
**QUARTERLY REPORT
GROUNDWATER MONITORING
AUGUST 2000
DEQ Site No. 03-93-0008**

Property Location:

**DELCO PETROLEUM CO. LLC
17873 SE McLoughlin Blvd.
Milwaukie, Oregon**

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED

OCT 31 2000

NORTHWEST REGION

September 29, 2000

Prepared For:

Delco Petroleum Company, LLC

14 Long Leaf Drive
Hamilton, New Jersey 08690

Prepared By:

GeoPro Geologic Services
Post Office Box 26
Battle Ground, WA 98604



Project Number 990621-A5

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1. INTRODUCTION

1.1. PURPOSE AND SCOPE OF WORK

The purpose of this report is to summarize analysis of groundwater samples collected on August 27, 2000 from ten (10) groundwater monitor wells at the existing service station, Delco Petroleum, 17873 SE McLoughlin Boulevard, Milwaukie, Oregon 97267 ("Site"). Richard C. Kent, Registered Geologist of GeoPro Geologic Services ("Consultant"), was authorized by Delco Petroleum Company, LLC, 14 Long Leaf Drive, Hamilton, New Jersey 08690 ("Client" and "Landowner") to begin work on July 1, 1999.

1.2. LOCATION

The Delco Petroleum Company, LLC service station at 17873 SE McLoughlin Boulevard, Milwaukie, Oregon 97267 ("Site") is a commercial property surrounded by commercial properties to the north, south and east, and, residential properties to the west, within the SE/4 of the SW/4, Section 18, Township 2 South, Range 2 East (WM) in Clackamas County, Oregon (see Figure 1 - "Location Map"). The Site is located in a community locally called "Jennings Lodge" of the town of Milwaukie, which is essentially a southeastern suburb of Portland, Oregon. The approximate 0.7-acre, nominal 100-foot elevation MSL Site is Tax Lot 1700 adjacent to "Ed's Mufflers and Brakes" to the north and "Busters Restaurant" to the south on the west side of SE McLoughlin Boulevard (Oregon State Highway 99). The Site has also been referenced as "Milwaukie Fuel Stop", "Delco Company", and/or "Flying J". The Willamette River flows northerly approximately one-half mile west of the Site and the Clackamas River flows westerly into the Willamette, approximately one and one-half miles south of the Site.

Prior to remedial activities during October through December 1999, the Site contained one (1) diesel underground storage tank ("UST") with a nominal capacity of 8,000-gallons, and, three (3) gasoline UST's each with a nominal capacity of 12,000-gallons in a 'tank field' located in the north-central portion of the Site. Three (3) gasoline pump islands were located beneath a canopy in the east-central portion of the Site, and, one (1) diesel pump was located approximately above the previous diesel UST on the northern edge of the property. The Site also contains a building with a service station office and connected "Jiffy Lube" (sub-leased) of three (3) service bays for auto lubrication and oil changing.

Following remedial excavation, the station was placed back in service with two (2) new 10,000-gallon and one (1) 8,000-gallon gasoline UST's, and one (1) 8,000-gallon diesel UST, piping, leak detection system, pump islands and canopy. The pump islands and canopy were re-built in essentially the same location and configuration as prior to remediation activities. However, the diesel pump location was moved from above the diesel UST and incorporated into the gasoline pump islands. The eastern portion of the Site was re-surfaced with asphalt (see Figure 2 - "Site Map").

2. PREVIOUS WORK

2.1. PREVIOUS REPORTS

Previous Site work has been summarized in the following reports available in the offices of the Oregon Department of Environmental Quality, Portland, Oregon ("DEQ"):

- "*Remedial Excavation Report*", for Delco Petroleum Company, LLC, Hamilton, New Jersey, by GeoPro Geologic Services, Battle Ground, WA, April 3, 2000, 29pp., Figures, Tables, and Appendices.
- "*Quarterly Report, July 1999, Groundwater Monitoring, Flying J-Milwaukie #2, DEQ Site No. 03-93-0008*", for Delco Petroleum Company, LLC, Hamilton, New Jersey, by GeoPro Geologic Services, Battle Ground, WA, August 4, 1999 by GeoPro Geologic Services, 21pp., Figures, Tables, and Appendices.

2.2. PREVIOUS GROUNDWATER SAMPLING

Since June 1993, fifteen (15) groundwater monitor wells have been installed to monitor groundwater levels and collect water samples. Ten (10) monitoring wells are currently available for obtaining groundwater samples (see Figure 2).

Monitoring Well MW-3 was decommissioned on February 20, 1995 caused by site characterization excavation activities (apparently a backhoe or similar) which removed soil around MW-3 to a depth of four (4)- to five (5)-feet and destroyed the annular seal. Monitor Well MW-7 was previously installed on January 27, 1995 as an anticipated monitoring location replacement for well MW-3. Also on January 27, 1995, monitor wells MW-8 and MW-9 were installed at the Site.

During remedial excavation, wells MW-2, MW-4, MW-7, and MW-8 were decommissioned. MW-14 was installed on November 17, 1999 in the general location of MW-7; and, MW-15 was also installed on November 17, 1999 as a replacement for MW-4 and MW-8. MW-14 and MW-15 are constructed with four (4)-inch PVC and all other wells are constructed with two (2)-inch PVC. One monitoring well, MW-11, was installed off-site in a general down-gradient direction on August 17, 1996, to the northwest, on "Ed's Muffler & Brakes" property.

The monitor wells are essentially in a configuration representing five (5) upgradient (MW-1, MW-6, MW-9, MW-10, and MW-13), and two (2) downgradient locations (MW-11, MW-12) relative to the existing USTs. Monitor well MW-15 is located within the location of the existing USTs.

Groundwater levels at the Site have fluctuated approximately four (4)-feet. The groundwater gradient direction has been variable, but generally in a north to northwest direction. No free product was reported in any monitor wells on and after September 29, 1995 (Fifth Quarterly Ground Water Monitoring Report by NWE).

Based on the soil sample analytical results contours of gasoline (as TPH) and related constituents, BTEX, and MTBE, the highest concentration patterns during remedial excavation appeared to be:

- 1) located east of Monitor Well MW-5 and north of the service station (distinctly south of the prior gasoline UST locations);

- 2) along the gasoline pipeline between the storm drain and the prior UST's; and at the area where the easternmost gasoline pipeline bends (elbows) southward to the easternmost pump island;
- 3) south along the pipelines to the prior pump islands, and, at the southwesternmost pump island, northeast of Monitor Well MW-1.

Relatively high concentrations of gasoline and related constituents in soil samples collected during remedial excavation north of the office may be related to leakage migration along a prior natural gas pipeline trench, and/or, overspill from previous gasoline tanks located immediately to the north, and/or, leakage migration along a prior gasoline pipeline trench. Higher concentrations found in soil samples collected during remedial excavation south of the prior UST's could have also been due to reversals in groundwater gradient at some time in the past.

The following Table 1 – "Monitor Well Installation Summary" includes reported well installation methods.

Table 1 – MONITOR WELL INSTALLATION SUMMARY

Monitor Well	Date Installed	Elevation (ft)	Total Depth (ft bgs)	SWL When Drilled	Casing & Screen Size	Screened Interval	Filter Pack	Annular Seal Bottom	General Lithology
MW-1	6/18/93	99.37	15.0	5.02	2-inch PVC	5-15 ft	10/20 4-15 ft	4 ft	clay
MW-2 destroyed	6/18/93	98.51	14.0	4.2	2-inch PVC	4-14 ft	10/20: 3-14 ft	3 ft	clay
MW-3 destroyed	6/18/93	98.57	15.0	4.0	2-inch PVC	5-15 ft	10/20: 4-15 ft	4 ft	clay, sandy silt
MW-4 destroyed	6/18/93	99.00	15.0	4.76	2-inch PVC	5-15 ft	10/20: 4-15 ft	4 ft	clay, fn sand
MW-5	6/19/93	100.41	15.0	6.14	2-inch PVC	5-15 ft	10/20: 4-15 ft	4 ft	clay, fn sand
MW-6	6/19/93	100.01	14.5	5.71	2-inch PVC	5-14.5 ft	10/20: 3.5-14.5 ft	3.5 ft	silty fn sand
MW-7 destroyed	1/27/95	98.96	19.0	unk	4-inch PVC	4-19 ft	10/20: 3-19 ft	unk (13?)	clayey silt, silty sand
MW-8 destroyed	1/27/95	99.63	20.0	unk	4-inch PVC	5-20 ft	10/20: 3-20 ft	unk (14.5?)	clayey silt, silty sand
MW-9	1/27/95	99.42	15.0	unk	2-inch PVC	5-15 ft	10/20: 3-15 ft	unk (10?)	clayey silt
MW-10	8/12/96	98.50	15.0	9.0	2-inch PVC	10-15 ft	10/20: 8-15 ft	8 ft	gray clay
MW-11	8/12/96	99.64	15.0	9.0	2-inch PVC	10-15 ft	10/20: 8-15 ft	8 ft	gray clay
MW-12	8/12/96	100.26	15.0	9.0	2-inch PVC	10-15 ft	10/20: 8-15 ft	8 ft	gray clay
MW-13	8/12/96	99.85	15.0	9.0	2-inch PVC	10-15 ft	10/20: 8-15 ft	8 ft	gray clay
MW-14	11/17/99	95.65	9.0	5.0	4-inch PVC	4-9 ft	10/20: 4-9 ft	4 ft	crushed rock
MW-15	11/17/99	96.42	15.5	5.0	4-inch PVC	5.5-15.5 ft	10/20: 4.5-15.5 ft	4.5 ft	pea gravel

Notes:

Elevations are from Barbieri surveys.

3. GEOLOGY AND HYDROGEOLOGY

The Site is within Pleistocene fine-grained facies of coarse sand to silt deposited by catastrophic floods.¹ The finer sediments are predominantly quartz and feldspar and also contain white mica. The coarser sediments are predominantly Columbia River Basalt fragments. Poorly defined beds of 1- to 3-feet thick have complex layering. Soil development commonly introduces significant clay in the upper 6- to 15-feet. The fine sediments are locally thick and extend upslope to elevation 300- to 350-feet. Local variations to shallow groundwater flow directions may occur due to changes in lithology and thickness of beds.

The northwest trending Oatfield Fault to the north and the sub-parallel Concord Fault to the south bound the Site. The faults are mapped (*ibid.*) as cutting through the youngest sediments, including the Pleistocene fine-grained facies.

The Site is generally at approximate elevation 100-feet mean sea level ("msl"). It is surrounded by gently sloping terrain toward the Willamette River, which flows northerly approximately one-half mile to the west. Wells within one-mile of the Site to the west include two monitoring wells, one industrial well, ten domestic wells (about 42-feet average depth), and one unused well (U.S. Geological Survey Water Resource Division). Most wells develop from basalt aquifers.²

Monitor well drilling logs describe the Site as underlain by medium to dark gray clay and clayey silt to approximately 12- to 15-feet depth where dark gray silty fine sand to medium sand was encountered. Remedial excavation to maximum depths below ground surface of approximately 14- to 15-feet in places encountered essentially backfill material to a continuous silty clay bed at about 8.5- to 9-feet. Sandy cobbly gravel and a fine-medium sand unit were encountered during excavation beneath the approximate four (4)-foot thick clay unit. The backfill material is predominantly uncompacted dark gray clayey silt to silty clay with medium to fine sand. Heterogeneous fill material included stumps, tires, concrete blocks up to six (6)-feet diameter, asphalt shingles, bricks, lumber, buckets, hay bales, and other material. An auto parts and building materials dump was uncovered in the northwest area of the excavation. All excavated soil and dump material was disposed off-site.

