SKOTDAL ENT

Golder Associates Inc.

18300 NE Union Hill Road, Suite 200
Redmond, WA USA 98052-3333
Telephone (425) 883-0777
Fax (425) 882-5498
www.golder.com

PRELIMINARY GROUNDWATER INVESTIGATION SNOHOMISH SQUARE LAUNDRY AND CLEANERS 1419 AVENUE D SNOHOMISH, WASHINGTON

RECEIVED
JUL 15 2004
DEPT OF ECOLOGY

Submitted to:

Skotdal Real Estate
P. O. Box 5267
Everett, Washington 98206

Submitted by:

Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052

Neil R. Gilham, LG, CHMM,
Senior Environmental Geologist

Douglas J. Morell, Ph.D
Principal

Distribution:

2 Copies - Skotdal Real Estate
1 Copy - Golder Associates Inc.

April 1, 2004

033-1002.001

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This report summarizes the findings of our Preliminary Groundwater Investigation conducted at the subject site on February 5 and February 8, 2004, that consisted of the installation of four groundwater monitoring wells, including soil and groundwater sampling, around a retail dry cleaning facility known as Snohomish Square Laundry and Cleaners. A Preliminary Subsurface Investigation was conducted at the subject site on November 19, 2003 and described in our draft report titled "Preliminary Subsurface Investigation, Snohomish Square Dry Cleaners", dated December 10, 2003.

1.1 Site Description

Snohomish Square Laundry and Cleaners (subject site) is located in the Snohomish Square Shopping Center at 1419 Avenue D in Snohomish, Washington (see Figure 1). The shopping center consists of several buildings occupied by retail shops, restaurants, U.S. Post Office, and a Top Foods supermarket. The subject site is located in the north end area of the shopping center (see Figure 2). The shopping center is mostly paved with some limited areas of landscape.

The subject site is at an elevation of approximately 160 feet above mean seal level. The topographic slope at the shopping center is gradually toward the southwest. Blackmans Lake, a freshwater lake, is located approximately 600 feet northeast of the subject site.

1.2 Purpose and Scope

The purpose of the Preliminary Groundwater Investigation was to determine groundwater quality, quantity, gradient, and flow direction in the area of the dry cleaning facility that was the subject of our prior Preliminary Subsurface Investigation.

Snohomish Square Laundry and Cleaners currently uses and appears to have historically used tetrachloroethene-based solvent in its operations. According to Art Skotdal, the former General Nutrition space in Building 4 was occupied by a drop-off/pickup dry cleaner facility during the 1970's. Mr. Skotdal indicated that no dry cleaning was conducted on-site.

Tetrachloroethene is also known as perchloroethylene and is abbreviated as PCE in this report. The expected contaminants from a dry cleaner operation using PCE include PCE and its degradation compounds trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride.

The prior Preliminary Subsurface Investigation (Golder, December 10, 2003) included soil and groundwater sampling from two exterior borings completed as temporary wells, and soil sampling from a shallow, interior hand-auger boring. PCE was detected in all soil samples and exceeded the MTCA Method A cleanup level in a soil sample obtained from the interior boring. PCE was also detected in groundwater samples collected from both temporary wells at concentrations exceeding the MTCA Method A cleanup level.

Based on the limited scope of the prior Preliminary Subsurface Investigation (Golder, December 10, 2003), the specific sources and transport mechanisms for the PCE release were not known. The objectives of the Preliminary Groundwater Investigation were the identification of groundwater gradient and flow direction at the subject property so that the extent and path of the potential contaminant plume can be assessed more efficiently during future investigations.

The Preliminary Groundwater Investigation scope of work included the following:

- Four hollow-stem auger borings were drilled (MW-1 through MW-4). Groundwater monitoring wells were installed in all four borings and constructed in accordance with Washington State regulations (Chapter 173-600 WAC).
- Soil samples were collected from MW-1 and MW-2 during drilling at approximately 5-foot intervals in both borings. No soil samples were collected from MW-3 and MW-4 because soil samples had previously been collected at these locations during the previous Preliminary Subsurface Investigation (Golder, December 10, 2003).
- Groundwater samples were collected from the monitoring wells installed using USEPA low-flow sampling methods.
- Soil and groundwater samples were analyzed for the presence of halogenated volatile organic compounds (HVOCs) using EPA Method 8260B.
- The well elevations (at top of casing) and locations were surveyed by a licensed surveyor in order to establish a reference for estimating groundwater gradient and flow directions.

2.0 SUBSURFACE INVESTIGATION

2.1 Field Investigation

Utilities were notified using the Utilities Underground Location Center (UULC) in advance of the field investigation (at least 48 hours before). Golder's Geophysical Group investigated the boring locations for underground utilities using ground-penetrating radar (GPR).

The field investigation was conducted on February 5, 2004. The field investigation included drilling four soil borings (MW-1 through MW-4) with a CME-55 limited access drill rig utilizing hollow-stem augers. All four borings were advanced to maximum depths ranging from 15 to 15.5 feet below ground surface (bgs). Borings MW-3 and MW-4 were drilled through asphalt pavement adjacent to the Snohomish Square Laundry and Cleaners, with MW-3 located to the north of the dry cleaner and MW-4 to the west. MW-2 was drilled through grass on the adjoining eastern property that is owned by Skotdal. MW-1 was drilled through asphalt adjacent and to the west of the former dry cleaner in Building 4. The monitoring well locations are depicted on Figures 2, 3, and 4.

Soil samples were collected at 5-foot intervals in borings MW-1 and MW-2, using a 2.5-inch I.D. oversized split-spoon sampler driven by a 300-pound hammer falling a distance of 30 inches, in accordance with the Standard Penetration Method, ASTM D-1586. The soil samples were placed in laboratory supplied glass jars, labeled, placed in an ice chest and maintained in a chilled state until relinquished to the laboratory. The samples from 5 and 10 feet bgs in both borings were selected for laboratory analysis. The drilling and sampling of soils were performed in accordance with GAI Technical Procedure TP-1.2-5, "Drilling, Sampling, and Logging of Soils." Soil samples were classified in accordance with GAI Technical Procedure TP-1.2-6, "Field Identification of Soil" which is summarized on the Soil Description Index in Appendix A. Boring logs describing the subsurface conditions are included in Appendix A. A Golder geologist performed all subsurface sampling and logging of soils.

Groundwater monitoring wells were installed in all four borings in accordance with Washington State regulations (Chapter 173-160 WAC), using 2-inch diameter PVC schedule 40 well casing. The well screen consisted of 0.020 inch machine-slotted casing and was installed from 5 to 15 feet bgs. The well casing was installed through the auger stem. A sand filter pack was placed around the well screen, from 4 to 15 feet bgs. The augers were then retracted leaving the well casing in place. A bentonite seal consisting of rehydrated bentonite pellets was placed over the sand, from 2 to 4 feet bgs. The wells were completed with traffic-rated flush-mounted well covers encased in concrete from 0 to 2 feet bgs. The well specifications are depicted on the monitoring well logs in Appendix A.

Groundwater samples were obtained from the monitoring wells on February 8, 2004 using a low-flow peristaltic pump. Dedicated tubing was lowered to the middle of the screened interval and pumped from the wells at a low rate. Conductivity, temperature, and pH were measured during pumping and when the measurements stabilized to within 10%, groundwater samples were collected and carefully poured into laboratory-provided containers (standard 40-milliliter VOA vials). The containers were then labeled, placed into an ice chest, and maintained in a chilled state until relinquished to the laboratory.

