **000-01640-003/999-999**

Project Name: **LAKEWD 2**

Project Manager: **PETER LOWISE**

Turnaround Request (in working days)

(Check One)

Same Day  1 Day

2 Day  3 Day

Standard

(Hydrocarbon analyses: 5 days,  
 All other analyses: 7 days)

(other)

Project Chemist:

**IVID BAUMEISTER**

Laboratory No. **08-127**

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-GX/BTEX	NWTPH-DX	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCBs by 8082	Pesticides by 8081	Total FCRA Metals (8)	TCLP Metals	VPH	EPH	% Moisture	
1	MW-15	8-15-01	1235	W	3				X											
2	MW-3		1015	W	3				X											
3	MW-4		1335	W	3				X											
4	MW-5		1430	W	3				X											
5	MW-6		1200	W	3				X											

COMMENTS:

RECEIVED BY: **Shirley Kent**  
 DATE: **8/15/01**

FIRM: **DSE**  
 TIME: **4:30**

RECEIVED BY:

FIRM:

DATE REVIEWED

REINQUISHED BY: **Shirley Kent**  
 DATE: **8-15-01**

FIRM: **HERRERA**  
 TIME: **16:28**

REINQUISHED BY:

FIRM:

REVIEWED BY:

Chromatographs with final report



**OnSite  
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

November 21, 2001

Diana Phelan  
Herrera Environmental Consultants, Inc.  
2200 6<sup>th</sup> Avenue, Suite 601  
Seattle, WA 98121

Re: Analytical Data for Project C00-01640-003  
Laboratory Reference No. 0111-138

Dear Diana:

Enclosed are the analytical results and associated quality control data for samples submitted on November 16, 2001.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister  
Project Manager

Enclosures

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 11-138-01  
 Client ID: MW-1S

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	59		20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	0.47		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	6.4		0.20
1,1-Dichloroethane	2.3		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	320		20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	9.1		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.51		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 11-138-01  
 Client ID: MW-1S

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	0.21		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20
	<b>Percent Recovery</b>		<b>Control Limits</b>
<b>Surrogate</b>			
Dibromofluoromethane	106		71-133
Toluene, d8	107		80-151
4-Bromofluorobenzene	104		75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 11-138-02  
 Client ID: MW-1M

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.95		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.87		0.20
1,3-Dichloropropane	ND		0.20



Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 11-138-03  
 Client ID: MW-1D

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.64		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 11-138-03  
 Client ID: MW-1D

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20
	<b>Percent Recovery</b>		<b>Control Limits</b>
<b>Surrogate</b>			
Dibromofluoromethane	112		71-133
Toluene, d8	105		80-151
4-Bromofluorobenzene	101		75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01

Matrix: Water  
 Units: ug/L (ppb)

Lab ID: 11-138-04  
 Client ID: MW-2D

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	1.2		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B**  
 Page 2 of 2

Lab ID: 11-138-04  
 Client ID: MW-2D

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20
	<b>Percent Recovery</b>		<b>Control Limits</b>
<b>Surrogate</b>			
Dibromofluoromethane	115		71-133
Toluene, d8	108		80-151
4-Bromofluorobenzene	101		75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 11-138-05  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.73		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.57		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B**  
 Page 2 of 2

Lab ID: 11-138-05  
 Client ID: MW-3

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20
	<b>Percent</b>		<b>Control</b>
<b>Surrogate</b>	<b>Recovery</b>		<b>Limits</b>
Dibromofluoromethane	114		71-133
Toluene, d8	106		80-151
4-Bromofluorobenzene	102		75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01

Matrix: Water  
 Units: ug/L (ppb)

Lab ID: 11-138-06  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	0.57		0.20
1,1-Dichloroethane	0.29		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	35		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	1.6		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.99		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 11-138-06  
 Client ID: MW-4

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20
<b>Surrogate</b>	<b>Percent Recovery</b>		<b>Control Limits</b>
Dibromofluoromethane	109		71-133
Toluene, d8	103		80-151
4-Bromofluorobenzene	99		75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01

Matrix: Water  
 Units: ug/L (ppb)

Lab ID: 11-138-07  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.90		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 11-138-07  
 Client ID: MW-5

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	119	71-133
Toluene, d8	107	80-151
4-Bromofluorobenzene	98	75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

### HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-20-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: 11-138-08  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		20
Chloromethane	ND		20
Vinyl Chloride	54		20
Bromomethane	ND		100
Chloroethane	ND		20
Trichlorofluoromethane	ND		20
1,1-Dichloroethene	ND		20
Iodomethane	ND		100
Methylene Chloride	440	B	100
(trans) 1,2-Dichloroethene	ND		20
1,1-Dichloroethane	ND		20
2,2-Dichloropropane	ND		20
(cis) 1,2-Dichloroethene	320		20
Bromochloromethane	ND		20
Chloroform	ND		20
1,1,1-Trichloroethane	ND		20
Carbon Tetrachloride	ND		20
1,1-Dichloropropene	ND		20
1,2-Dichloroethane	ND		20
Trichloroethene	ND		20
1,2-Dichloropropane	ND		20
Dibromomethane	ND		20
Bromodichloromethane	ND		20
2-Chloroethyl Vinyl Ether	ND		100
(cis) 1,3-Dichloropropene	ND		20
(trans) 1,3-Dichloropropene	ND		20
1,1,2-Trichloroethane	ND		20
Tetrachloroethene	ND		20
1,3-Dichloropropane	ND		20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B**  
 Page 2 of 2

Lab ID: 11-138-08  
 Client ID: MW-6

Compound	Results	Flags	PQL
Dibromochloromethane	ND		20
1,2-Dibromoethane	ND		20
Chlorobenzene	ND		20
1,1,1,2-Tetrachloroethane	ND		20
Bromoform	ND		100
Bromobenzene	ND		20
1,1,2,2-Tetrachloroethane	ND		20
1,2,3-Trichloropropane	ND		20
2-Chlorotoluene	ND		20
4-Chlorotoluene	ND		20
1,3-Dichlorobenzene	ND		20
1,4-Dichlorobenzene	ND		20
1,2-Dichlorobenzene	ND		20
1,2-Dibromo-3-chloropropane	ND		100
1,2,4-Trichlorobenzene	ND		20
Hexachlorobutadiene	ND		20
1,2,3-Trichlorobenzene	ND		20
	<b>Percent Recovery</b>		<b>Control Limits</b>
<b>Surrogate</b>			
Dibromofluoromethane	111		71-133
Toluene, d8	105		80-151
4-Bromofluorobenzene	103		75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 1 of 2

Date Extracted: 11-19-01  
 Date Analyzed: 11-19-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: MB1119W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	1.0		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 2 of 2

Lab ID: MB1119W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20
	<b>Percent Recovery</b>		<b>Control Limits</b>
<b>Surrogate</b>			
Dibromofluoromethane	107		71-133
Toluene, d8	105		80-151
4-Bromofluorobenzene	102		75-139

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 1 of 2

Date Extracted: 11-20-01  
 Date Analyzed: 11-20-01  
 Matrix: Water  
 Units: ug/L (ppb)  
 Lab ID: MB1120W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		1.0
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	3.9		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: November 21, 2001  
 Samples Submitted: November 16, 2001  
 Lab Traveler: 11-138  
 Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B  
 METHOD BLANK QUALITY CONTROL**

Page 2 of 2

Lab ID: MB1120W1

<b>Compound</b>	<b>Results</b>	<b>Flags</b>	<b>PQL</b>
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20
<b>Surrogate</b>	<b>Percent Recovery</b>		<b>Control Limits</b>
Dibromofluoromethane	112		71-133
Toluene, d8	106		80-151
4-Bromofluorobenzene	103		75-139

Date of Report: November 21, 2001  
Samples Submitted: November 16, 2001  
Lab Traveler: 11-138  
Project: C00-01640-003

**HALOGENATED VOLATILES by EPA 8260B  
SB/SBD QUALITY CONTROL**

Date Extracted: 11-19-01  
Date Analyzed: 11-19-01

Matrix: Water  
Units: ug/L (ppb)

Lab ID: SB1119W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	RPD	Flags
1,1-Dichloroethene	10.0	8.13	81	8.73	87	7.2	
Benzene	10.0	8.92	89	9.48	95	6.0	
Trichloroethene	10.0	9.28	93	9.83	98	5.8	
Toluene	10.0	9.50	95	10.1	101	6.2	
Chlorobenzene	10.0	9.83	98	9.40	94	4.4	



## DATA QUALIFIERS AND ABBREVIATIONS

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

D - Data from 1: \_\_\_\_ dilution.