A typical cross-section of material encountered during remedial excavation is shown in Figure 3 – "Cross-Section Index Map", and Figure 4 – "Cross-Section".

¹ "Geologic Map of the Lake Oswego Quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon", M.H. Beeson and Others. State of Oregon Department of Geology and Mineral Industries GMS-59, 1989, 1 Plate.

² NWE memo dated June 30, 1994.

4. GROUNDWATER GRADIENTS

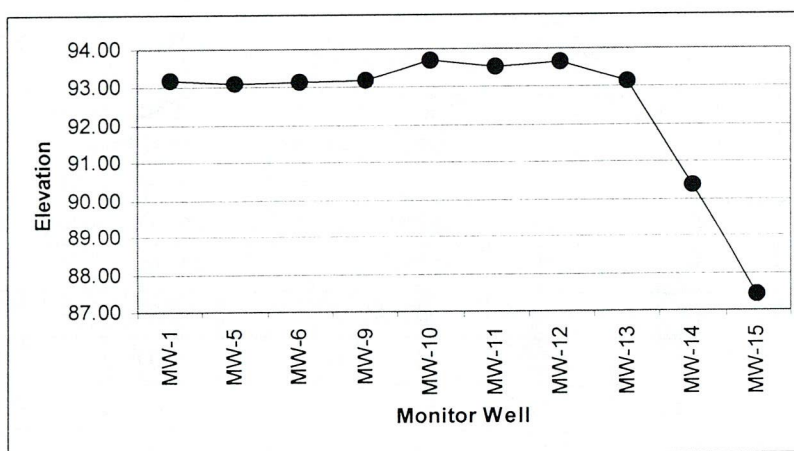
The following Table 2 – “Monitor Well Elevations and Static Water Levels” and Chart 1 – “August 2000 Static Water Elevations” summarize monitor well relative elevations at the top of the PVC casings and measured static water levels in August 2000.

Table 2 – MONITOR WELL ELEVATIONS AND STATIC WATER LEVELS

Surveyed by Barbieri & Associated, July 27, 1999 and February 1, 2000.

Monitor Well	Elevation	Static Water Level 8-27-00	SWL Elevation
MW-1	99.37	6.16	93.21
MW-5	100.41	7.3	93.11
MW-6	100.01	6.88	93.13
MW-9	99.42	6.23	93.19
MW-10	98.5	4.78	93.72
MW-11	99.64	6.11	93.53
MW-12	100.26	6.62	93.64
MW-13	99.85	6.69	93.16
MW-14	95.65	5.29	90.36
MW-15	96.42	9	87.42

Chart 1 – AUGUST 2000 STATIC WATER ELEVATIONS



The groundwater flow direction is estimated to be northerly as indicated by static water level measurements taken on August 27, 2000. Estimated gradients are shown in Figure 5 – “Groundwater Gradient With MW-15 Measurement”, and Figure 6 – “Groundwater Gradient Without MW-15 Measurement”. As noted above in Chart 1, the static water levels for monitor wells MW-14 and MW-15 are significantly lower than other monitor wells. MW-14 and MW-15 were installed during remedial excavation within the excavation. These lower static water elevations are atypical and could be due to a loss in permeability through the well screen, the much higher permeability of the material within the excavation consisting of pea gravel and crushed rock, possible continuity through the UST excavation backfill above and below a confining clay layer near 8-feet, or other unknown causes to be investigated in future monitoring events.

5. GROUNDWATER SAMPLING METHODOLOGY

Prior to purging, the static water level was measured in each well. The monitor wells were purged of stagnant water in the casing and filter pack by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized, or approximately three well volumes were evacuated (see Appendix B - "Water Sample Field Logs"). Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging.

Water samples were placed in clear 40-milliliter vials (volatile organic analysis-VOA) and 1-liter amber glass containers. All sample containers were new (except containing a preservative prepared by the laboratory). Separate vials were used for water samples to be analyzed for gasoline and gasoline constituents (e.g. BTEX). Disposable latex gloves were used at all times during sampling. Closure of each sample container was accomplished with a plastic screw cap onto a Teflon faced septum, which was used to seal the bottle without headspace. Each sample bottle was then inverted and tapped to test for air bubbles. The bottles were labeled and placed in an ice chest with blu-ice for transport to the laboratory. All samples were accompanied from the field to laboratory by a signed and dated chain-of-custody and request for analysis. Two (2) VOA's and one (1) liter bottles were filled with groundwater from each monitor well and the treatment facility spigot for analysis, except an additional VOA was filled for those samples analyzed for volatiles.

6. LABORATORY ANALYSES

The following Tables 3 and 4 summarize laboratory analysis for groundwater samples collected on August 7, 2000. The laboratory report is included in Appendix A - "August 2000 Laboratory Report". Analyses performed were at the request of DEQ.

Table 3 – GROUNDWATER ANALYSES: GASOLINE, DIESEL, AND MTBE

Monitor Well	NWTPH-Gx (µg/l)	NWTPH-Dx (mg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	Naphthalene (µg/l)
MW-1	1820	ND	207	8.26	ND	ND	72.4	14.5
MW-5	667	ND	170	ND	ND	ND	ND	30.2
MW-6	ND	ND	ND	ND	ND	ND	ND	ND
MW-9	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	ND	0.610	ND	ND	ND	ND	ND	ND
MW-12	ND	ND	ND	ND	ND	ND	ND	ND
MW-13	ND	ND	ND	ND	ND	ND	ND	ND
MW-14	ND	ND	ND	ND	ND	ND	37.8	ND
MW-15	410	ND	24.6	2.13	10.6	10.3	7.66	11.3

Notes: : ND = Not Detected at or above reporting limit; NWTPH-Gx = gasoline-range hydrocarbons, NWTPH-Dx = diesel-range hydrocarbons, B=benzene, T=toluene, E=ethylbenzene, X=total xylenes, MTBE = methyl tert-butyl ether(typical gasoline additive).

Gasoline hydrocarbons were analyzed per NWTPH-Gx Method and BTEX/MTBE/N were analyzed per EPA Method 8021B. Diesel and Heavy Range Hydrocarbons were analyzed per NWTPH-Dx Method.

A slight diesel odor was observed during the sample collection at Monitor Well MW-5. No free product was observed during purging or sampling of any of the monitor wells.

Table 4 – GROUNDWATER ANALYSES: DETECTED VOLATILE ORGANIC COMPOUNDS

Volatile organic compounds were analyzed per EPA Method 8260B.

Analyte	MW-1 (µg/l) Upgradient	MW-11 (µg/l) Off-Site
Benzene	168	ND
cis-1,2,-Dichloroethene	ND	1.96
Isopropylbenzene	10.2	ND
Methyl tert-butyl ether	48.6	ND
n-Propylbenzene	16.7	ND

Notes: ND = Not Detected at or above reporting limit.

7. INTERPRETATIONS AND CONCLUSIONS

7.1. GROUNDWATER ANALYSES

The August 2000 groundwater sampling event resulted in gasoline-range hydrocarbons being detected in samples from monitor wells MW-1, MW-5, MW-11, and MW-15. MTBE, a typical gasoline additive, was detected in samples from MW-1, MW-14, and MW-15. Concentrations of benzene above 5 µg/l (ppb) were detected in samples from MW-1, MW-5, and MW-15. Toluene was detected in samples from MW-1 and MW-15. Ethylbenzene was detected in the sample from MW-15. Naphthalene was detected in samples from MW-1, MW-5, and MW-15. Diesel was detected only in the sample from MW-11.

Due to the large amount of petroleum contaminated material removed from the Site, some residual petroleum constituents would be expected to have been removed from the soil as it was excavated and some dissolution to the groundwater could have occurred. Detected constituents are apparently a result of the excavation activities, and are not considered to be due to leaking of underground storage tanks or associated equipment, such as, pipelines. The Site is located in an area of very low hydraulic gradients and 'flushing' of the groundwater will take further time. Natural degradation is expected to occur and significant reduction of any remaining petroleum hydrocarbons in the soil and groundwater can be expected to continue to degrade.

7.2. GROUNDWATER GRADIENTS

With the exception of monitor wells MW-14 and MW-15, located within the remedial excavation, all static water levels are essentially within one-half foot of each other. The groundwater direction of flow is estimated to be northerly. Significant gradient changes occur in the vicinity of monitor wells MW-14 and MW-15 which could be due to a loss in permeability through the well screen, the much higher permeability of the material within the excavation consisting of pea gravel and crushed rock, possible continuity through the UST excavation backfill above and below a confining clay layer near 8-feet, or other unknown causes to be investigated in future monitoring events.

8. RECOMMENDATIONS

8.1. FURTHER WORK

It is recommended that further quarterly groundwater sampling work be performed according to direction by DEQ. It is recommended that future groundwater sampling of monitor well MW-6, MW-13, and MW-12 not be performed because analyzed constituents have been non-detected or insignificant. It is recommended, however, that static water levels be measured in these wells during future sampling events.

9. LIMITATIONS

This report is restricted to an investigation which has included the review of previous work involving underground storage tanks which contained known or suspected hazardous products identified either by the property owner(s), historical records, or previous reports. Such records and investigations have been relied upon in good faith, however, no responsibility is accepted for errors or omissions of previous work. Drilling services were performed under separate agreement with the landowner and Consultant makes no claim of responsibility for services provided by drilling services or others.

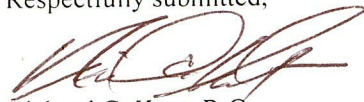
It is possible that exploration or sampling by others failed to reveal the presence of hazardous materials at areas where hazardous materials were assumed, suspected or expected to exist. Client understands that third-party failures to discover contaminated or hazardous materials through appropriate and mutually agreed-upon sampling techniques does not guarantee that such materials do not exist at the Site. Similarly, a Site which in fact is unaffected by contaminated or hazardous materials at the time of exploration or sampling, may later, due to natural causes or human intervention, become contaminated. Consultant is not responsible for failing to locate groundwater monitoring wells which have not discovered hazardous materials at the time of this report or in the future.

This report should not be construed as presenting a value to the Site nor the condition as to construction capabilities. In the event of changes in future development plans as understood at the time of this report, the conclusions and recommendations made herein shall be invalid until given the opportunity to review and modify this report in writing.

Services were performed, findings obtained, and recommendations prepared in a manner generally exercised by members of the profession under similar conditions at the time services were rendered. This warranty is in lieu of all other warranties, either expressed or implied. Findings apply only to present conditions, and opinions expressed are subject to revision when additional or new information is submitted in writing. This report has been prepared for the landowner(s) or landowner's agents and Consultant shall not accept liability or responsibility for detachment, partial use or separation by third parties and such use shall be at user's sole risk.

Portions of an Agreement to perform professional services for the Client may or may not be disclosed in this report. Final approval of environmental investigations and remediation is authorized only by appropriate governmental agencies.

Respectfully submitted,



Richard C. Kent, R.G.