The soil and groundwater samples were submitted to OnSite Environmental, Inc. in Redmond, Washington. Chain of custody procedures were followed during sample collection and transport to the laboratory. The samples were analyzed for the presence of HVOCs using EPA Method 8260B.

Investigation-derived waste (IDW), which included soil and decontamination rinsates, was placed and sealed into 55-gallon DOT drums. These drums were labeled and left in a designated on-site location pending proper disposition.

2.2 Subsurface Conditions

A Golder field geologist logged subsurface conditions encountered during the drilling of the four monitoring wells. Monitoring well logs are included in Appendix A. The regional surficial geology resulted from the advance and retreat of continental glacial ice-sheets that covered much of northwestern Washington during the Pleistocene. Sediments underlying the subject site were deposited by and in response to the continental glacial ice-sheets. The advancing glacial ice sheet, which in the mid-Puget Sound region was over 3,000 feet thick, overran these sediments. As a result, they have been over-consolidated and have a dense/hard consistency.

The area of investigation underneath the asphalt pavement is underlain by pea gravel and sand fill to about 5 feet bgs. The fill in MW-1 was underlain by approximately one-inch of topsoil, overlying a hard silty clay which appears to be a glaciolacustrine deposit (sediment deposited in a pro-glacial lake) to about 7 feet bgs. Underlying the glaciolacustrine deposit to the maximum depth of the borehole is a very dense, fine to coarse sand with fine to coarse gravel and little fines. MW-2 was drilled in the rear yard of a residence located just east of the drycleaner. The topsoil was underlain by a loose to compact, silty sand to approximately 7.5 feet bgs. Very dense, gravelly, medium to coarse sand with little trace fines were encountered from 7.5 feet bgs to the maximum depth drilled. The subsurface conditions in MW-3 and MW-4 were similar to those encountered in MW-1 and MW-2, based on drill cuttings.

Groundwater was initially encountered in MW-1 at approximately 6.5 feet bgs, and rose to 4 feet bgs at the end of drilling. Groundwater was encountered in MW-2 at approximately 6 feet bgs. The groundwater was encountered at similar levels in MW-3 and MW-4. Groundwater levels measured prior to sampling with the peristaltic pump were approximately 7 feet below top of well casing (TOC) in MW-1, 7.8 feet below TOC in MW-2, and approximately 5 feet below TOC in MW-3 and MW-4.

A survey of the well locations and top of casing elevations was completed on March 12, 2004 by Triad Associates of Kirkland, Washington. Depth to groundwater was measured on February 8, 2004. Groundwater elevation and contours for February 8, 2004 are depicted on Figure 4. The interpreted groundwater flow direction is towards to southwest.

3.0 ANALYTICAL RESULTS

The soil and groundwater samples submitted to the laboratory were analyzed for the presence of HVOCs using EPA Method 8260B. The analytical results are summarized on Tables 1 and 2 and include the results for all detected HVOCs and also for PCE and its common degradation products, regardless of whether they were detected. Laboratory analytical reports are included in Appendix B.

3.1 Soil

PCE was detected in one soil sample, MW-1 @10', at a concentration of 0.0019 milligrams per kilogram (mg/kg). The MTCA Method A cleanup level for PCE in soil is 0.05 mg/kg. No other HVOCs, including PCE degradation products, were detected in any other soil sample or greater than at the detection limit.

3.2 Groundwater

PCE was detected in groundwater samples from all four monitoring wells. The concentrations of PCE were 530 micrograms per liter (µg/L) in MW-4, 180 µg/L in MW-1, and 17 µg/L in MW-3. All of these concentrations exceed the 5 µg/L MTCA Method A cleanup level for PCE in groundwater. Only MW-2, located east of the drycleaner had a PCE concentration less than the MTCA Method A cleanup level for PCE in groundwater, at 0.51 µg/L.

Chloroform was detected in MW-3 at 2.3 µg/L, in MW-1 at 2.0 µg/L, and in MW-2 at 1.8 µg/L. None of these concentrations exceed the 7.17 µg/L MTCA Method B cleanup level for chloroform in groundwater. Chloroform was not detected in MW-4 at the detection limit.

TCE, 1,1-DCE, Cis-1,2-DCE, Trans-1,2-DCE, and vinyl chloride were not detected at or greater than the detection limit in any of the groundwater samples. However, the laboratory practical quantitation limit (PQL) was raised because of the sample dilution required due to the presence of relatively high concentrations of PCE. Therefore, 1,1-DCE and vinyl chloride could be present in groundwater at concentrations that exceed Method A or B cleanup levels but are less than the PQL of 4 µg/L (see Table 2).

4.0 CONCLUSIONS

The results of the Preliminary Groundwater Investigation indicate that a release of PCE has occurred that has affected soil and groundwater at the subject site. PCE was detected in one soil sample, MW-1 at 10 feet bgs at a concentration significantly below the MTCA Method A cleanup level. No other HVOCs , including PCE degradation products, were detected in any other soil sample at or greater than the detection limit.

PCE was detected in groundwater at concentrations that considerably exceed the 5 µg/L MTCA Method A cleanup level for PCE in all but one of the groundwater samples, MW-2 at 0.51 µg/L. The concentrations of PCE in soil were small relative to the Method A cleanup level and the relatively high PCE concentrations detected in groundwater. This may suggest that there are higher PCE concentrations in soil that were not discovered during this preliminary investigation and which represent the potential source of groundwater contamination.

Groundwater flow direction is interpreted to be towards the southeast. The relative concentrations of PCE and the groundwater flow direction suggest a source at or near the existing dry cleaner facility. The limits of the PCE contaminated groundwater plume have not been determined to the north, west, or south.

The specific sources and transport mechanisms for the PCE release are not conclusively known. Typically, releases at dry cleaner facilities occur around the dry cleaning machine, at floor drains, or through leaking sewer pipes. These typical point source release areas have not been thoroughly investigated as part of this approved scope of work. Because, there is evidence that a release of PCE has occurred and the source has not been determined, further investigation is recommended.

The Model Toxics Control Act (MTCA) Cleanup Regulation (WAC 173-340) has established an owner or operator's requirements for reporting releases of hazardous substances to the environment that may be a threat to human health and the environment and such reports must be made within 90 days of discovery. The findings of this study suggest that the release will need to be reported to the Washington State Department of Ecology in accordance with MTCA regulations.

5.0 LIMITATIONS

This Preliminary Groundwater Investigation has been prepared for the exclusive use of Skotdal Real Estate. We have performed the Preliminary Groundwater Investigation in accordance with the scope of work presented in our proposals dated January 15 and 27, 2004.

This report includes data and information collected during the site visit and field investigation by Golder Associates, Inc. and is based solely on the condition of the property at the time of the site visit and field investigation.

This report is not meant to represent a legal opinion. No other warranty, expressed or implied, is made. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Golder Associates Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of data obtained decisions made or actions taken based on this report.

6.0 REFERENCES

Washington State Department of Ecology, *Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Regulation*, Version 3.1, November 2001.

Washington State Department of Ecology, *Model Toxics Control Act Cleanup Regulation*, Chapter 173-340, amended February 12, 2001.