E - The value reported exceeds the quantitation range, and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWT PH-Dx recommended.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical \_\_\_\_\_.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected at PQL

MRL - Method Reporting Limit

PQL - Practical Quantitation Limit

RPD - Relative Percent Difference



**OnSite Environmental Inc.**  
 14648 NE 95th Street • Redmond, WA 98052  
 Phone: (425) 883-3881 • Fax: (425) 885-4603

# Chain of Custody

<b>Turnaround Request (in working days)</b> (Check One) <input type="checkbox"/> Same Day <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input checked="" type="checkbox"/> Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days) <input type="checkbox"/> (other)		<b>Requested Analysis</b> NWTPH-HCID NWTPH-GX/BTEX NWTPH-DX Volatiles by 8260B Halogenated Volatiles by 8260B Semivolatiles by 8270C PAHs by 8270C PCB's by 8082 Pesticides by 8081 Herbicides by 8151A Total RCRA Metals (8) Priority Pollutant Metals (13) TCLP Metals VPH EPH % Moisture	
Project Manager: <b>DAVID BAUMEISTER</b> Laboratory No. <b>11-138</b>			
Company: <b>HERRERA ENVIRONMENTAL CONSULTANTS</b> Project No.: <b>COO-01640-003</b> Project Name: <b>LAKEWDM2</b> Project Manager: <b>DIANA PHELAN</b>	Date Sampled: <b>11-15-01</b> Time Sampled: <b>13:15</b> Matrix: <b>W</b> # of Cont.: <b>3</b>	Date Sampled: <b>11-15-01</b> Time Sampled: <b>14:15</b> Matrix: <b>W</b> # of Cont.: <b>3</b>	Date Sampled: <b>11-15-01</b> Time Sampled: <b>15:35</b> Matrix: <b>W</b> # of Cont.: <b>3</b>
Lab ID: <b>1 MW-15</b> <b>2 MW-1M</b> <b>3 MW-1D</b> <b>4 MW-2D</b> <b>5 MW-3</b> <b>6 MW-4</b> <b>7 MW-5</b> <b>8 MW-6</b>	Date Sampled: <b>11-15-01</b> Time Sampled: <b>10:30</b> Matrix: <b>W</b> # of Cont.: <b>3</b>	Date Sampled: <b>11-15-01</b> Time Sampled: <b>09:15</b> Matrix: <b>W</b> # of Cont.: <b>3</b>	Date Sampled: <b>11-15-01</b> Time Sampled: <b>11:20</b> Matrix: <b>W</b> # of Cont.: <b>3</b>
Relinquished by: <b>[Signature]</b> Date: <b>11-16-01</b> Time: <b>12:10</b>	Relinquished by: <b>[Signature]</b> Date: <b>11-16-01</b> Time: <b>12:10</b>	COMMENTS:	
Relinquished by: <b>[Signature]</b> Date: <b>11-16-01</b> Time: <b>12:10</b>	Relinquished by: <b>[Signature]</b> Date: <b>11-16-01</b> Time: <b>12:10</b>	Chromatographs with final report <input type="checkbox"/>	

## Data Quality Assurance Review Summary

A data quality assurance review was performed on all analytical data from ground water samples collected during four sampling events conducted between February and November 2001 at the Lakewood Mall site. The laboratory's performance was reviewed in accordance with quality control specifications outlined by the analytical methods and the U.S. Environmental Protection Agency (EPA) functional guidelines for organic data review (U.S. EPA 1994).

Five ground water samples (including one field duplicate) were collected from wells MW-1s, MW-3, MW-4, and MW-5 on a quarterly basis during the following sampling events: February 12, May 17, August 15, and November 15, 2001. Three ground water samples were collected from deeper wells MW-1m, MW-1d, and MW-2d only during the November 2001 sampling event. OnSite Environmental, Inc. of Redmond, Washington analyzed the ground water samples from each event for halogenated volatile organic compounds (HVOCs) using U.S. EPA method 8260B.

Quality control data submitted by the laboratory were reviewed; raw laboratory data were not provided or reviewed. Data validation results are summarized separately below for each sampling effort.

### February 2001 HVOC Ground Water Analytical Results

Five ground water samples (including one field duplicate) were collected for chemical analysis from wells MW-1s, MW-3, MW-4, and MW-5 on February 12, 2001. The water HVOC results were determined to be acceptable for use based on the following criteria:

**Holding Times**—All 5 samples were preserved with hydrochloric acid and were extracted and analyzed within the maximum holding time (14 days) for this method.