Figure 1 – LOCATION MAP

Source: U.S.G.S. Topographic Map, Gladstone Quadrangle, 1:24,000

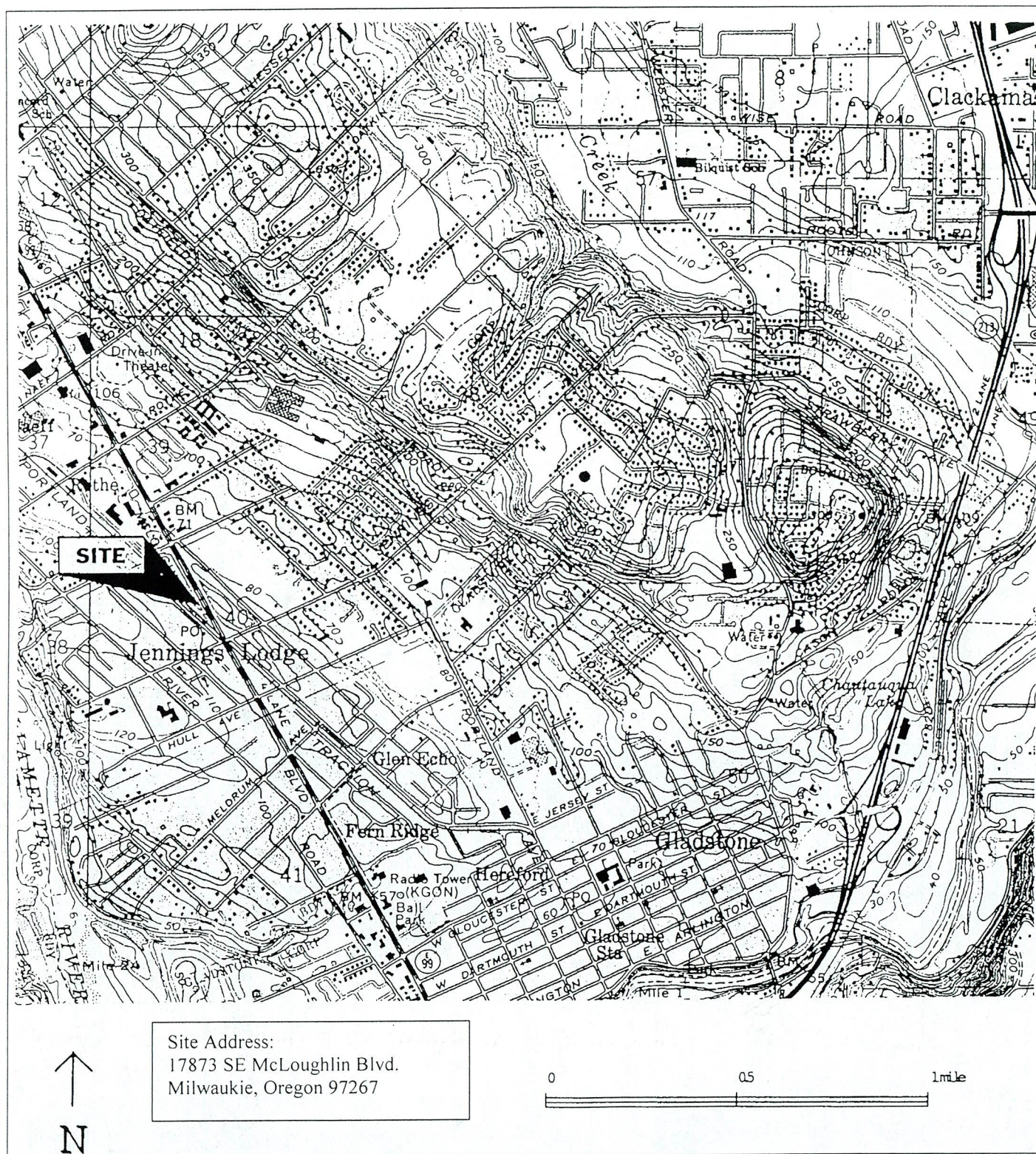
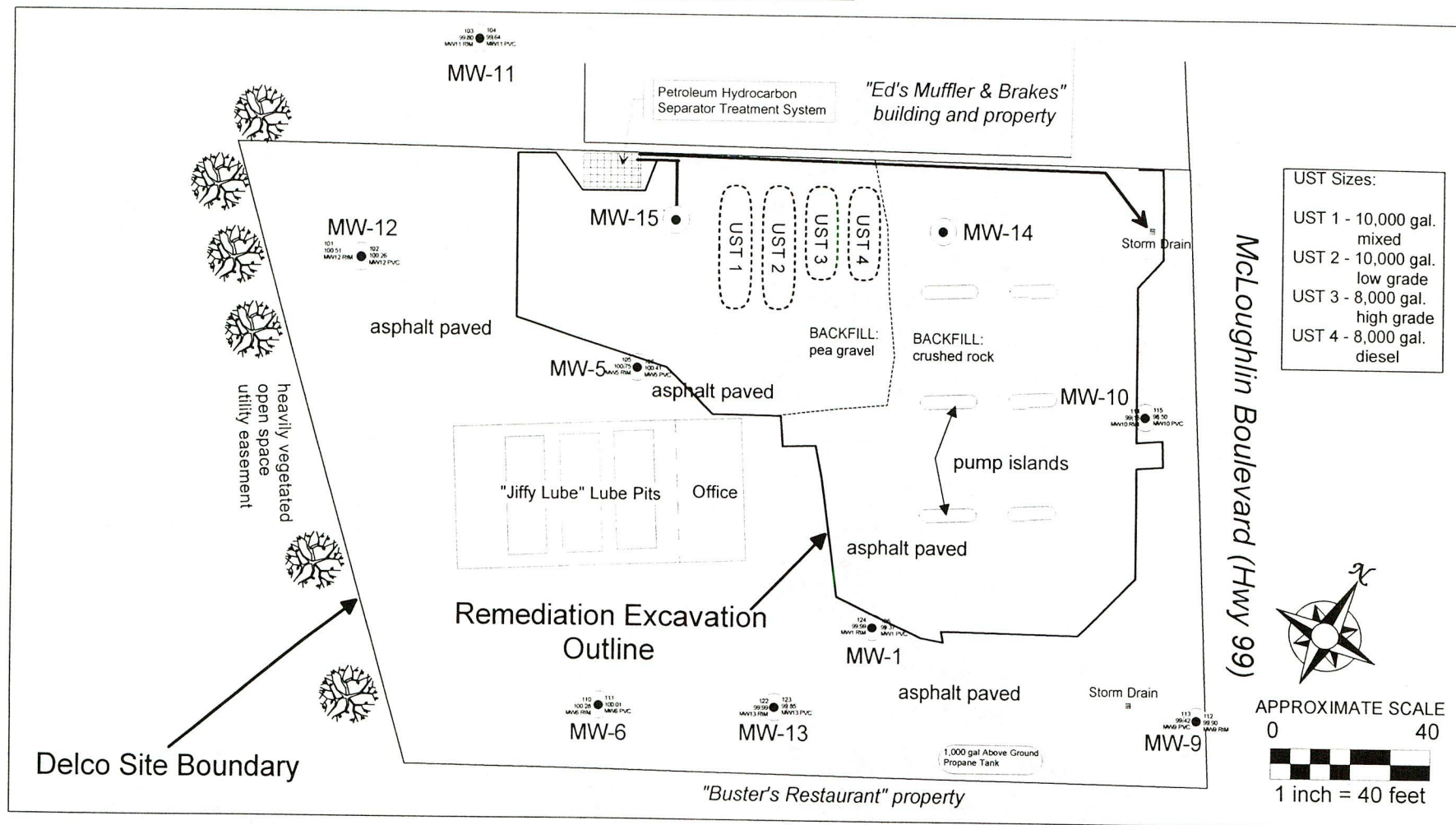