TABLES

TABLE 1

Soil Analytical Results for Detected Halogenated Volatile Organic Compounds

Well No.	Location	Sample No.	Depth (feet)[1]	Soil Analytical Results (milligrams per kilogram)[2]					
				Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
MW-1	West of Bldg.4	MW-1 @ 5'	5 - 5.5	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013
		MW-1 @ 10'	10 - 10.5	0.0019	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012
MW-2	East of Bldg.3	MW-2 @ 5'	5 - 5.5	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
		MW-2 @ 10'	10 - 10.5	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
MTCA Cleanup Levels for Soil				0.05 [3]	0.03 [3]	1.67 [4]	800 [4]	1,600 [4]	0.667 [4]

Results in ***BOLD/ITALIC*** indicates the analytical result exceeds MTCA cleanup levels

[1]Depth in feet below ground surface (bgs)

[2]Analysis using EPA Method 8260B

[3]Method A Soil Cleanup Levels for Unrestricted Land Uses, Table 740-1, Model Toxics Control Act (MTCA) Cleanup Regulation - Chapter 173-340 WAC (amended February 12, 2001)

[4]Method B Formula Value for Soil (Unrestricted Land Use) - Direct Contact Pathway (Ingestion Only), Cleanup Levels and Risk Calculations under MTCA, version 3.1, updated November 2001

Golder Associates

TABLE 2

Groundwater Analytical Results for Detected Halogenated Volatile Organic Compounds

Boring No.	Location	Sample No.	Groundwater Analytical Results (micrograms per liter)[1]						
			Tetrachloroethene	Trichloroethene	1,1-Dichloroethene[2]	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride[2]	Chloroform
MW-1	West of Bldg.4	MW-1	***180***	<1.0	<1.0	<1.0	<1.0	<1.0	2
MW-2	East of Bldg.3	MW-2	0.51	<0.20	<0.20	<0.20	<0.20	<0.20	1.8
MW-3	North of Bldg.3	MW-3	***17***	<0.20	<0.20	<0.20	<0.20	<0.20	2.3
MW-4	West of Bldg.3	MW-4	***530***	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MTCA Cleanup Levels for Groundwater			**5**[3]	**5**[3]	**0.729**[4,5]	**80**[4]	**160**[4]	**0.2**[3]	**7.17**[4]

Results in ***BOLD/ITALIC*** indicates the analytical result exceeds MTCA cleanup levels

[1]Analysis using EPA Method 8260B

[2]Practical Quantitation Limit exceeds MTCA cleanup level

[3]Method A Cleanup Levels for Ground Water, Table 720-1, Model Toxics Control Act (MTCA) Cleanup Regulation - Chapter 173-340 WAC (amended February 12, 2001)

[4]Method B Formula Value for Potable Groundwater, Cleanup Levels and Risk Calculations under MTCA, version 3.1, updated November 2001

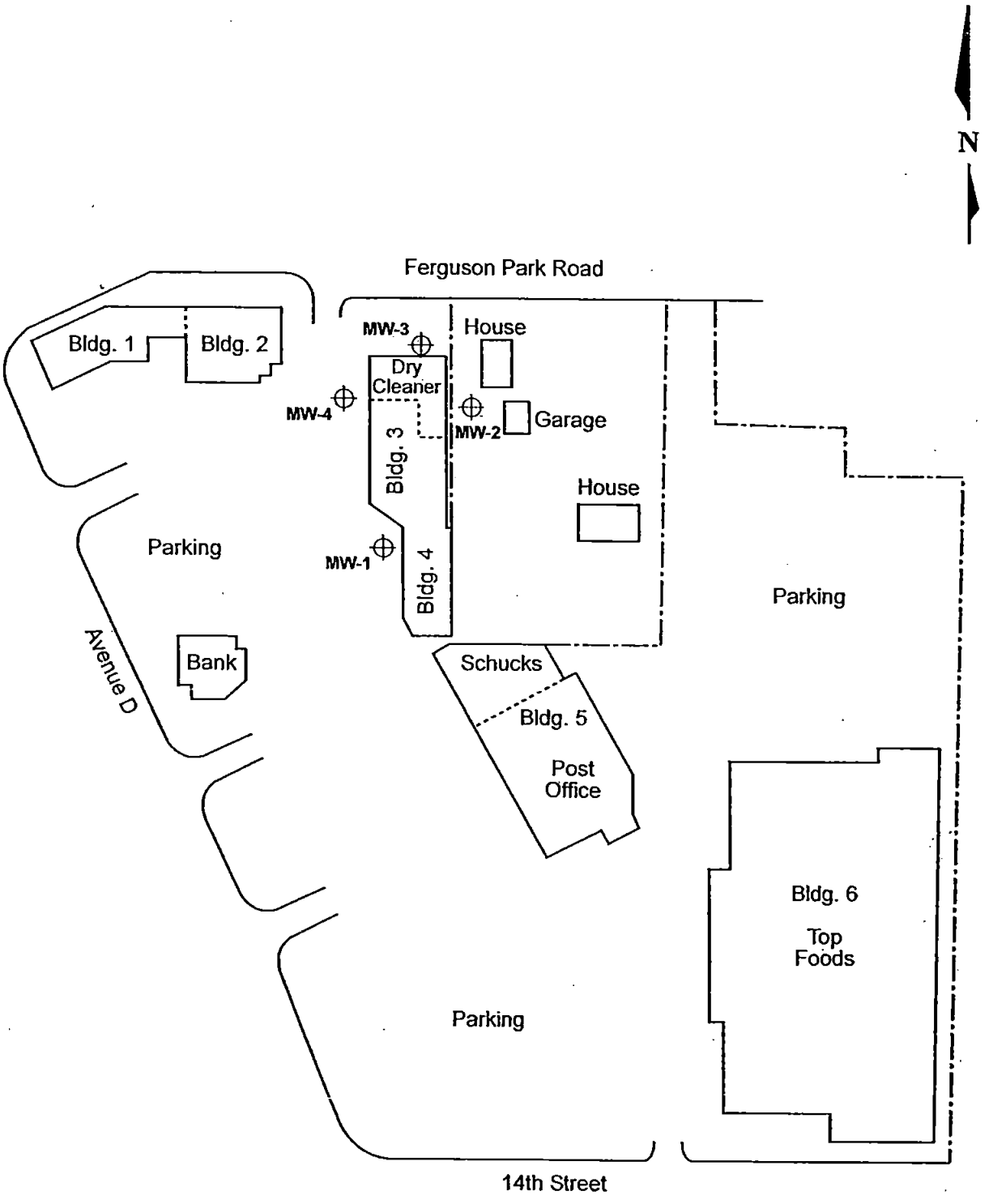
[5]Adjusted cleanup level per MTCA Chapter 173-340-720(7)(b)