**Laboratory Reporting Limits**—The laboratory reporting (practical quantitation limits for water HVOCs are below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-DCE. MTCA method B ground water cleanup criterion for 1,1-DCE was 0.0729 µg/L, but the practical quantitation limit was 0.20 µg/L. The usability of 1,1-DCE data for all five water samples is limited

**Blank Analysis**—One method blank was analyzed with the ground water samples. The method blank did not contained reportable levels of HVOC constituents above practical quantitation limits, and no data have been qualified. No field blanks were collected.

**Surrogate Analysis**—Three surrogate compounds were analyzed with the project samples, blanks, and spiked samples in accordance with the U.S. EPA method 8260B. As shown in Table B1, surrogate recovery values for each compound were within their respective laboratory control limit ranges. No samples required dilution.

**Table B1. Water HVOC surrogate recovery results (February 2001).**

Compound	Project Water Samples Percent Recovery	Method Blank Percent Recovery	Laboratory QC Limits—Water
Dibromofluoromethane	73-76	73	71-133
Toluene-d8	88-97	90	80-151
4-Bromofluorobenzene	91-97	88	75-139

**Duplicate Analysis**—A field duplicate (water sample MW-6) was collected from well MW-1s to be analyzed as a blind duplicate. As shown in Table B2, duplicate results of the seven HVOC analytes exhibited relative percent difference (RPD) values within the laboratory control limits (less than 30 percent).

**Table B2. Water HVOC duplicate results (February 2001).**

Compound	MW-1s Results	MW-6 Results	RPD
Tetrachloroethene (PCE)	1.2	1.2	0.0
Trichloroethene (TCE)	15	16	6.5
(cis) 1,2-Dichloroethene	390	370	5.3
(trans) 1,2-Dichloroethene	8.2	8.5	3.6
1,1-Dichloroethene	0.37	0.42	13
1,1-Dichloroethane	3.1	3.6	15
Vinyl chloride	47	48	2.1

**Spike Blank Analysis**—A non-project spike blank sample (SB0214W1) was analyzed as the spike blank/spike blank duplicate (SB/SBD). Blank spike levels were 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table B3, percent recovery values for the five HVOC constituents were within their respective laboratory control limit ranges. All RPD values were within their respective laboratory control limit ranges.

**Table B3. Water HVOC spike blank results (February 2001).**

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD Results	Laboratory RPD QC Limits
1,1-Dichloroethene	96	98	69-113	1.3	0-15
Benzene	72	74	72-128	2.8	0-10
Trichloroethene	113	114	82-122	0.69	0-12
Toluene	94	96	54-118	2.7	0-15
Chlorobenzene	96	99	86-103	3.0	0-6

## May 2001 HVOC Ground Water Analytical Results

Five ground water samples (including one field duplicate) were collected for chemical analysis from wells MW-1s, MW-3, MW-4, and MW-5 on May 17, 2001. The water HVOC results were determined to be acceptable for use based on the following criteria:

**Holding Times**—All 5 samples were preserved with hydrochloric acid and were extracted and analyzed within the maximum holding time (14 days) for this method.

**Laboratory Reporting Limits**—The laboratory reporting (practical quantitation limits for water HVOCs are below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-DCE. MTCA method B ground water cleanup criterion for 1,1-DCE was 0.0729 µg/L, but the practical quantitation limit was 0.20 µg/L. The usability of 1,1-DCE data for all five water samples is limited.

**Blank Analysis**—One method blank was analyzed with the ground water samples. The method blank did not contained reportable levels of HVOC constituents above practical quantitation limits, and no data have been qualified. No field blanks were collected.

**Surrogate Analysis**—Three surrogate compounds were analyzed with the project samples, blanks, and spiked samples in accordance with the U.S. EPA method 8260B. As shown in Table B4, surrogate recovery values for each compound were within their respective laboratory control limit ranges. No samples required dilution.

**Table B4. Water HVOC surrogate recovery results (May 2001).**

Compound	Project Water Samples Percent Recovery	Method Blank Percent Recovery	Laboratory QC Limits—Water
Dibromofluoromethane	120-133	126	71-133
Toluene-d8	93-99	95	80-151
4-Bromofluorobenzene	97-104	109	75-139

**Duplicate Analysis**—A field duplicate (water sample MW-6) was collected from well MW-1s to be analyzed as a blind duplicate. As shown in Table B5, duplicate results of the eight HVOC analytes exhibited RPD values within the laboratory control limits (less than 30 percent).