Figure 2 – SITE MAP



GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

MW-13
122 99.00 RM
123 98.50 RM
MW13 PVC

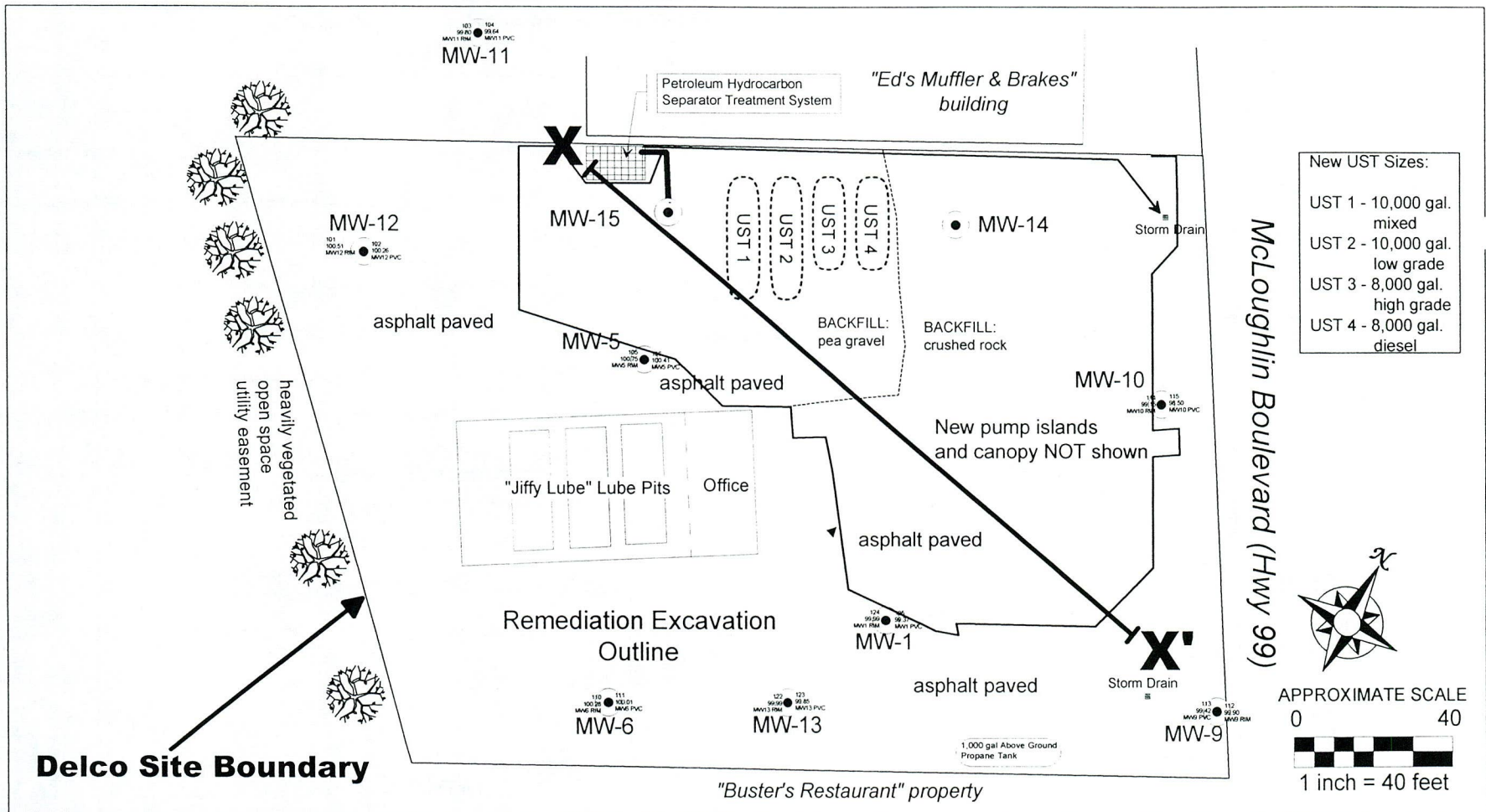
Monitor Well Location

4" PVC pipeline to treatment facility
and discharge to storm drain

SITE MAP

DELCO PETROLEUM CO. LLC
17873 SE McLoughlin Blvd.
Milwaukie, OR

Figure 3 – CROSS-SECTION INDEX MAP



CROSS-SECTION INDEX MAP

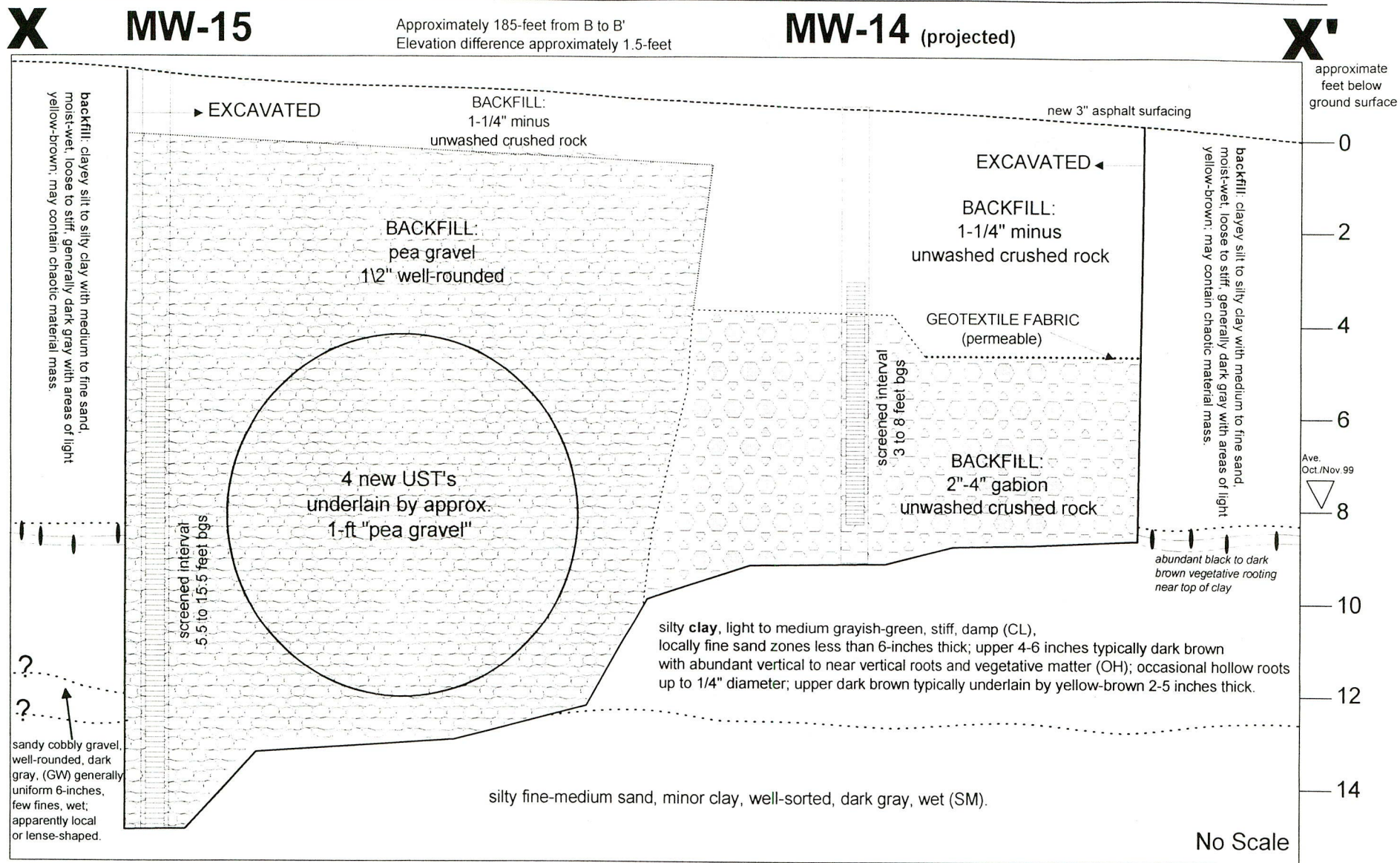
DELCO PETROLEUM CO. LLC
17873 SE McLoughlin Blvd.
Milwaukie, OR



GeoPro Geologic Services
Battle Ground, WA
Project No. 990621



4" PVC pipeline to treatment facility
and discharge to storm drain
Existing Monitor Well Location



NOTES:

MW-14: between previous monitor wells MW-2 and MW-7.
MW-15: production of downgradient groundwater to treatment facility installed near previous monitor well MW-8 location.

Figure 4
CROSS-SECTION

DELCO PETROLEUM CO. LLC
17873 SE McLoughlin Blvd.
Milwaukie, OR



GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

Figure 5 – GROUNDWATER GRADIENT WITH MW-15 MEASUREMENT

Elevation in feet (CI = 1.0-ft)
See Figure 2 – “Site Map” for scale

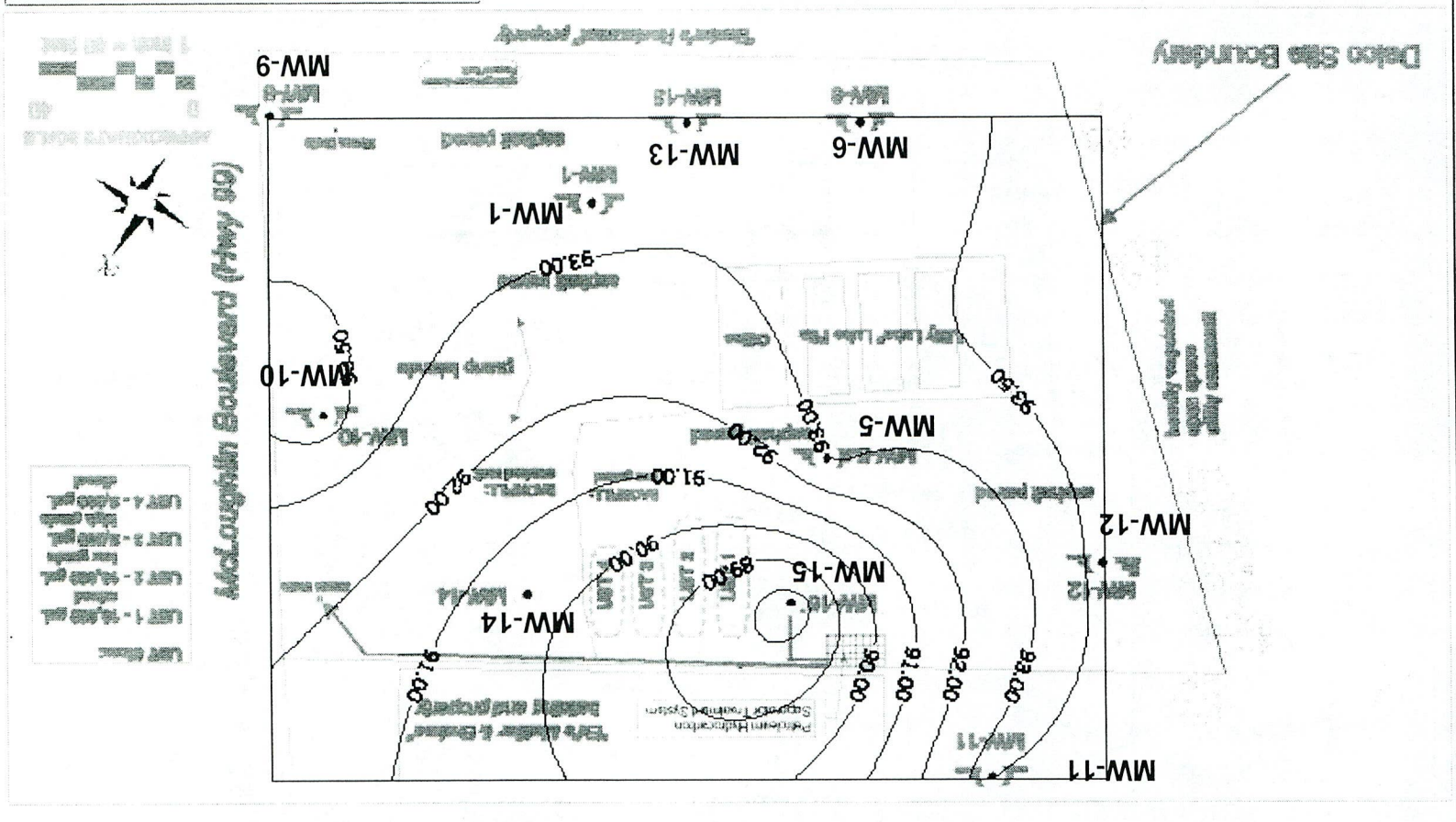
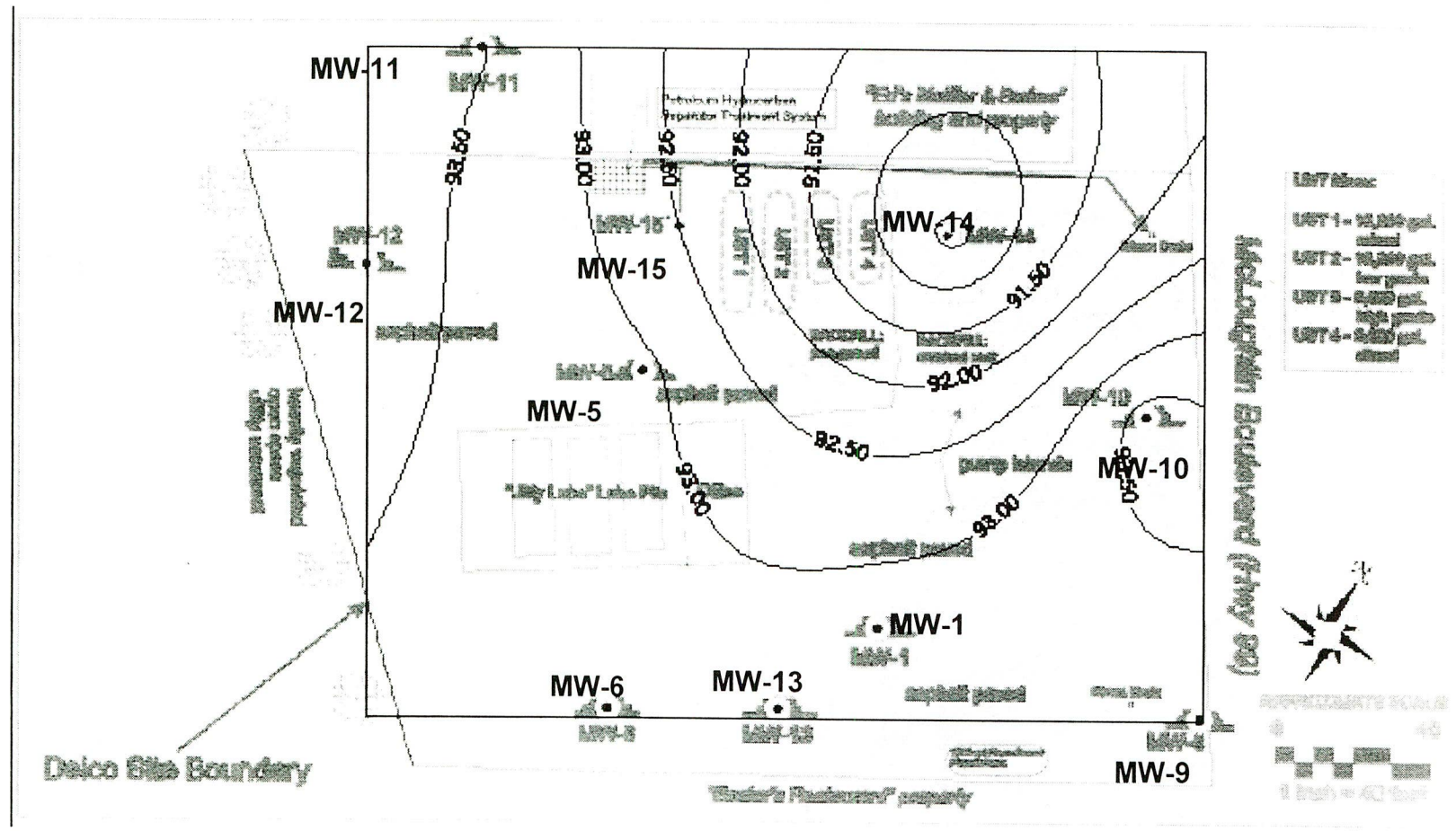