FIGURES

FIGURE 1
SITE LOCATION MAP
SKOTDAL/SNOHOMISH SQUARE INVEST./WA

DRAWING NO. 0331002000fg01.fh11 DATE 12/01/03 DRAWN BY AMP

Golder Associates



LEGEND

MW-2 ⊕ Monitoring well location

FIGURE **2**
SITE PLAN
SKOTDAL/SNOHOMISH SQUARE INVEST./WA

DRAWING NO. 0331002001fg03.fh11 DATE 03/18/04 DRAWN BY EL

Golder Associates

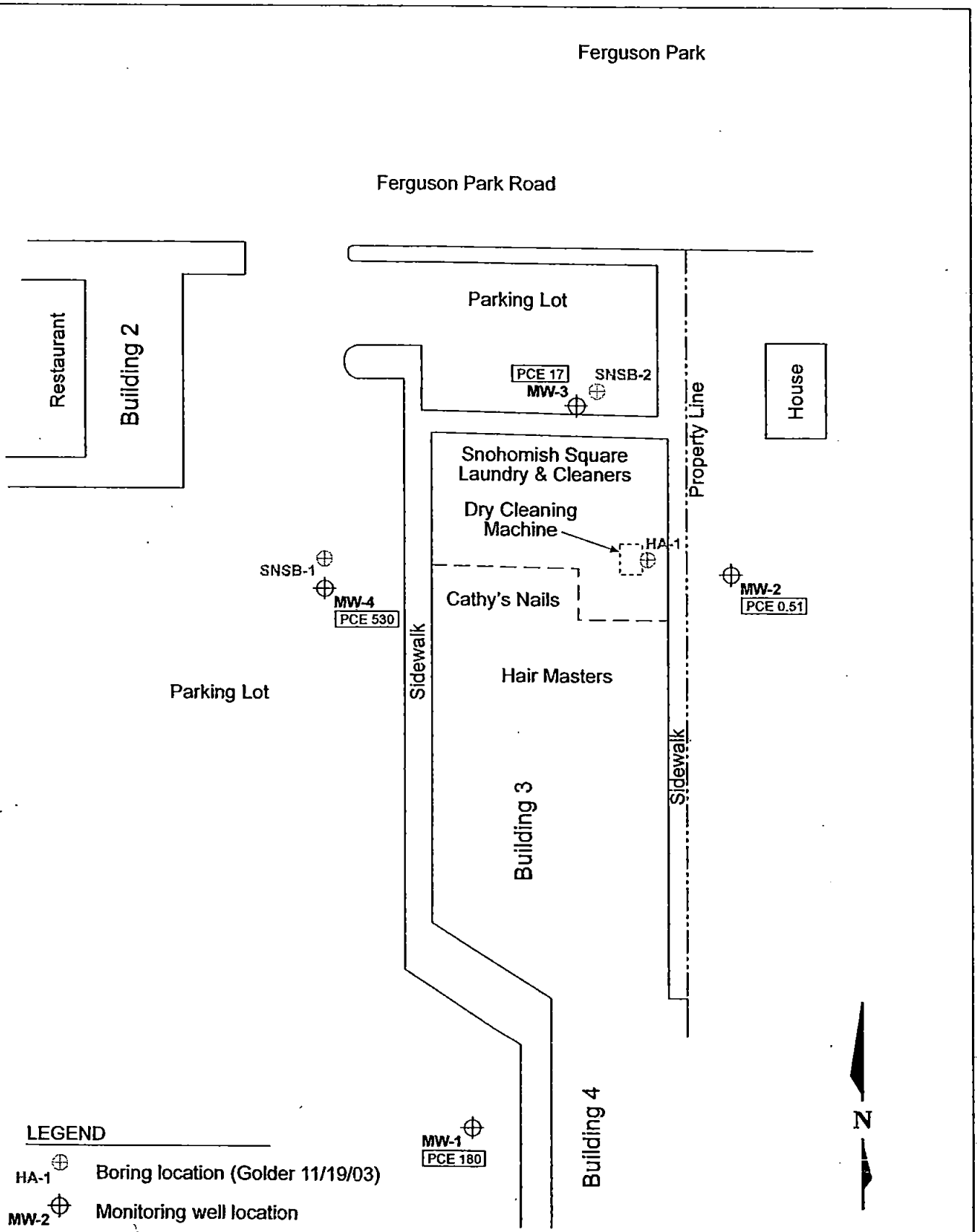
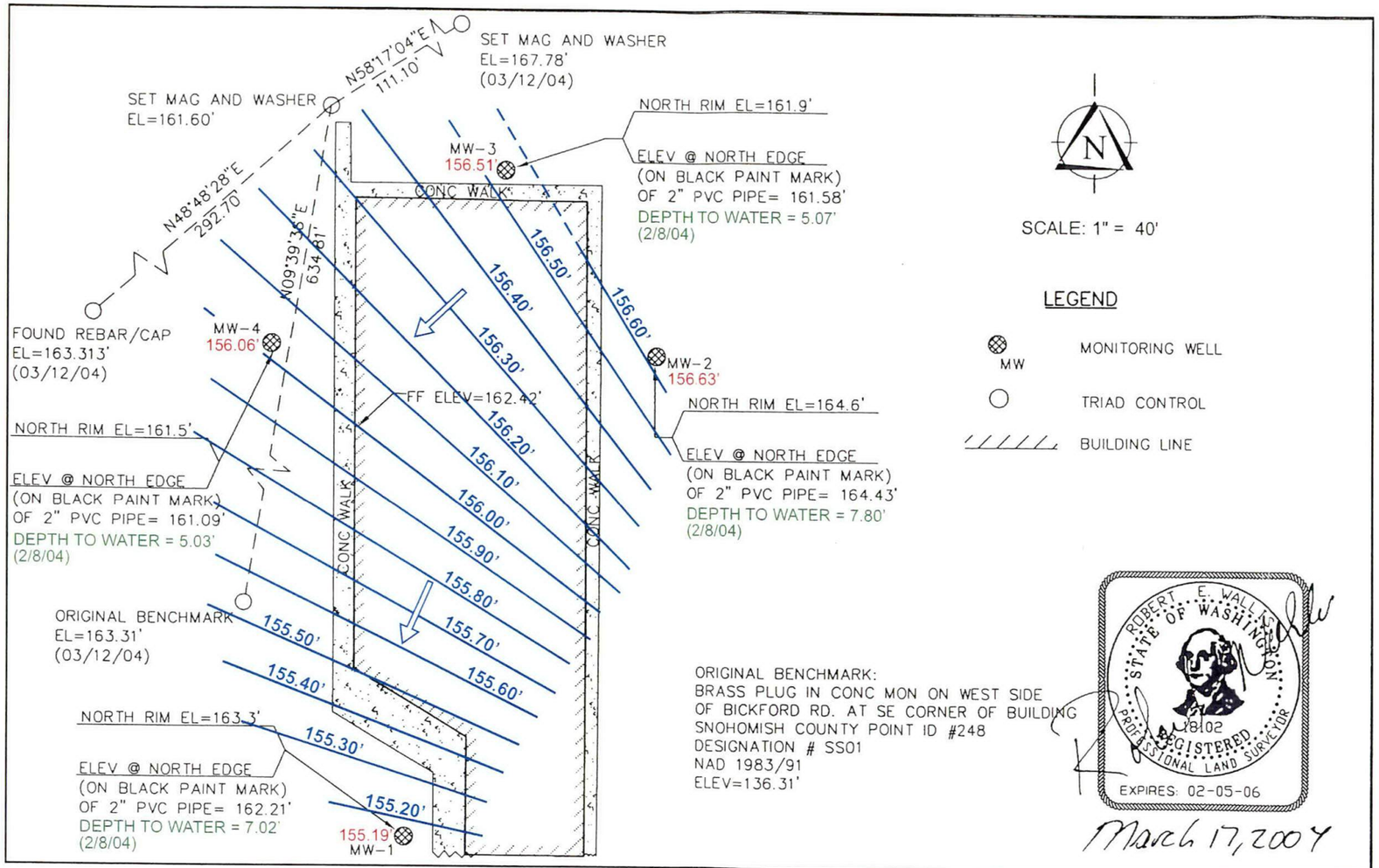