**Table B5. Water HVOC duplicate results (May 2001).**

Compound	MW-1s Results	MW-6 Results	RPD
Tetrachloroethene (PCE)	2.3	2.3	0
Trichloroethene (TCE)	18	18	0
cis 1,2-Dichloroethene (cis DCE)	600	620	3.3
trans 1,2-Dichloroethene (trans DCE)	10	9.6	4.1
1,1-Dichloroethene (1,1-DCE)	0.64	0.61	5
1,1-Dichloroethane (1,1-DCA)	5.5	5.2	6
Vinyl chloride	41	40	2.5
1,4-Dichlorobenzene (1,4-DCB)	0.30	0.27	10.5

**Spike Blank Analysis**—A non-project spike blank sample (SB0521W1) was analyzed as the SB/SBD. Blank spike levels were 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table B6, percent recovery values for the five HVOC constituents were within their respective laboratory control limit ranges. All RPD values were within their respective laboratory control limit ranges.

**Table B6. Water HVOC spike blank results (May 2001).**

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD	Laboratory RPD QC Limits
1,1-Dichloroethene	79	90	69-113	12	0-15
Benzene	89	97	72-128	9.3	0-10
Trichloroethene	87	97	82-122	9.9	0-12
Toluene	74	82	54-118	11	0-15
Chlorobenzene	96	94	86-103	1.5	0-6

## August 2001 HVOC Ground Water Analytical Results

Five ground water samples (including one field duplicate) were collected for chemical analysis from wells MW-1s, MW-3, MW-4, and MW-5 on August 15, 2001. The water HVOC results were determined to be acceptable for use based on the following criteria:

**Holding Times**—All 5 samples were preserved with hydrochloric acid and were extracted and analyzed within the maximum holding time (14 days) for this method.

**Laboratory Reporting Limits**—The laboratory reporting (practical quantitation limits for water HVOCs are below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-DCE. MTCA method B ground water cleanup criterion for 1,1-DCE was 0.0729 µg/L, but the practical quantitation limit was 0.20 µg/L. The usability of 1,1-DCE data for all five water samples is limited. The practical quantitation limits for project sample MW-6 were elevated by a factor of 10 because the sample was diluted.

**Blank Analysis**—Two method blanks were analyzed because project samples were analyzed in separate batches. Neither method blank contained reportable levels of HVOC constituents above practical quantitation limits, and no data have been qualified. No field blanks were collected.

**Surrogate Analysis**—Three surrogate compounds were analyzed with the project samples and both method blanks in accordance with the method. As shown in Table B7, surrogate recovery values for each compound were within their respective laboratory control limit ranges.

**Table B7. Water HVOC surrogate recovery results (August 2001).**

Compound	Project Water Samples Percent Recoveries	Method Blanks Percent Recoveries	Laboratory QC Limits
Dibromofluoromethane	88-96	90-95	71-133
Toluene-d8	94-100	98-98	80-151
4-Bromofluorobenzene	100-104	100-102	75-139

**Duplicate Analysis**—A field duplicate (water sample MW-6) was collected from well MW-1s to be analyzed as a blind duplicate. As shown in Table B8, duplicate results of the five of the seven HVOC analytes exhibited RPD values within the laboratory control limits (less than 30 percent). The two remaining HVOC constituents were not detected above laboratory reporting (practical quantitation) limits in one or both samples.

**Table B8. Water HVOC duplicate results (August 2001).**

Compound	MW-1s Results	MW-6 Results	RPD
Tetrachloroethene (PCE)	1.7	< 2.0	Not calculated
Trichloroethene (TCE)	14	13	7.4
(cis) 1,2-Dichloroethene	490	500	2.0
(trans) 1,2-Dichloroethene	8.3	7.1	16
1,1-Dichloroethene	0.56	<2.0	Not calculated
1,1-Dichloroethane	4.2	3.6	15.4
Vinyl chloride	40	35	13.3

**Spike Blank Analysis**—A non-project spike blank sample (SB0816W1) was analyzed as the SB/SBD. Blank spike levels were 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table B9, percent recovery values for the five HVOC constituents were within their respective laboratory control limit ranges. All RPD values were within their respective laboratory control limit ranges.