Figure 6 – GROUNDWATER GRADIENT WITHOUT MW-15 MEASUREMENT

Elevation in feet (CI= 0.5-ft)
See Figure 2 – “Site Map” for scale



APPENDIX A

AUGUST 2000 LABORATORY REPORT



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P008579-01	Water	08/27/00 14:40	08/29/00 14:25
MW-5	P008579-02	Water	08/27/00 17:35	08/29/00 14:25
MW-6	P008579-03	Water	08/27/00 13:48	08/29/00 14:25
MW-9	P008579-04	Water	08/27/00 14:11	08/29/00 14:25
MW-10	P008579-05	Water	08/27/00 16:15	08/29/00 14:25
MW-11	P008579-06	Water	08/27/00 18:25	08/29/00 14:25
MW-12	P008579-07	Water	08/27/00 18:45	08/29/00 14:25
MW-13	P008579-08	Water	08/27/00 12:36	08/29/00 14:25
MW-14	P008579-09	Water	08/27/00 16:42	08/29/00 14:25
MW-15	P008579-10	Water	08/27/00 17:30	08/29/00 14:25

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Crystal Burkholder, Project Manager

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/MTBE/N per EPA Method 8021B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (P008579-01RE2) Water						Sampled: 08/27/00 Received: 08/29/00			
Benzene	207	2.50	ug/l	5	NW-G, 8021B	09/05/00	09/05/00	0090039	
Toluene	8.26	2.50	"	"	"	"	"	"	
Ethylbenzene	ND	2.50	"	"	"	"	"	"	
Xylenes (total)	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	72.4	10.0	"	"	"	"	"	"	T-05
Naphthalene	14.5	10.0	"	"	"	"	"	"	T-05
Gasoline Range Hydrocarbons	1820	400	"	"	"	"	"	"	
Surr: 4-BFB (FID)	86.6 %	50-150							
Surr: 4-BFB (PID)	93.2 %	75-125							
MW-5 (P008579-02RE2) Water						Sampled: 08/27/00 Received: 08/29/00			
Benzene	170	2.50	ug/l	5	NW-G, 8021B	09/05/00	09/05/00	0090039	
Toluene	ND	2.50	"	"	"	"	"	"	
Ethylbenzene	ND	2.50	"	"	"	"	"	"	
Xylenes (total)	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	10.0	"	"	"	"	"	"	T-04
Naphthalene	30.2	10.0	"	"	"	"	"	"	T-05
Gasoline Range Hydrocarbons	667	400	"	"	"	"	"	"	
Surr: 4-BFB (FID)	89.6 %	50-150							
Surr: 4-BFB (PID)	99.0 %	75-125							
MW-6 (P008579-03) Water						Sampled: 08/27/00 Received: 08/29/00			
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	09/04/00	09/04/00	0090035	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	90.6 %	50-150							
Surr: 4-BFB (PID)	97.0 %	75-125							

North Creek Analytical - Portland

Crystal Burkholder, Project Manager

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/MTBE/N per EPA Method 8021B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-9 (P008579-04) Water					Sampled: 08/27/00 Received: 08/29/00				
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	09/04/00	09/04/00	0090035	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	90.6 %	50-150							
Surr: 4-BFB (PID)	97.4 %	75-125							
MW-10 (P008579-05RE2) Water					Sampled: 08/27/00 Received: 08/29/00				
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	09/05/00	09/05/00	0090039	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	83.2 %	50-150							
Surr: 4-BFB (PID)	91.0 %	75-125							
MW-11 (P008579-06RE2) Water					Sampled: 08/27/00 Received: 08/29/00				
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	09/05/00	09/05/00	0090039	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	85.6 %	50-150							
Surr: 4-BFB (PID)	93.4 %	75-125							

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/MTBE/N per EPA Method 8021B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-12 (P008579-07) Water					Sampled: 08/27/00 Received: 08/29/00				
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	09/04/00	09/04/00	0090035	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	87.0 %	50-150							
Surr: 4-BFB (PID)	93.8 %	75-125							
MW-13 (P008579-08) Water					Sampled: 08/27/00 Received: 08/29/00				
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	09/04/00	09/04/00	0090035	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	88.0 %	50-150							
Surr: 4-BFB (PID)	96.6 %	75-125							
MW-14 (P008579-09RE2) Water					Sampled: 08/27/00 Received: 08/29/00				
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	09/05/00	09/05/00	0090039	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	37.8	2.00	"	"	"	"	"	"	T-05
Naphthalene	ND	2.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	88.6 %	50-150							
Surr: 4-BFB (PID)	96.6 %	75-125							

North Creek Analytical - Portland

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/MTBE/N per EPA Method 8021B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-15 (P008579-10RE2) Water						Sampled: 08/27/00 Received: 08/29/00			
Benzene	24.6	0.500	ug/l	1	NW-G, 8021B	09/05/00	09/05/00	0090039	
Toluene	2.13	0.500	"	"	"	"	"	"	
Ethylbenzene	10.6	0.500	"	"	"	"	"	"	
Xylenes (total)	10.3	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	7.66	2.00	"	"	"	"	"	"	T-05
Naphthalene	11.3	2.00	"	"	"	"	"	"	T-05
Gasoline Range Hydrocarbons	410	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	87.0 %	50-150							
Surr: 4-BFB (PID)	96.2 %	75-125							

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GeoPro Geologic Services
 P.O. Box 26
 Battle Ground, WA 98604

Project: Delco
 Project Number: 990621-A4
 Project Manager: Richard Kent

Reported:
 09/19/00 13:54

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (P008579-01) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	90.0 %	50-150							
MW-5 (P008579-02) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	96.1 %	50-150							
MW-6 (P008579-03) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	91.5 %	50-150							
MW-9 (P008579-04) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	95.0 %	50-150							
MW-10 (P008579-05) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	91.0 %	50-150							
MW-11 (P008579-06) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	0.610	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	D-17
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	71.5 %	50-150							

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-12 (P008579-07) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	101 %	50-150							
MW-13 (P008579-08) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	99.5 %	50-150							
MW-14 (P008579-09) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	78.6 %	50-150							
MW-15 (P008579-10) Water						Sampled: 08/27/00 Received: 08/29/00			
Diesel Range Organics	ND	0.250	mg/l	1	NWTPH-Dx	09/01/00	09/05/00	0090013	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	81.0 %	50-150							

North Creek Analytical - Portland

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Environmental Laboratory Network

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (P008579-01) Water						Sampled: 08/27/00 Received: 08/29/00			
Acetone	ND	50.0	ug/l	5	EPA 8260B	09/09/00	09/09/00	0090168	
Benzene	168	5.00	"	"	"	"	"	"	
Bromobenzene	ND	5.00	"	"	"	"	"	"	
Bromochloromethane	ND	5.00	"	"	"	"	"	"	
Bromodichloromethane	ND	5.00	"	"	"	"	"	"	
Bromoform	ND	5.00	"	"	"	"	"	"	
Bromomethane	ND	25.0	"	"	"	"	"	"	
2-Butanone	ND	50.0	"	"	"	"	"	"	
n-Butylbenzene	ND	25.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.00	"	"	"	"	"	"	
Carbon disulfide	ND	50.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.00	"	"	"	"	"	"	
Chlorobenzene	ND	5.00	"	"	"	"	"	"	
Chloroethane	ND	5.00	"	"	"	"	"	"	
Chloroform	ND	5.00	"	"	"	"	"	"	
Chloromethane	ND	25.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	25.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	5.00	"	"	"	"	"	"	
Dibromomethane	ND	5.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	25.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.00	"	"	"	"	"	"	
Ethylbenzene	ND	5.00	"	"	"	"	"	"	

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (P008579-01) Water						Sampled: 08/27/00 Received: 08/29/00			
Hexachlorobutadiene	ND	10.0	ug/l	5	EPA 8260B	09/09/00	09/09/00	0090168	
2-Hexanone	ND	50.0	"	"	"	"	"	"	
Isopropylbenzene	10.2	10.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	10.0	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	25.0	"	"	"	"	"	"	
Methyl tert-butyl ether	48.6	5.00	"	"	"	"	"	"	
Methylene chloride	ND	25.0	"	"	"	"	"	"	
Naphthalene	ND	10.0	"	"	"	"	"	"	
n-Propylbenzene	16.7	5.00	"	"	"	"	"	"	
Styrene	ND	5.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.00	"	"	"	"	"	"	
Tetrachloroethene	ND	5.00	"	"	"	"	"	"	
Toluene	ND	5.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.00	"	"	"	"	"	"	
Trichloroethene	ND	5.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.00	"	"	"	"	"	"	
Vinyl chloride	ND	5.00	"	"	"	"	"	"	
o-Xylene	ND	5.00	"	"	"	"	"	"	
m,p-Xylene	ND	10.0	"	"	"	"	"	"	
Surr: 4-BFB	106 %	75-125							
Surr: 1,2-DCA-d4	105 %	75-125							
Surr: Dibromofluoromethane	103 %	75-125							
Surr: Toluene-d8	100 %	75-125							

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

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Environmental Laboratory Network

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-11 (P008579-06) Water						Sampled: 08/27/00 Received: 08/29/00			
Acetone	ND	10.0	ug/l	1	EPA 8260B	09/09/00	09/09/00	0090168	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	1.96	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-11 (P008579-06) Water						Sampled: 08/27/00 Received: 08/29/00			
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	09/09/00	09/09/00	0090168	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	108 %	75-125							
Surr: 1,2-DCA-d4	104 %	75-125							
Surr: Dibromofluoromethane	104 %	75-125							
Surr: Toluene-d8	101 %	75-125							

North Creek Analytical - Portland

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/MTBE/N per EPA Method 8021B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 0090035 - EPA 5030B

Blank (0090035-BLK1)

Prepared & Analyzed: 09/04/00

Benzene	ND	0.500	ug/l							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							
Methyl tert-butyl ether	ND	2.00	"							
Naphthalene	ND	2.00	"							
Gasoline Range Hydrocarbons	ND	80.0	"							
Surr: 4-BFB (FID)	45.9		"	50.0		91.8	50-150			
Surr: 4-BFB (PID)	49.9		"	50.0		99.8	75-125			

LCS (0090035-BS1)

Prepared & Analyzed: 09/04/00

Gasoline Range Hydrocarbons	1130	80.0	ug/l	1250		90.4	50-150			
Surr: 4-BFB (FID)	54.7		"	50.0		109	50-150			

LCS (0090035-BS2)