FIGURE 3
MONITORING WELL LOCATION AND PCE CONCENTRATIONS
SKOTDAL/SNOHOMISH SQUARE INVEST./WA

DRAWING NO. 0331002001fg01.fh11 DATE 03/18/04 DRAWN BY EL

Golder Associates



Source: Triad Associates
Exhibit for Well Location
03/15/04

RED = GROUNDWATER ELEVATION (FEET)

GREEN = DEPTH TO GROUNDWATER (FEET) ON FEBRUARY 8, 2004

BLUE = GROUNDWATER ELEVATION CONTOUR ON FEBRUARY 8, 2004

FIGURE **4**

WELL SURVEY AND GROUNDWATER ELEVATION

SKOTDAL/SNOHOMISH SQUARE INVEST./WA

DRAWING NO. 0331002001fg02.fh11 DATE 03/19/04 DRAWN BY EL

Golder Associates

APPENDIX A

MONITORING WELL LOGS

Unified Soil Classification System

Criteria for Assigning Group Symbols and Names			Soil Classification Group	Generalized Group Descriptions
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 Sieve	CLEAN GRAVELS Less than 5% fines	GW	Well-graded Gravels
			GP	Poorly-graded gravels
		GRAVELS WITH FINES More than 12% fines	GM	Gravel and Silt Mixtures
			GC	Gravel and Clay Mixtures
	SANDS 50% or more of coarse fraction passes No. 4 Sieve	CLEAN SANDS Less than 5% fines	SW	Well-graded Sands
			SP	Poorly-graded Sands
		SANDS WITH FINES More than 12% fines	SM	Sand and Silt Mixtures
			SC	Sand and Clay Mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50	INORGANIC	CL	Low-plasticity Clays
			ML	Non-plastic and Low-Plasticity Silts
		ORGANIC	OL	Non-plastic and Low-Plasticity Organic Clays Non-plastic and Low-Plasticity Organic Silts
	SILTS AND CLAYS Liquid limit greater than 50	INORGANIC	CH	High-plasticity Clays
			MH	High-plasticity Silts
		ORGANIC	OH	High-plasticity Organic Clays High-plasticity Organic Silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT	Peat

Component Definitions by Gradation

Component	Size Range
Boulders	Above 12 in.
Cobbles	3 in. to 12 in.
Gravel	3 in. to No. 4 (4.76mm)
Coarse gravel	3 in. to 3/4 in.
Fine gravel	3/4 in. to No. 4 (4.76mm)
Sand	No. 4 (4.76mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.76mm) to No. 10 (2.0mm)
Medium sand	No. 10 (2.0mm) to No. 40 (0.42mm)
Fine sand	No. 40 (0.42mm) to No. 200 (0.074mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

Samples

SS	SPT Sampler (2.0" OD)
HD	Heavy Duty Split Spoon
SH	Shelby Tube
P	Pitcher Sampler
B	Bulk
C	Cored

Unless otherwise noted, drive samples advanced with 140 lb. hammer with 30 in. drop.

Relative Density or Consistency Utilizing Standard Penetration Test Values

Cohesionless Soils (a)			Cohesive Soils (b)		
Density (c)	N, blows/ft. (c)	Relative Density (%)	Consistency	N, blows/ft. (c)	Undrained Shear Strength (d) (psf)
Very loose	0 to 4	0 – 15	Very soft	0 to 2	<250
Loose	4 to 10	15 – 35	Soft	2 to 4	250–500
Compact	10 to 30	35 – 65	Firm	4 to 8	500–1000
Dense	30 to 50	65 – 85	Stiff	8 to 15	1000–2000
Very Dense	over 50	>85	Very Stiff	15 to 30	2000–4000
			Hard	over 30	>4000

(a) Soils consisting of gravel, sand, and silt, either separately or in combination, possessing no characteristics of plasticity, and exhibiting drained behavior.

(b) Soils possessing the characteristics of plasticity, and exhibiting undrained behavior.

(c) Refer to text of ASTM D 1586-84 for a definition of N; in normally consolidated cohesionless soils Relative Density terms are based on N values corrected for overburden pressures.

(d) Undrained shear strength = 1/2 unconfined compression strength.

Laboratory Tests

Test	Designation
Moisture	(1)
Density	D
Grain Size	G
Hydrometer	H
Atterberg Limits	(1)
Consolidation	C
Unconfined	U
UU Triax	UU
CU Triax	CU
CD Triax	CD
Permeability	P

(1) Moisture and Atterberg Limits plotted on log.

Descriptive Terminology Denoting Component Proportions

Descriptive Terms	Range of Proportion
Trace	0–5%
Little	5–12%
Some or Adjective (a)	12–30%
And	30–50%

(a) Use Gravelly, Sandy or Silty as appropriate.

Silt and Clay Descriptions

Description	Typical Unified Designation
Silt	ML (non-plastic)
Clayey Silt	CL–ML (low plasticity)
Silty Clay	CL
Clay	CH
Plastic Silt	MH
Organic Soils	OL, OH, Pt

Golder Associates

Figure

SOIL CLASSIFICATION/LEGEND

RECORD OF BOREHOLE MW-2

SHEET 1 of 1

PROJECT: Skotdal/Snohomish Square
PROJECT NUMBER: 033-1002.001
LOCATION: East of Bldg. 3

DRILLING METHOD: HSA
DRILLING DATE: 2/5/04
DRILL RIG: CME-55, Limited Access

DATUM: MSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (300 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p — W — W_l	NOTES WATER LEVELS / GRAPHIC
0	HSA	0.0 - 0.7 Grass, overlying dark orange brown, loose, silty SAND with gravel, roots, damp to moist. (TOPSOIL)	SM		0.7							Flush-mount monument & concrete.
		0.7 - 7.5 Loose to compact, orange brown, nonstratified, very silty SAND with gravel, trace clay, damp to moist.	SM									Bentonite seal.
		At 3' - becomes compact to very dense, increase in gravels, and tan.										
5						1	MC	50/6in	50/6in	0.5 / 0.5		
		At 6' - becomes moist to wet.										
		7.5 - 15.3 Very dense, grayish tan, nonstratified, gravelly medium to coarse SAND, trace fine sand, wet.	SW		7.5							Sand filter pack.
10						2	MC	50/1in	50/1in	0.1 / 0.1		Slotted pvc screen.
15						3	MC	50/3in	50/3in	0.3 / 0.3		
		Boring completed at 15.3 ft.			15.3							
20												

Groundwater encountered at 6 ft.