**Table B9. Water HVOC spike blank results (August 2001).**

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD	Laboratory RPD QC Limits
1,1-Dichloroethene	85	83	69-113	2.5	0-15
Benzene	91	89	72-128	2.1	0-10
Trichloroethene	99	97	82-122	2.3	0-12
Toluene	95	93	54-118	1.7	0-15
Chlorobenzene	95	93	86-103	2.1	0-6

## November 2001 HVOC Ground Water Analytical Results

Eight ground water samples (including one field duplicate) were collected for chemical analysis from wells MW-1s, MW-1m, MW-1d, MW-2d, MW-3, MW-4, and MW-5 on November 15, 2001. The water HVOC results were determined to be acceptable for use based on the following criteria:

**Holding Times**—All 8 samples were preserved with hydrochloric acid and were extracted and analyzed within the maximum holding time (14 days) for this method.

**Laboratory Reporting Limits**—The laboratory reporting (practical quantitation limits for water HVOCs are below regulatory criteria (i.e., WAC 173-340), with the exception of 1,1-DCE. MTCA method B ground water cleanup criterion for 1,1-DCE was 0.0729 µg/L, but the practical quantitation limit was 0.20 µg/L. The usability of 1,1-DCE data for all eight water samples is limited. The practical quantitation limits for project sample MW-6 and vinyl chloride and cis DCE for project sample MW-1s were elevated by a factor of 100 because both samples were diluted.

**Blank Analysis**—Two method blanks were analyzed because project samples were analyzed in separate batches. Both method blanks contained methylene chloride detected above practical quantitation limit of 0.20 µg/L, at concentrations of 1.0 and 3.9 µg/L. Methylene chloride also was detected in project sample MW-6 at a concentration of 440 µg/L; the concentration was elevated by a factor of 100 because sample was diluted (concentration in this sample was 4.4 µg/L). No methylene chloride was detected in project sample MW-1s; MW-6 is a blind field duplicate of MW-1s. Since methylene chloride was detected in both method blanks indicates that it likely is a laboratory contaminant, since it is a common laboratory solvent. No other HVOC constituents were detected in either method blank. No field blanks were collected.

**Surrogate Analysis**—Three surrogate compounds were analyzed with the project samples and both method blanks in accordance with the method. As shown in Table B10, surrogate recovery values for each compound were within their respective laboratory control limit ranges.

**Table B10. Water HVOC surrogate recovery results (November 2001).**

Compound	Project Water Samples Percent Recoveries	Method Blanks Percent Recoveries	Laboratory QC Limits
Dibromofluoromethane	106-119	107-112	71-133
Toluene-d8	103-108	105-106	80-151
4-Bromofluorobenzene	98-104	102-103	75-139

**Duplicate Analysis**—A field duplicate (water sample MW-6) was collected from well MW-1s to be analyzed as a blind duplicate. As shown in Table B11, duplicate results of cis DCE and vinyl chloride exhibited RPD values within the laboratory control limits (less than 30 percent). The six remaining HVOC constituents were not detected above laboratory reporting (practical quantitation) limits in field duplicate sample MW-6; practical quantitation limits were elevated by a factor of 100 because sample was diluted.

**Table B11. Water HVOC duplicate results (August 2001).**

Compound	MW-1s Results	MW-6 Results	RPD
Tetrachloroethene (PCE)	0.51	< 20	Not calculated
Trichloroethene (TCE)	9.1	< 20	Not calculated
cis 1,2-Dichloroethene (cis DCE)	320	320	0
trans 1,2-Dichloroethene (trans DCE)	6.4	< 20	Not calculated
1,1-Dichloroethene (1,1-DCE)	0.47	< 20	Not calculated
1,1-Dichloroethane (1,1-DCA)	2.3	< 20	Not calculated
Vinyl chloride	59	54	8.8
1,4-Dichlorobenzene (1,4-DCB)	0.21	< 20	Not calculated

**Spike Blank Analysis**—A non-project spike blank sample (SB1119W1) was analyzed as the SB/SBD. Blank spike levels were 10 to 50 times the laboratory reporting (practical quantitation) limits. Percent recovery and RPD results were correctly calculated. As shown in Table B12, percent recovery values for the five HVOC constituents were within their respective laboratory control limit ranges. All RPD values were within their respective laboratory control limit ranges.

**Table B12. Water HVOC spike blank results (November 2001).**

Compound	SB % Recovery	SBD % Recovery	Laboratory % Recovery Limits	SB/SBD RPD	Laboratory RPD QC Limits
1,1-Dichloroethene	81	87	69-113	7.2	0-15
Benzene	89	95	72-128	6.0	0-10
Trichloroethene	93	98	82-122	5.8	0-12
Toluene	95	101	54-118	6.2	0-15
Chlorobenzene	98	94	86-103	4.4	0-6

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