Prepared & Analyzed: 09/04/00

Benzene	18.1	0.500	ug/l	20.0		90.5	70-130			
Toluene	17.4	0.500	"	20.0		87.0	70-130			
Ethylbenzene	19.3	0.500	"	20.0		96.5	70-130			
Xylenes (total)	57.3	1.00	"	60.0		95.5	70-130			
Methyl tert-butyl ether	18.8	2.00	"	20.0		94.0	70-130			
Naphthalene	19.1	2.00	"	20.0		95.5	70-130			
Surr: 4-BFB (PID)	51.3		"	50.0		103	75-125			

Duplicate (0090035-DUP1)

Source: P008579-09

Prepared & Analyzed: 09/04/00

Gasoline Range Hydrocarbons	ND	80.0	ug/l		ND				50	
Surr: 4-BFB (FID)	42.8		"	50.0		85.6	50-150			

Matrix Spike (0090035-MS1)

Source: P008579-10

Prepared & Analyzed: 09/04/00

Benzene	193	5.00	ug/l	200	25.6	83.7	70-130			
Toluene	161	5.00	"	200	ND	78.5	70-130			
Ethylbenzene	184	5.00	"	200	11.5	86.3	70-130			
Xylenes (total)	528	10.0	"	600	ND	86.5	70-130			
Methyl tert-butyl ether	194	20.0	"	200	ND	91.6	70-130			
Naphthalene	215	20.0	"	200	20.1	97.4	70-130			
Surr: 4-BFB (PID)	48.7		"	50.0		97.4	75-125			

North Creek Analytical - Portland

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/MTBE/N per EPA Method 8021B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 0090035 - EPA 5030B

Matrix Spike Dup (0090035-MSD1)

Source: P008579-10

Prepared & Analyzed: 09/04/00

Benzene	189	5.00	ug/l	200	25.6	81.7	70-130	2.09	15	
Toluene	156	5.00	"	200	ND	76.0	70-130	3.15	15	
Ethylbenzene	177	5.00	"	200	11.5	82.8	70-130	3.88	15	
Xylenes (total)	513	10.0	"	600	ND	84.0	70-130	2.88	15	
Methyl tert-butyl ether	201	20.0	"	200	ND	95.1	70-130	3.54	15	
Naphthalene	232	20.0	"	200	20.1	106	70-130	7.61	15	
Surr: 4-BFB (PID)	50.6		"	50.0		101	75-125			

Batch 0090039 - EPA 5030B

Blank (0090039-BLK1)

Prepared & Analyzed: 09/05/00

Benzene	ND	0.500	ug/l							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							
Methyl tert-butyl ether	ND	2.00	"							
Naphthalene	ND	2.00	"							
Gasoline Range Hydrocarbons	ND	80.0	"							
Surr: 4-BFB (FID)	46.3		"	50.0		92.6	50-150			
Surr: 4-BFB (PID)	50.1		"	50.0		100	75-125			

LCS (0090039-BS1)

Prepared & Analyzed: 09/05/00

Gasoline Range Hydrocarbons	1120	80.0	ug/l	1250		89.6	50-150			
Surr: 4-BFB (FID)	53.0		"	50.0		106	50-150			

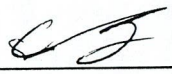
LCS (0090039-BS2)

Prepared & Analyzed: 09/05/00

Benzene	16.7	0.500	ug/l	20.0		83.5	70-130			
Toluene	16.3	0.500	"	20.0		81.5	70-130			
Ethylbenzene	17.9	0.500	"	20.0		89.5	70-130			
Xylenes (total)	53.7	1.00	"	60.0		89.5	70-130			
Methyl tert-butyl ether	17.7	2.00	"	20.0		88.5	70-130			
Naphthalene	19.6	2.00	"	20.0		98.0	70-130			
Surr: 4-BFB (PID)	48.6		"	50.0		97.2	75-125			

North Creek Analytical - Portland

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North Creek Analytical, Inc.
Environmental Laboratory Network

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GeoPro Geologic Services
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Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
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Batch 0090013 - EPA 3510 Fuels

Blank (0090013-BLK1)

Prepared: 09/01/00 Analyzed: 09/05/00

Diesel Range Organics	ND	0.250	mg/l						
Heavy Oil Range Hydrocarbons	ND	0.500	"						
Surr: 1-Chlorooctadecane	0.0971		"	0.100		97.1	50-150		

LCS (0090013-BS1)

Prepared: 09/01/00 Analyzed: 09/05/00

Diesel Range Organics	2.51	0.250	mg/l	2.58		97.3	50-150		
Heavy Oil Range Hydrocarbons	1.75	0.500	"	1.58		111	50-150		
Surr: 1-Chlorooctadecane	0.0890		"	0.100		89.0	50-150		

LCS Dup (0090013-BSD1)

Prepared: 09/01/00 Analyzed: 09/05/00

Diesel Range Organics	2.47	0.250	mg/l	2.58		95.7	50-150	1.61	50
Heavy Oil Range Hydrocarbons	1.76	0.500	"	1.58		111	50-150	0.570	50
Surr: 1-Chlorooctadecane	0.0910		"	0.100		91.0	50-150		

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager



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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD Limit	Notes
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Batch 0090168 - EPA 5030

Blank (0090168-BLK1)

Prepared & Analyzed: 09/09/00

Acetone	ND	10.0	ug/l
Benzene	ND	1.00	"
Bromobenzene	ND	1.00	"
Bromochloromethane	ND	1.00	"
Bromodichloromethane	ND	1.00	"
Bromoform	ND	1.00	"
Bromomethane	ND	5.00	"
2-Butanone	ND	10.0	"
n-Butylbenzene	ND	5.00	"
sec-Butylbenzene	ND	1.00	"
tert-Butylbenzene	ND	1.00	"
Carbon disulfide	ND	10.0	"
Carbon tetrachloride	ND	1.00	"
Chlorobenzene	ND	1.00	"
Chloroethane	ND	1.00	"
Chloroform	ND	1.00	"
Chloromethane	ND	5.00	"
2-Chlorotoluene	ND	1.00	"
4-Chlorotoluene	ND	1.00	"
1,2-Dibromo-3-chloropropane	ND	5.00	"
Dibromochloromethane	ND	1.00	"
1,2-Dibromoethane	ND	1.00	"
Dibromomethane	ND	1.00	"
1,2-Dichlorobenzene	ND	1.00	"
1,3-Dichlorobenzene	ND	1.00	"
1,4-Dichlorobenzene	ND	1.00	"
Dichlorodifluoromethane	ND	5.00	"
1,1-Dichloroethane	ND	1.00	"
1,2-Dichloroethane	ND	1.00	"
1,1-Dichloroethene	ND	1.00	"
cis-1,2-Dichloroethene	ND	1.00	"
trans-1,2-Dichloroethene	ND	1.00	"
1,2-Dichloropropane	ND	1.00	"
1,3-Dichloropropane	ND	1.00	"
2,2-Dichloropropane	ND	1.00	"
1,1-Dichloropropene	ND	1.00	"

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

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GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 0090168 - EPA 5030

Blank (0090168-BLK1)

Prepared & Analyzed: 09/09/00

cis-1,3-Dichloropropene	ND	1.00	ug/l							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	2.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	2.00	"							
p-Isopropyltoluene	ND	2.00	"							
4-Methyl-2-pentanone	ND	5.00	"							
Methyl tert-butyl ether	ND	1.00	"							
Methylene chloride	ND	5.00	"							
Naphthalene	ND	2.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							
1,1,1,2-Tetrachloroethane	ND	1.00	"							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	1.00	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surr: 4-BFB	21.7		"	20.0		109	75-125			
Surr: 1,2-DCA-d4	20.3		"	20.0		101	75-125			
Surr: Dibromofluoromethane	20.2		"	20.0		101	75-125			
Surr: Toluene-d8	19.8		"	20.0		99.0	75-125			

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

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Environmental Laboratory Network

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 0090168 - EPA 5030

LCS (0090168-BS1)

Prepared & Analyzed: 09/09/00

Benzene	16.5	1.00	ug/l	20.0		82.5	80-125			
Chlorobenzene	18.0	1.00	"	20.0		90.0	80-125			
1,1-Dichloroethene	16.1	1.00	"	20.0		80.5	70-135			
Toluene	16.6	1.00	"	20.0		83.0	80-125			
Trichloroethene	13.9	1.00	"	20.0		69.5	70-130			
Surr: 4-BFB	21.6		"	20.0		108	75-125			
Surr: 1,2-DCA-d4	20.1		"	20.0		101	75-125			
Surr: Dibromofluoromethane	19.6		"	20.0		98.0	75-125			
Surr: Toluene-d8	20.2		"	20.0		101	75-125			

LCS Dup (0090168-BS1)

Prepared & Analyzed: 09/09/00

Benzene	17.0	1.00	ug/l	20.0		85.0	80-125	2.99	25	
Chlorobenzene	18.5	1.00	"	20.0		92.5	80-125	2.74	25	
1,1-Dichloroethene	18.8	1.00	"	20.0		94.0	70-135	15.5	25	
Toluene	17.9	1.00	"	20.0		89.5	80-125	7.54	25	
Trichloroethene	15.3	1.00	"	20.0		76.5	70-130	9.59	25	
Surr: 4-BFB	21.2		"	20.0		106	75-125			
Surr: 1,2-DCA-d4	20.5		"	20.0		103	75-125			
Surr: Dibromofluoromethane	20.1		"	20.0		101	75-125			
Surr: Toluene-d8	20.0		"	20.0		100	75-125			

Matrix Spike (0090168-MS1)

Source: P008435-03RE1 Prepared: 09/09/00 Analyzed: 09/11/00

Benzene	21.4	1.00	ug/l	20.0	4.87	82.6	80-125			
Chlorobenzene	17.4	1.00	"	20.0	ND	87.0	80-125			
1,1-Dichloroethene	16.3	1.00	"	20.0	ND	81.5	70-135			
Toluene	16.3	1.00	"	20.0	ND	79.8	80-125			
Trichloroethene	18.6	1.00	"	20.0	3.46	75.7	70-130			
Surr: 4-BFB	20.5		"	20.0		103	75-125			
Surr: 1,2-DCA-d4	20.9		"	20.0		104	75-125			
Surr: Dibromofluoromethane	21.7		"	20.0		109	75-125			
Surr: Toluene-d8	19.1		"	20.0		95.5	75-125			

Q-01

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541.383.9310 fax 541.382.7588

GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	--------------------	-------	----------------	------------------	------	----------------	-----	--------------	-------

Batch 0090168 - EPA 5030

Matrix Spike Dup (0090168-MSD1)

Source: P008435-03RE1 Prepared: 09/09/00 Analyzed: 09/11/00

Benzene	21.6	1.00	ug/l	20.0	4.87	83.7	80-125	0.930	25	
Chlorobenzene	18.3	1.00	"	20.0	ND	91.5	80-125	5.04	25	
1,1-Dichloroethene	16.4	1.00	"	20.0	ND	82.0	70-135	0.612	25	
Toluene	16.6	1.00	"	20.0	ND	81.4	80-125	1.82	25	
Trichloroethene	18.1	1.00	"	20.0	3.46	73.2	70-130	2.72	25	
Surr: 4-BFB	20.5		"	20.0		103	75-125			
Surr: 1,2-DCA-d4	20.6		"	20.0		103	75-125			
Surr: Dibromofluoromethane	21.1		"	20.0		106	75-125			
Surr: Toluene-d8	19.8		"	20.0		99.0	75-125			

North Creek Analytical - Portland

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541.383.9310 fax 541.382.7588

GeoPro Geologic Services
P.O. Box 26
Battle Ground, WA 98604

Project: Delco
Project Number: 990621-A4
Project Manager: Richard Kent

Reported:
09/19/00 13:54

Notes and Definitions

- D-17 Detected hydrocarbons in the diesel range do not have a distinct diesel pattern and may be due to heavily weathered diesel or possibly biogenic interference.
- Q-01 The spike recovery, and/or RPD, for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
- T-04 Tentative analyte hit did not confirm by GC/MS.
- T-05 Analyte hit confirmed by GC/MS.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- wet Sample results reported on a wet weight basis
- RPD Relative Percent Difference

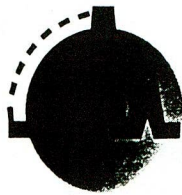
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Crystal Burkholder, Project Manager

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Environmental Laboratory Network

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North Creek Analytical OnSite Environmental Inc.