1 in to 3 ft
DRILLING CONTRACTOR: Cascade
DRILLER: Andy

LOGGED: M. Stiehler
CHECKED:
DATE:

Golder Associates

BOREHOLE RECORD 033-1002.001.GPJ GLDR_WA.GDT 3/12/04

RECORD OF BOREHOLE MW-3

SHEET 1 of 1

PROJECT: Skotdal/Snohomish Square
PROJECT NUMBER: 033-1002.001
LOCATION: North of Bldg. 3

DRILLING METHOD: HSA
DRILLING DATE: 2/5/04
DRILL RIG: CME-55, Limited Access

DATUM: MSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (300 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p — W — W_l	NOTES WATER LEVELS / GRAPHIC
0	HSA	0.0 - 15.0 No samples taken. Drilled to 15 feet, similar conditions encountered (to MW-1 & MW-2). Monitoring well installed.										Flush-mount monument & concrete. Bentonite seal. Sand filter pack. Slotted pvc screen.
5												
10												
15		Boring completed at 15.0 ft.			15.0							
20												

1 in to 3 ft
DRILLING CONTRACTOR: Cascade
DRILLER: Andy

LOGGED: M. Stiehler
CHECKED:
DATE:

Golder Associates

BOREHOLE RECORD 033-1002.001.GPJ GLDR_WA.GDT 2/11/04

RECORD OF BOREHOLE MW-4

SHEET 1 of 1

PROJECT: Skotdal/Snohomish Square
PROJECT NUMBER: 033-1002.001
LOCATION: West of Bldg. 3

DRILLING METHOD: HSA
DRILLING DATE: 2/5/04
DRILL RIG: CME-55, Limited Access

DATUM: MSL
AZIMUTH: N/A
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (300 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p — W — W_l	NOTES WATER LEVELS / GRAPHIC
0	HSA	0.0 - 15.0 No samples taken. Drilled to 15 feet, similar conditions encountered (to MW-1 & MW-2). Monitoring well installed.										Flush-mount monument & concrete. Bentonite seal. Sand filter pack. Slotted pvc screen.
15		Boring completed at 15.0 ft.			15.0							
20												

1 in to 3 ft
DRILLING CONTRACTOR: Cascade
DRILLER: Andy

LOGGED: M. Stiehler
CHECKED:
DATE:

Golder Associates

BOREHOLE RECORD 033-1002.001.GPJ GLDR_WA.GDT 2/11/04

APPENDIX B

LABORATORY ANALYTICAL RESULTS

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

February 13, 2004

Neil Gilham
Golder Associates Inc.
18300 NE Union Hill Road
Suite 200
Redmond, WA 98052-3333

Re: Analytical Data for Project 033-1002.001
Laboratory Reference No. 0402-036

Dear Neil:

Enclosed are the analytical results and associated quality control data for samples submitted on February 6, 2004.

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 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

Case Narrative

Samples were collected on February 5, 2004 and received by the laboratory on February 6, 2004. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

page 1 of 2

Date Extracted: 2-10-04
Date Analyzed: 2-10-04

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-036-01
Client ID: MW-1@5'

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0013
Chloromethane	ND		0.0013
Vinyl Chloride	ND		0.0013
Bromomethane	ND		0.0013
Chloroethane	ND		0.0013
Trichlorofluoromethane	ND		0.0013
1,1-Dichloroethene	ND		0.0013
Iodomethane	ND		0.0067
Methylene Chloride	ND		0.0067
(trans) 1,2-Dichloroethene	ND		0.0013
1,1-Dichloroethane	ND		0.0013
2,2-Dichloropropane	ND		0.0013
(cis) 1,2-Dichloroethene	ND		0.0013
Bromochloromethane	ND		0.0013
Chloroform	ND		0.0013
1,1,1-Trichloroethane	ND		0.0013
Carbon Tetrachloride	ND		0.0013
1,1-Dichloropropene	ND		0.0013
1,2-Dichloroethane	ND		0.0013
Trichloroethene	ND		0.0013
1,2-Dichloropropane	ND		0.0013
Dibromomethane	ND		0.0013
Bromodichloromethane	ND		0.0013
2-Chloroethyl Vinyl Ether	ND		0.0067
(cis) 1,3-Dichloropropene	ND		0.0013
(trans) 1,3-Dichloropropene	ND		0.0013

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 02-036-01
Client ID: MW-1@5'

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0013
Tetrachloroethene	ND		0.0013
1,3-Dichloropropane	ND		0.0013
Dibromochloromethane	ND		0.0013
1,2-Dibromoethane	ND		0.0013
Chlorobenzene	ND		0.0013
1,1,1,2-Tetrachloroethane	ND		0.0013
Bromoform	ND		0.0013
Bromobenzene	ND		0.0013
1,1,2,2-Tetrachloroethane	ND		0.0013
1,2,3-Trichloropropane	ND		0.0013
2-Chlorotoluene	ND		0.0013
4-Chlorotoluene	ND		0.0013
1,3-Dichlorobenzene	ND		0.0013
1,4-Dichlorobenzene	ND		0.0013
1,2-Dichlorobenzene	ND		0.0013
1,2-Dibromo-3-chloropropane	ND		0.0067
1,2,4-Trichlorobenzene	ND		0.0013
Hexachlorobutadiene	ND		0.0067
1,2,3-Trichlorobenzene	ND		0.0013

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	80	71-126
Toluene, d8	91	73-130
4-Bromofluorobenzene	91	70-130

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

page 1 of 2

Date Extracted:	2-10-04
Date Analyzed:	2-10-04
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	02-036-02
Client ID:	**MW-1@10'**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0012
Chloromethane	ND		0.0012
Vinyl Chloride	ND		0.0012
Bromomethane	ND		0.0012
Chloroethane	ND		0.0012
Trichlorofluoromethane	ND		0.0012
1,1-Dichloroethene	ND		0.0012
Iodomethane	ND		0.0061
Methylene Chloride	ND		0.0061
(trans) 1,2-Dichloroethene	ND		0.0012
1,1-Dichloroethane	ND		0.0012
2,2-Dichloropropane	ND		0.0012
(cis) 1,2-Dichloroethene	ND		0.0012
Bromochloromethane	ND		0.0012
Chloroform	ND		0.0012
1,1,1-Trichloroethane	ND		0.0012
Carbon Tetrachloride	ND		0.0012
1,1-Dichloropropene	ND		0.0012
1,2-Dichloroethane	ND		0.0012
Trichloroethene	ND		0.0012
1,2-Dichloropropane	ND		0.0012
Dibromomethane	ND		0.0012
Bromodichloromethane	ND		0.0012
2-Chloroethyl Vinyl Ether	ND		0.0061
(cis) 1,3-Dichloropropene	ND		0.0012
(trans) 1,3-Dichloropropene	ND		0.0012

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 02-036-02
Client ID: MW-1@10'

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0012
Tetrachloroethene	0.0019		0.0012
1,3-Dichloropropane	ND		0.0012
Dibromochloromethane	ND		0.0012
1,2-Dibromoethane	ND		0.0012
Chlorobenzene	ND		0.0012
1,1,1,2-Tetrachloroethane	ND		0.0012
Bromoform	ND		0.0012
Bromobenzene	ND		0.0012
1,1,2,2-Tetrachloroethane	ND		0.0012
1,2,3-Trichloropropane	ND		0.0012
2-Chlorotoluene	ND		0.0012
4-Chlorotoluene	ND		0.0012
1,3-Dichlorobenzene	ND		0.0012
1,4-Dichlorobenzene	ND		0.0012
1,2-Dichlorobenzene	ND		0.0012
1,2-Dibromo-3-chloropropane	ND		0.0061
1,2,4-Trichlorobenzene	ND		0.0012
Hexachlorobutadiene	ND		0.0061
1,2,3-Trichlorobenzene	ND		0.0012