14924 NE 31st Circle • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

4.8 R

Page 1 of 1

Company: GeoPro Geologic Services

Project No.: 990621-A4

Project Name: Delco Petroleum

Project Manager:

Turn Around Requested

(Check One)

- ☐ Same Day
- ☐ 24 Hours
- ☐ 48 Hours
- ☒ Standard
- ☐ _____ (other)

Project Chemist:

Laboratory No. P008579

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX, Neg Nitrogen NTBE	NWTPH-Dx	Volatiles by 8240/624/8260 8260	Halogenated Volatiles by 8260	Semivolatiles by 8270/625	PAHs by 8270/625	PCBs by 8081/608	Total RCRA Metals (8)	TCLP Metals	VPH	EPH	% Moistur
	MW-1	8/27/00	1440	W	4		X	X	X									
	MW-5		1735		3													
	MW-6		1348		3													
	MW-9		1411		3													
	MW-10		1615		3													
	MW-11		1825		4				X									
	MW-12		1845		3													
	MW-13		1236		3													
	MW-14		1642		3													
	MW-15		1730		3													

RELINQUISHED BY <u>Kel M</u>	DATE 8/29/00	RECEIVED BY <u>Mr Morgan</u>	DATE 8/29/00
FIRM <u>GeoPro</u>	TIME	FIRM <u>NCA</u>	TIME 14:25
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY	DATE REVIEWED		

COMMENTS:

APPENDIX B

AUGUST 2000

WATER SAMPLE

FIELD LOGS

GeoPro Geologic Services

Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-1
Time Sample Collected: 14:40	SAMPLE NO.: MW-1
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 15	Well depth when sampled (ft): 15
Well install date: 6/18/93	Depth to bottom of aquifer seal (ft): 1.8
Casing inside diameter (inches): 2	Elevation: 99.37

WELL PURGE INFORMATION

Pre-purge static water level (ft): 6.161	Pre-purge volume of water in casing & annulus (gals): 5.42
Filter pack thickness (inches): 6	Total amount purged (gals): 8
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:

The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or ½-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.

Other Comments: traffic cover ID 54772; water in traffic cover.

SWL at time of sample collection: 6.89 ft.	Other:
Sample temperature: 68.5 °F	Sample color: gray
Sample conductance: 3.31×10^{-2}	Sample turbidity: v slight
Sample pH: 8.5	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx, VOC (8260B)

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1440	1.40	73.6	3.57	8.84	v slight	gray
15	1421	4.20	70.7	3.33	8.75	v slight	
25	1428	7.00	68.7	3.14	8.33	mod	
30	1432	8.00	68.3	3.31	8.50	mod	gray

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft .

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 0 ft above seal $\times 0.163 \text{ gals/ft} = 0 \text{ gals}$.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = $8.84 \text{ ft below seal} \times 0.163 \text{ gals/ft} + [\text{annulus}] 8.84 \text{ ft. below seal} \times 0.45 \text{ gals/ft} = 5.42 \text{ gals}$.

Bailer Volume Example

Bailer dimensions are 1.5" ID $\times$ 36" long. $1.5" = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about ¼ gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons per volume}$ (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals.} = 3 \text{ purged volumes}$. $11 \text{ gals.} \times 1 \text{ bail/0.28 gals} = \text{about } 40 \text{ bails}$ (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

GeoPro Geologic Services

Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-5
Time Sample Collected: 17:35	SAMPLE NO.: MW-5
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 15	Well depth when sampled (ft): 15
Well install date: 6/19/93	Depth to bottom of aquifer seal (ft): 3.5
Casing inside diameter (inches): 2	Elevation: 100.41

WELL PURGE INFORMATION

Pre-purge static water level (ft): 7.30	Pre-purge volume of water in casing & annulus (gals): 4.72
Filter pack thickness (inches): 6	Total amount purged (gals): 8
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:
The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or 1/2-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.

Other Comments: OR WRD ID metal tag in traffic box: 54776

SWL at time of sample collection: 7.42 ft.	Other:
Sample temperature: 63.7 °F	Sample color: lt gray
Sample conductance: 1.62×10^{-2}	Sample turbidity: v slight
Sample pH: 8.35	Sample odor: "diesel"

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1716	1.40	63.5	1.53	9.09	clear	
15	1720	4.20	62.3	1.48	8.82	slight	
25	1726	7.00	63.8	1.62	8.65	slight	
30	1729	8.00	63.7	1.62	8.35	slight	odor

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 0 ft above seal $\times 0.163 \text{ gals/ft} = 0 \text{ gals}$.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = 7.7 ft below seal $\times 0.163 \text{ gals/ft} +$ [annulus] 7.7 ft. below seal $\times 0.45 \text{ gals/ft} = 4.72 \text{ gals}$

Bailer Volume Example

Bailer dimensions are 1.5" ID x 36" long. $1.5" = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about 1/4 gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons per volume}$ (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals} = 3 \text{ purged volumes}$. $11 \text{ gals.} \times 1 \text{ bail}/0.28 \text{ gals} = \text{about } 40 \text{ bails}$ (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

GeoPro Geologic Services

Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-6
Time Sample Collected: 13:48	SAMPLE NO.: MW-6
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 14.5	Well depth when sampled (ft): 14.5
Well install date: 6/19/93	Depth to bottom of aquifer seal (ft): 3.5
Casing inside diameter (inches): 2	Elevation: 100.01

WELL PURGE INFORMATION

Pre-purge static water level (ft): 6.88	Pre-purge volume of water in casing & annulus (gals): 4.67
Filter pack thickness (inches): 6	Total amount purged (gals): 7.8
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:

The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or ½-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.

Other Comments:

SWL at time of sample collection: 7.77 ft.	Other:
Sample temperature: 67.2 °F	Sample color: lt gray
Sample conductance: 1.68×10^{-2}	Sample turbidity: slight
Sample pH: 8.72	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1330	1.40	67.0	2.01	8.65	mod	
15	1337	4.20	67.0	1.92	8.52	mod	
25	1340	7.00	67.2	1.68	8.71	mod	
29	1344	7.8	67.2	1.68	8.72	mod	med gray

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 0 ft above seal $\times 0.163 \text{ gals/ft}$ = 0 gals.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = 7.62 ft below seal $\times 0.163 \text{ gals/ft}$ + [annulus] 7.62 ft. below seal $\times 0.45 \text{ gals/ft}$ = 4.67 gals.

Bailer Volume Example

Bailer dimensions are 1.5" ID $\times$ 36" long. $1.5'' = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about ¼ gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons per volume}$ (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals.} = 3 \text{ purged volumes}$. 11 gals. $\times$ 1 bail/0.28 gals = about 40 bails (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

GeoPro Geologic Services

Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-9
Time Sample Collected: 14:11 and 18:30	SAMPLE NO.: MW-9
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 15	Well depth when sampled (ft): 15
Well install date: 1/27/95	Depth to bottom of aquifer seal (ft): 3
Casing inside diameter (inches): 2	Elevation: 99.42

WELL PURGE INFORMATION

Pre-purge static water level (ft): 6.228	Pre-purge volume of water in casing & annulus (gals): 5.37
Filter pack thickness (inches): 6	Total amount purged (gals): 7.2
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:
The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or 1/2-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.

Other Comments: very slow recharge; possible screen plug

SWL at time of sample collection: 8.1 ft.	Other:
Sample temperature: 65.3 °F	Sample color: lt gray
Sample conductance: 2.40×10^{-2}	Sample turbidity: mod
Sample pH: 8.4	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1307	1.40	69.3	2.76	8.17	mod	lt yel brn
15	1311	4.20	66.2	2.48	8.04	mod	lt gray
25	1337	7.00	64.2	2.49	8.49	mod	lt gray
27	1820	7.2	65.8	2.52	8.22	mod	lt gray

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 0 ft above seal $\times 0.163 \text{ gals/ft}$ = 0 gals.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = 8.77 ft below seal $\times 0.163 \text{ gals/ft}$ + [annulus] 8.77 ft. below seal $\times 0.45 \text{ gals/ft}$ = 5.37 gals.

Bailer Volume Example

Bailer dimensions are 1.5" ID x 36" long. $1.5" = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about 1/4 gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons per volume}$ (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals.} = 3 \text{ purged volumes.}$ 11 gals. $\times 1 \text{ bail}/0.28 \text{ gals} = \text{about } 40 \text{ bails (excluding water above aquifer seal).}$

NOTE: all references on this Field Log to dimensions and volumes are approximations.

GeoPro Geologic Services

Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-10
Time Sample Collected: 1615	SAMPLE NO.: MW-10
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 15	Well depth when sampled (ft): 15
Well install date: 8/12/96	Depth to bottom of aquifer seal (ft): 8
Casing inside diameter (inches): 2	Elevation: 98.50
WELL PURGE INFORMATION	
Pre-purge static water level (ft): 4.778	Pre-purge volume of water in casing & annulus (gals): 4.81
Filter pack thickness (inches): 8	Total amount purged (gals): 9.8
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method: The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or ½-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.	
Other Comments: OR WRD No. L04479 metal tag in traffic box; traffic box stamped ID 90055	
SWL at time of sample collection: 7.0 ft.	Other:
Sample temperature: 63.1 °F	Sample color: lt gray
Sample conductance: 1.83×10^{-2}	Sample turbidity: slight
Sample pH: 9.27	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1557	1.40	73.0	2.03	9.15	slight	lt brn gray
15	1601	4.20	65.3	1.91	8.85	slight	lt gray
25	1604	7.00	64.1	1.86	9.08	slight	lt gray
35	1613	9.80	63.0	1.83	9.27	slight	lt gray

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 3.2 ft above seal $\times 0.163 \text{ gals/ft} = 0.525 \text{ gals}$.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = 7 ft below seal $\times 0.163 \text{ gals/ft} +$ [annulus] 7 ft. below seal $\times 0.45 \text{ gals/ft} = 4.29 \text{ gals}$.

Bailer Volume Example

Bailer dimensions are 1.5" ID x 36" long. $1.5" = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about ¼ gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons per volume}$ (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals} = 3 \text{ purged volumes}$. $11 \text{ gals} \times 1 \text{ bail}/0.28 \text{ gals} = \text{about } 40 \text{ bails}$ (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

GeoPro Geologic Services

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WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-11
Time Sample Collected: 1825	SAMPLE NO.: MW-11
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 15	Well depth when sampled (ft): 15
Well install date: 8/12/96	Depth to bottom of aquifer seal (ft): 8
Casing inside diameter (inches): 2	Elevation: 99.64
WELL PURGE INFORMATION	
Pre-purge static water level (ft): 6.11	Pre-purge volume of water in casing & annulus (gals): 4.6
Filter pack thickness (inches): 8	Total amount purged (gals): 7.0
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump
SAMPLE COLLECTION INFORMATION	
Sample Collection Method: The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or 1/2-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.	
Other Comments: traffic cover stamped MW 11 90056; metal tag in traffic box OR DWR ID L04488	
SWL at time of sample collection: 6.1 ft.	Other:
Sample temperature: 62.4 °F	Sample color: lt yel brn
Sample conductance: 2.65×10^{-2}	Sample turbidity: slight
Sample pH: 8.83	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx, VOC (8260B)

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1807	1.40	63.6	2.98	8.90	slight	yel brn
15	1811	4.20	63.4	2.77	8.84	slight	yel brn
25	1820	7.00	62.4	2.65	8.83	slight	yel brn

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity. then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 1.9 ft above seal $\times 0.163 \text{ gals/ft} = 0.31 \text{ gals}$.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = 7 ft below seal $\times 0.163 \text{ gals/ft} +$ [annulus] 7 ft. below seal $\times 0.45 \text{ gals/ft} = 4.29 \text{ gals}$.

Bailer Volume Example

Bailer dimensions are 1.5" ID $\times$ 36" long. $1.5" = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about 1/4 gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons per volume}$ (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals.} = 3 \text{ purged volumes}$. 11 gals. $\times 1 \text{ bail/0.28 gals} = \text{about 40 bails}$ (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

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WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-12
Time Sample Collected: 18:45	SAMPLE NO.: MW-12
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 15	Well depth when sampled (ft): 15
Well install date: 8/12/96	Depth to bottom of aquifer seal (ft): 8
Casing inside diameter (inches): 2	Elevation: 100.26

WELL PURGE INFORMATION

Pre-purge static water level (ft): 6.62	Pre-purge volume of water in casing & annulus (gals): 4.49
Filter pack thickness (inches): 8	Total amount purged (gals): 7.0
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:
The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or 1/2-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blue-ice for transport to the laboratory.

Other Comments: OR DWR metal tag in traffic box ID L04489, very slow recharge

SWL at time of sample collection: 12.6 ft.	Other: slight sheen
Sample temperature: 62.5 °F	Sample color: clear
Sample conductance: 2.15×10^{-2}	Sample turbidity: clear
Sample pH: 8.91	Sample odor: slight

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1757	1.40	65.1	2.42	8.65	mod	brn
15	1802	4.20	63.3	2.33	8.86	mod	gry-brn
25	1811	7.00	62.5	2.15	8.91	mod	lt gray

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 1.2 ft above seal $\times 0.163 \text{ gals/ft} = 0.2 \text{ gals}$.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = 7 ft below seal $\times 0.163 \text{ gals/ft} +$ [annulus] 7 ft. below seal $\times 0.45 \text{ gals/ft} = 4.29 \text{ gals}$.

Bailer Volume Example

Bailer dimensions are 1.5" ID $\times$ 36" long. 1.5" = 0.092 gals/ft. 3 ft bailer = 0.28 gals/bail, or about 1/4 gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons per volume}$ (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals.} = 3 \text{ purged volumes}$. 11 gals. $\times 1 \text{ bail/0.28 gals} = \text{about } 40 \text{ bails}$ (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

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WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-13
Time Sample Collected: 12:36	SAMPLE NO.: MW-13
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 15	Well depth when sampled (ft): 15
Well install date: 8/12/96	Depth to bottom of aquifer seal (ft): 8
Casing inside diameter (inches): 2	Elevation: 99.85

WELL PURGE INFORMATION

Pre-purge static water level (ft): 6.692	Pre-purge volume of water in casing & annulus (gals): 4.5
Filter pack thickness (inches): 8	Total amount purged (gals): 8.0
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:

The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or ½-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.

Other Comments: OR DWR ID metal tag in traffic box L04487; top of traffic box stamped MW-13 90058

SWL at time of sample collection: 7.1 ft.	Other:
Sample temperature: 63.9 °F	Sample color: clear
Sample conductance: 2.14×10^{-2}	Sample turbidity: none
Sample pH:	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
5	1214	1.40	68.5	2.61	7.46		med yel brn
15	1222	4.20	67.0	2.35	7.45		med yel brn
25	1223	7.00	65.3	2.20	8.34		
30	1226	8.00	64.0	2.14	8.13	clear	

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:
2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then 1.5 gals/ft $\times$ 0.30 = 0.45 gals/ft in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

2" DATA: ABOVE SEAL: Volume in 2" PVC in 8" hole = 1.31 ft above seal $\times$ 0.163 gals/ft = 0.21 gals.

BELOW SEAL: Volume [in 2" PVC in 8" hole] = 7 ft below seal $\times$ 0.163 gals/ft + [annulus] 7 ft. below seal $\times$ 0.45 gals/ft = 4.29 gals.

Bailer Volume Example

Bailer dimensions are 1.5" ID x 36" long. 1.5" = 0.092 gals/ft. 3 ft bailer = 0.28 gals/bail, or about ¼ gal/bail. e.g. 10 ft of water in monitor well $\times$ 0.363 gals/ft = 3.63 gallons per volume (assume no water above aquifer seal). 3.63 $\times$ 3 = 11 gals. = 3 purged volumes. 11 gals. $\times$ 1 bail/0.28 gals = about 40 bails (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

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WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-14
Time Sample Collected: 16:42	SAMPLE NO.: MW-14
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 9	Well depth when sampled (ft): 9
Well install date: 11/17/99	Depth to bottom of aquifer seal (ft): 4
Casing inside diameter (inches): 4	Elevation: 99.65

WELL PURGE INFORMATION

Pre-purge static water level (ft): 5.29	Pre-purge volume of water in casing & annulus (gals): 8.17
Filter pack thickness (inches): 8	Total amount purged (gals): 11.2
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:

The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or 1/2-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.

Other Comments: OR DWR ID metal tag in traffic box L13022

SWL at time of sample collection: 5.29 ft.	Other:
Sample temperature: 68.0 °F	Sample color: clear
Sample conductance: 0.90×10^{-2}	Sample turbidity: none
Sample pH: 9.58	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
10	1616	2.8	67.0	0.89	9.10	slight	
20	1627	5.6	67.7	0.99	9.24		lt gray
30	1634	8.4	70.0	0.96	9.10		
40	1638	11.2	69.0	0.90	9.58		

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:
2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

4" DATA: ABOVE SEAL: Volume in 4" PVC in 10.25" hole = 0 ft above seal $\times 0.653 \text{ gals/ft} = 0 \text{ gals}$.

BELOW SEAL: Volume [in 4" PVC in 10.25" hole] = 3.71 ft below seal $\times 0.653 \text{ gals/ft}$ + [annulus] 3.71 ft. below seal $\times 1.55 \text{ gals/ft} = 8.17 \text{ gals}$.

Bailer Volume Example

Bailer dimensions are 1.5" ID x 36" long. $1.5" = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about 1/4 gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons}$ per volume (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals} = 3 \text{ purged volumes}$. 11 gals. $\times 1 \text{ bail}/0.28 \text{ gals} = \text{about } 40 \text{ bails}$ (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.

GeoPro Geologic Services

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WATER SAMPLE FIELD LOG

Project Name: Delco Petroleum Groundwater Sampling
Project Location: 17873 SE McLoughlin Blvd., Milwaukie, Oregon 97267
Client: Delco Petroleum Co., LLC

Project Number: 990621-A4

DATE: 8/27/00	WELL NO.: MW-15
Time Sample Collected: 17:30	SAMPLE NO.: MW-15
COC/RFA Number: 000828	Sampler: rck
Well as-built depth (ft): 9	Well depth when sampled (ft): 15.5
Well install date: 11/17/99	Depth to bottom of aquifer seal (ft): 4.5
Casing inside diameter (inches): 4	Elevation: 96.42

WELL PURGE INFORMATION

Pre-purge static water level (ft): 9.00	Pre-purge volume of water in casing & annulus (gals): 14.3
Filter pack thickness (inches): 8	Total amount purged (gals): 11.2*
No. of 55-gal drums used for purged water: <1	☒ Purge by bailer ☐ Purge by pump

SAMPLE COLLECTION INFORMATION

Sample Collection Method:

The monitor well was purged of stagnant water in the casing and filter by hand bailing with a disposable bailer until the temperature, conductivity and pH reasonably stabilized or approximately three well volumes were evacuated. Samples were collected with a disposable PVC bailer lowered below the water level which had reached approximately 80% of the static level as recorded prior to purging. Water samples were placed in septum-capped 40-milliliter vials (volatile organic analysis-VOA) and/or 1 or ½-liter amber glass containers. The containers were filled to prevent air-entrapment, sealed with Teflon septums as appropriate, labeled, and placed in an ice chest with blu-ice for transport to the laboratory.

Other Comments: OR DWR ID metal tag in traffic box L13023; *area around screen is pea gravel backfill extending into UST area.

SWL at time of sample collection: 9.0 ft.	Other:
Sample temperature: 66.5 °F	Sample color: clear
Sample conductance: 1.27×10^{-2}	Sample turbidity: none
Sample pH: 8.69	Sample odor: none

Analysis Requested:

NWTPH-Gx/BTEX, Naphthalene and MTBE, NWTPH-Dx

FIELD DATA

Bail No.	Time	Gals. Purged	Temp °F	Cond $\times 10^{-2}$	pH	Turbidity	Comment
10	1706	2.8	69.2	1.35	9.01	clear	
20	1714	5.6	66.8	1.33	9.22		
30	1720	8.4	67.0	1.28	8.80		
40	1725	11.2	66.5	1.27	8.69	clear	

Purged Volume Example

One purged volume is the water contained within the filter pack (annulus) and the casing ("standing water"). Bail approximately 3 purged volumes of water prior to collecting a sample. For example, calculate one purged volume using the following conversions:

2" Sch-40 PVC casing = 0.163 gallons per foot (4" casing is 0.653 gallons per foot). Assume filter pack w/6" annulus (8" hole) has 30% porosity, then $1.5 \text{ gals/ft} \times 0.30 = 0.45 \text{ gals/ft}$ in annulus. A 4" PVC in 10.25" hole, annulus of 6.25", is 1.55 gals/ft.

4" DATA: ABOVE SEAL: Volume in 4" PVC in 10.25" hole = 0 ft above seal $\times 0.163 \text{ gals/ft} = 0 \text{ gals}$.

BELOW SEAL: Volume [in 4" PVC in 10.25" hole] = 6.5 ft below seal $\times 0.653 \text{ gals/ft} +$ [annulus] 6.5 ft. below seal $\times 1.55 \text{ gals/ft} = 14.3 \text{ gals}$

Bailer Volume Example

Bailer dimensions are 1.5" ID $\times$ 36" long. $1.5" = 0.092 \text{ gals/ft}$. 3 ft bailer = 0.28 gals/bail, or about ¼ gal/bail. e.g. 10 ft of water in monitor well $\times 0.363 \text{ gals/ft} = 3.63 \text{ gallons}$ per volume (assume no water above aquifer seal). $3.63 \times 3 = 11 \text{ gals.} = 3 \text{ purged volumes}$. $11 \text{ gals.} \times 1 \text{ bail/0.28 gals} = \text{about } 40 \text{ bails}$ (excluding water above aquifer seal).

NOTE: all references on this Field Log to dimensions and volumes are approximations.