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	85	71-126
Toluene, d8	87	73-130
4-Bromofluorobenzene	91	70-130

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 2-10-04
Date Analyzed: 2-10-04

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-036-04
Client ID: MW-2@5'

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0011
Chloromethane	ND		0.0011
Vinyl Chloride	ND		0.0011
Bromomethane	ND		0.0011
Chloroethane	ND		0.0011
Trichlorofluoromethane	ND		0.0011
1,1-Dichloroethene	ND		0.0011
Iodomethane	ND		0.0056
Methylene Chloride	ND		0.0056
(trans) 1,2-Dichloroethene	ND		0.0011
1,1-Dichloroethane	ND		0.0011
2,2-Dichloropropane	ND		0.0011
(cis) 1,2-Dichloroethene	ND		0.0011
Bromochloromethane	ND		0.0011
Chloroform	ND		0.0011
1,1,1-Trichloroethane	ND		0.0011
Carbon Tetrachloride	ND		0.0011
1,1-Dichloropropene	ND		0.0011
1,2-Dichloroethane	ND		0.0011
Trichloroethene	ND		0.0011
1,2-Dichloropropane	ND		0.0011
Dibromomethane	ND		0.0011
Bromodichloromethane	ND		0.0011
2-Chloroethyl Vinyl Ether	ND		0.0056
(cis) 1,3-Dichloropropene	ND		0.0011
(trans) 1,3-Dichloropropene	ND		0.0011

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 02-036-04
Client ID: MW-2@5'

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0011
Tetrachloroethene	ND		0.0011
1,3-Dichloropropane	ND		0.0011
Dibromochloromethane	ND		0.0011
1,2-Dibromoethane	ND		0.0011
Chlorobenzene	ND		0.0011
1,1,1,2-Tetrachloroethane	ND		0.0011
Bromoform	ND		0.0011
Bromobenzene	ND		0.0011
1,1,2,2-Tetrachloroethane	ND		0.0011
1,2,3-Trichloropropane	ND		0.0011
2-Chlorotoluene	ND		0.0011
4-Chlorotoluene	ND		0.0011
1,3-Dichlorobenzene	ND		0.0011
1,4-Dichlorobenzene	ND		0.0011
1,2-Dichlorobenzene	ND		0.0011
1,2-Dibromo-3-chloropropane	ND		0.0056
1,2,4-Trichlorobenzene	ND		0.0011
Hexachlorobutadiene	ND		0.0056
1,2,3-Trichlorobenzene	ND		0.0011

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	82	71-126
Toluene, d8	92	73-130
4-Bromofluorobenzene	91	70-130

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

page 1 of 2

Date Extracted:	2-10-04
Date Analyzed:	2-10-04
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	02-036-05
Client ID:	**MW-2@10'**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0011
Chloromethane	ND		0.0011
Vinyl Chloride	ND		0.0011
Bromomethane	ND		0.0011
Chloroethane	ND		0.0011
Trichlorofluoromethane	ND		0.0011
1,1-Dichloroethene	ND		0.0011
Iodomethane	ND		0.0056
Methylene Chloride	ND		0.0056
(trans) 1,2-Dichloroethene	ND		0.0011
1,1-Dichloroethane	ND		0.0011
2,2-Dichloropropane	ND		0.0011
(cis) 1,2-Dichloroethene	ND		0.0011
Bromochloromethane	ND		0.0011
Chloroform	ND		0.0011
1,1,1-Trichloroethane	ND		0.0011
Carbon Tetrachloride	ND		0.0011
1,1-Dichloropropene	ND		0.0011
1,2-Dichloroethane	ND		0.0011
Trichloroethene	ND		0.0011
1,2-Dichloropropane	ND		0.0011
Dibromomethane	ND		0.0011
Bromodichloromethane	ND		0.0011
2-Chloroethyl Vinyl Ether	ND		0.0056
(cis) 1,3-Dichloropropene	ND		0.0011
(trans) 1,3-Dichloropropene	ND		0.0011

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-036-05
Client ID: MW-2@10'

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0011
Tetrachloroethene	ND		0.0011
1,3-Dichloropropane	ND		0.0011
Dibromochloromethane	ND		0.0011
1,2-Dibromoethane	ND		0.0011
Chlorobenzene	ND		0.0011
1,1,1,2-Tetrachloroethane	ND		0.0011
Bromoform	ND		0.0011
Bromobenzene	ND		0.0011
1,1,2,2-Tetrachloroethane	ND		0.0011
1,2,3-Trichloropropane	ND		0.0011
2-Chlorotoluene	ND		0.0011
4-Chlorotoluene	ND		0.0011
1,3-Dichlorobenzene	ND		0.0011
1,4-Dichlorobenzene	ND		0.0011
1,2-Dichlorobenzene	ND		0.0011
1,2-Dibromo-3-chloropropane	ND		0.0056
1,2,4-Trichlorobenzene	ND		0.0011
Hexachlorobutadiene	ND		0.0056
1,2,3-Trichlorobenzene	ND		0.0011

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	79	71-126
Toluene, d8	90	73-130
4-Bromofluorobenzene	92	70-130

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL

page 1 of 2

Date Extracted: 2-10-04
Date Analyzed: 2-10-04

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0210S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0010
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0010
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Iodomethane	ND		0.0050
Methylene Chloride	ND		0.0050
(trans) 1,2-Dichloroethene	ND		0.0010
1,1-Dichloroethane	ND		0.0010
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0050
(cis) 1,3-Dichloropropene	ND		0.0010
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 2 of 2

Lab ID: MB0210S1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Bromoform	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0050
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0050
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	80	71-126
Toluene, d8	92	73-130
4-Bromofluorobenzene	96	70-130

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

HALOGENATED VOLATILES by EPA 8260B
MS/MSD QUALITY CONTROL

Date Extracted: 2-10-04
Date Analyzed: 2-10-04

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-045-78

Compound	Sample Amount	Spike Amount	MS	Percent Recovery	MSD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	ND	0.0500	0.0388	78	0.0408	82	53-141	
Benzene	ND	0.0500	0.0442	88	0.0471	94	66-135	
Trichloroethene	ND	0.0500	0.0454	91	0.0477	95	69-130	
Toluene	ND	0.0500	0.0430	86	0.0462	92	72-127	
Chlorobenzene	ND	0.0500	0.0440	88	0.0450	90	68-134	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	5	11	
Benzene	6	11	
Trichloroethene	5	13	
Toluene	7	11	
Chlorobenzene	2	12	

Date of Report: February 13, 2004
Samples Submitted: February 6, 2004
Laboratory Reference: 0402-036
Project: 033-1002.001

% MOISTURE

Date Analyzed: 2-9-04

Client ID	Lab ID	% Moisture
MW-1@5'	02-036-01	25
MW-1@10'	02-036-02	21
MW-2@5'	02-036-04	18
MW-2@15'	02-036-05	10

OnSite Environmental Inc.

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.

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-napthalene) are present in the sample.

O - Hydrocarbons outside the defined gasoline range are present in the sample.

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
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

February 19, 2004

Neil Gilham
Golder Associates Inc.
18300 NE Union Hill Road
Suite 200
Redmond, WA 98052-3333

Re: Analytical Data for Project 033-1002-100
Laboratory Reference No. 0402-076

Dear Neil:

Enclosed are the analytical results and associated quality control data for samples submitted on February 10, 2004.

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 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

Case Narrative

Samples were collected on February 10, 2004 and received by the laboratory on February 10, 2004. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Date Extracted: 2-11-04
Date Analyzed: 2-11-04

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-076-01
Client ID: MW-1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		1.0
Chloromethane	ND		1.0
Vinyl Chloride	ND		1.0
Bromomethane	ND		1.0
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		1.0
1,1-Dichloroethene	ND		1.0
Iodomethane	ND		5.0
Methylene Chloride	ND		5.0
(trans) 1,2-Dichloroethene	ND		1.0
1,1-Dichloroethane	ND		1.0
2,2-Dichloropropane	ND		1.0
(cis) 1,2-Dichloroethene	ND		1.0
Bromochloromethane	ND		1.0
Chloroform	2.0		1.0
1,1,1-Trichloroethane	ND		1.0
Carbon Tetrachloride	ND		1.0
1,1-Dichloropropene	ND		1.0
1,2-Dichloroethane	ND		1.0
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		1.0
Dibromomethane	ND		1.0
Bromodichloromethane	ND		1.0
2-Chloroethyl Vinyl Ether	ND		5.0
(cis) 1,3-Dichloropropene	ND		1.0
(trans) 1,3-Dichloropropene	ND		1.0

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-076-01
Client ID: MW-1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		1.0
Tetrachloroethene	180		1.0
1,3-Dichloropropane	ND		1.0
Dibromochloromethane	ND		1.0
1,2-Dibromoethane	ND		1.0
Chlorobenzene	ND		1.0
1,1,1,2-Tetrachloroethane	ND		1.0
Bromoform	ND		5.0
Bromobenzene	ND		1.0
1,1,2,2-Tetrachloroethane	ND		1.0
1,2,3-Trichloropropane	ND		1.0
2-Chlorotoluene	ND		1.0
4-Chlorotoluene	ND		1.0
1,3-Dichlorobenzene	ND		1.0
1,4-Dichlorobenzene	ND		1.0
1,2-Dichlorobenzene	ND		1.0
1,2-Dibromo-3-chloropropane	ND		5.0
1,2,4-Trichlorobenzene	ND		1.0
Hexachlorobutadiene	ND		1.0
1,2,3-Trichlorobenzene	ND		1.0

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	105	70-123
Toluene, d8	98	70-119
4-Bromofluorobenzene	89	70-119

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Date Extracted:	2-11-04
Date Analyzed:	2-11-04
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-076-02
Client ID:	**MW-2**

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	1.8		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

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-076-02
Client ID: MW-2

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.51		0.20
1,3-Dichloropropane	ND		0.20
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	102	70-123
Toluene, d8	97	70-119
4-Bromofluorobenzene	90	70-119

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted: 2-11-04
Date Analyzed: 2-11-04

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-076-03
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	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	2.3		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

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 02-076-03
Client ID: MW-3

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	17		0.20
1,3-Dichloropropane	ND		0.20
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	0.24		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	104	70-123
Toluene, d8	97	70-119
4-Bromofluorobenzene	91	70-119

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Page 1 of 2

Date Extracted:	2-11-04
Date Analyzed:	2-11-04
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-076-04
Client ID:	**MW-4**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		4.0
Chloromethane	ND		4.0
Vinyl Chloride	ND		4.0
Bromomethane	ND		4.0
Chloroethane	ND		4.0
Trichlorofluoromethane	ND		4.0
1,1-Dichloroethene	ND		4.0
Iodomethane	ND		20
Methylene Chloride	ND		20
(trans) 1,2-Dichloroethene	ND		4.0
1,1-Dichloroethane	ND		4.0
2,2-Dichloropropane	ND		4.0
(cis) 1,2-Dichloroethene	ND		4.0
Bromochloromethane	ND		4.0
Chloroform	ND		4.0
1,1,1-Trichloroethane	ND		4.0
Carbon Tetrachloride	ND		4.0
1,1-Dichloropropene	ND		4.0
1,2-Dichloroethane	ND		4.0
Trichloroethene	ND		4.0
1,2-Dichloropropane	ND		4.0
Dibromomethane	ND		4.0
Bromodichloromethane	ND		4.0
2-Chloroethyl Vinyl Ether	ND		20
(cis) 1,3-Dichloropropene	ND		4.0
(trans) 1,3-Dichloropropene	ND		4.0

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 02-076-04
Client ID: MW-4

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		4.0
Tetrachloroethene	530		4.0
1,3-Dichloropropane	ND		4.0
Dibromochloromethane	ND		4.0
1,2-Dibromoethane	ND		4.0
Chlorobenzene	ND		4.0
1,1,1,2-Tetrachloroethane	ND		4.0
Bromoform	ND		20
Bromobenzene	ND		4.0
1,1,2,2-Tetrachloroethane	ND		4.0
1,2,3-Trichloropropane	ND		4.0
2-Chlorotoluene	ND		4.0
4-Chlorotoluene	ND		4.0
1,3-Dichlorobenzene	ND		4.0
1,4-Dichlorobenzene	ND		4.0
1,2-Dichlorobenzene	ND		4.0
1,2-Dibromo-3-chloropropane	ND		20
1,2,4-Trichlorobenzene	ND		4.0
Hexachlorobutadiene	ND		4.0
1,2,3-Trichlorobenzene	ND		4.0

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	104	70-123
Toluene, d8	98	70-119
4-Bromofluorobenzene	90	70-119

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-11-04
Date Analyzed: 2-11-04

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0211W1

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

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL

Lab ID: MB0211W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
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	102	70-123
Toluene, d8	97	70-119
4-Bromofluorobenzene	90	70-119

Date of Report: February 19, 2004
Samples Submitted: February 10, 2004
Laboratory Reference: 0402-076
Project: 033-1002-100

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 2-11-04
Date Analyzed: 2-11-04

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0211W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	11.2	112	10.6	106	70-130	
Benzene	10.0	9.60	96	9.25	93	70-130	
Trichloroethene	10.0	8.91	89	8.60	86	70-130	
Toluene	10.0	9.24	92	8.73	87	70-130	
Chlorobenzene	10.0	9.76	98	9.29	93	70-130	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	6	17	
Benzene	4	13	
Trichloroethene	4	12	
Toluene	6	14	
Chlorobenzene	5	9	

OnSite Environmental Inc.

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.

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-napthalene) are present in the sample.

O - Hydrocarbons outside the defined gasoline range are present in the sample.

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
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

Company: Golder Associates
Project Number: 033-1002-100
Project Name: Snoqualmie Dry Cleaners
Project Manager: Neil Gilbar
Sampled by: Alex McKenzie Jessica

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days)
- ☐ _____ (other)

Laboratory Number: 02-076

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 / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH					% Moisture
1	MW-1	2/9/04	1050	W	3					X															
2	MW-2		1310							X															
3	MW-3		1220							X															
4	MW-4		1140							X															
5	TRIP BLANK																								

	Signature	Company	Date	Time
Relinquished by		Golder Associates	2/10/04	1500
Received by	Kelly Hill	OnSite Env.	2/10/04	15:00
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy