03-93-0008

REMEDIAL EXCAVATION REPORT
DEQ Site No. 03-93-0008

Property Location:

DELCO PETROLEUM CO. LLC

17873 SE McLoughlin Blvd.

Milwaukie, Oregon

April 3, 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-A4

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1. INTRODUCTION

1.1. PURPOSE AND SCOPE OF WORK

The purpose of this report is to summarize remediation by excavation of petroleum contaminated soil, and, removal and installation of underground storage tanks and associated facilities at the Delco Petroleum Company LLC ("Delco") service station, 17873 SE McLoughlin Boulevard, Milwaukie, Oregon 97267 ("Site"). The landowner contact is Mr. Devinder Dhillon of Delco Petroleum Co., LLC, 14 Long Leaf Drive, Hamilton, New Jersey 08690 ("Client" and "Landowner"). GeoPro Geologic Services ("Consultant") was authorized by Client to begin work on July 1, 1999, as amended through Agreement.

For further information on the following documentation related to the removal and construction of the service station facility, please contact OR UST Service Provider Licensee RE ID 774, ADDR ID 111589, Pacific Northern Environmental, Corp., 1081 Columbia Blvd., Longview, WA 98632, whose services and responsibilities included removing the previous Petroleum UST System and installing the new Petroleum UST System at the Site pursuant to appropriate regulations.

UST Decommissioning/Change-in-Service Report 30-Day Notice, and/or

UST Decommissioning/Change-in-Service Report Checklist, and/or

UST Decommissioning/Change-in-Service Report, and/or

EPA Notification for Underground Storage Tanks, and/or

UST System Retrofitting or Upgrading Checklist and Registration Form, and/or

General Permit Registration Form.

Previous environmental Site work prior to decommissioning the old Petroleum UST System and installing the new Petroleum UST System is summarized in a report submitted to the Oregon Department of Environmental Quality ("DEQ") titled "Quarterly Report, July 1999, Groundwater Monitoring, Flying J-Milwaukie #2, DEQ Site No. 03-93-0008", dated August 4, 1999 by GeoPro Geologic Services. Planned remedial excavation and replacement of underground storage tanks was submitted as a "Work Plan" dated August 11, 1999 and subsequently approved by DEQ. Two (2) additional groundwater monitoring wells were installed as a supplement to the Work Plan at the direction of DEQ.

Analysis of soil and groundwater samples collected from borings and monitor wells in May 1993 indicated that groundwater contamination exceeded cleanup levels due to apparent gasoline and/or diesel leakage from the UST's, piping, and/or associated facilities. Free product was observed during sampling of groundwater monitor well MW-3 from July 1994 through January 1995.

The decommissioned UST's referenced herein may have been installed in 1978 or earlier by the previous landowner, Flying J Inc., 50 West 990 South, P.O. Box 678, Brigham City UT 84302 who apparently purchased the property on December 6, 1976. Delco reportedly purchased the property on February 2, 1994.

The landowner decided that the excavation of soil as the source of contamination was necessary to reduce the risk of groundwater contamination. Groundwater cleanup is the primary goal of DEQ.

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 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 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 Willamette River flows northerly approximately one-half mile west of the Site and the Clackamas River westerly into the Willamette approximately one and one-half miles south of the Site.

Prior to remedial activities, the Site was an active service station which 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 (see Figure 2 – "Pre-Excavation Site Map and Cross-Section A-A' Index"). 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 3 – "Post-Excavation Site Map and Cross-Section B-B' Index").

2. PREVIOUS WORK

2.1. PREVIOUS ENVIRONMENTAL REPORTS

In addition to the above referenced reports by GeoPro, previous Site work has been summarized in the following reports:

- "*Environmental Assessment-Phase I*", Jiffy Lube International Store #1012, apparently for Pennzoil Company, June 10, 1993, 11pp., Figures, Tables, and Appendices.
- "*Phase II Environmental Assessment Report*", by Delta Environmental Consultants, Inc., Bellevue, WA, undated, 4pp., Figures, Tables, and Appendices.
- "*Phase III Environmental Assessment Report*", for Jiffy Lube, Milwaukie, OR, by Delta Environmental Consultants, Inc., Bellevue, WA, undated, 6pp., Figures, Tables, and Appendices.
- "*Cleanup Standards for Benzene, Toluene, Ethylbenzene, Xylene, and TPH per EPA Guidance Document EPA 910/9-91-036*", for Eclipse Environmental Consulting, Richland, WA, by Columbia Energy & Environmental Services, Inc., Richland, WA, June 15, 1994, 5pp. and Tables.
- "*Quarterly Groundwater Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, December 19, 1994.

- "*Third Quarterly Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, June 15, 1995, 6pp. and Appendices.
- "*Fourth Quarterly Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, June 22, 1995, 7pp. and Appendices.
- "*Fifth Quarterly Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, October 18, 1995, 7pp. and Appendices.
- "*Delco Project Summary Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, December 20, 1995, 6pp. and Appendices.
- "*Sixth Quarterly Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, February 15, 1996, 7pp. and Appendices.
- "*Seventh Quarterly Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, May 15, 1996, 7pp. and Appendices.
- "*Ground Water Monitoring Report*", for Delco Company, by Northwest Envirocon, Inc., Vancouver, WA, September 30, 1996, 10pp. and data information.
- "*Eighth Quarterly Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, November 8, 1996, 8pp. and Appendices.
- "*Ninth Quarterly Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, February 21, 1997, 8pp. and Appendices.
- "*First Quarter 1998 Ground Water Monitoring Report*", for Delco Company (formerly Flying J), by Northwest Envirocon, Inc., Vancouver, WA, February 12, 1998, 8pp. and Appendices.

2.2. PIPING SYSTEM LEAK

Apparently a previous surface spill from a nozzle estimated at 81-gallons was reported in April 1988, but was cleaned up satisfactorily. On February 18, 1993, an 'Initial Report Form For UST Cleanup Project' was prepared by Flying J Inc. for a reported pipeline free-product release that apparently was discovered on January 12, 1993 (see Appendix A – "1993 Pipeline Leak and Cleanup") while installing a second stage vapor system. A map is not included in available documentation, however, it is assumed that the referenced pipeline ran from the UST's eastward toward Monitor Well MW-2 (see Figure 2). During remedial excavation in September 1999, an abandoned set of pipelines was found between the UST's and MW-2 (see Figure 4 - "Exposed Diesel UST and Gasoline Pipelines").

Groundwater was not encountered during excavation for retrofitting of the piping system in January 1993 according to the report to DEQ prepared by Flying J. Apparently a composite soil sample was collected from the excavation trench on January 12, 1993 and analyzed for Total Petroleum Hydrocarbons - Gasoline ("TPHg"), benzene, toluene, ethylbenzene, xylenes ("BTEX") and lead. The results of analyzing the composite soil sample were gasoline at 1,000 ("mg/kg"), non-detection of benzene and toluene, ethylbenzene was

detected at 13 mg/kg, xylenes were detected at 21 mg/kg, and lead was not detected indicating that the source was unleaded gasoline.

Excavated soil from the January 1993 trench was apparently stockpiled west of the Jiffy Lube building and later sampled on July 18, 1994. The results of sampling the spoil pile indicated non-detection of gasoline, diesel at 164 kg/mg, and heavy oils/diesel at 206 and 330 mg/kg (see Wy'East Laboratory Report, Appendix A).

2.3. JIFFY LUBE UST DECOMMISSIONING

Five (5) Jiffy Lube UST's, 1,500-gallons each, were decommissioned by excavation and disposal between November 21 and December 20, 1994 according to a Decommissioning/Service Change Report submitted to DEQ on March 9, 1995 (see Appendix B – "1994 Jiffy Lube UST Decommissioning Report"). Soil contamination within the UST excavation was reported to DEQ, however, there is no apparent available record of sampling and analyzing soil samples from the excavation. The UST's apparently contained motor oil.

2.4. UST LEAK TESTS

Four (4) previous Flying J UST's were tested for tightness by Hydrocarbon Specialty Contractors, Inc., Spokane, WA on December 10, 1993, which resulted in passing tests (see Appendix C – "UST Leak Detection Testing Reports"). On December 17, 1994, the four UST's were tested for leakage by NDE Environmental Corp., Austin, TX and passed.

On September 3, 1994, NDE Environmental Corp., Austin, TX tested the gasoline lines. The Regular and Unleaded lines passed, but the Premium gasoline line leak detector failed the test (see Appendix C).

On January 23, 1998, Tanknology, Austin, TX tested the UST's and lines. The lines and the gasoline UST's passed, but the diesel UST failed (see Appendix C).

Apparently there may have been leakage over time from the Premium gasoline pipeline and the diesel UST piping.

2.5. INITIAL ENVIRONMENTAL ASSESSMENTS

"Phase I" and "Phase II" Environmental Assessments were completed by Delta Environmental Consultants Inc. ("Delta"), 3150 Richards Road, Suite 100, Bellevue, Washington 98005 between May 12 and May 27, 1993. Phase I was completed to asses the historical and potential environmental impacts to the Site. Phase II involved drilling five soil borings to collect and analyze soil samples. The Site was known as "Jiffy Lube International Store #1012", located at 17869 SE McLoughlin Boulevard, Milwaukie, Oregon. Phase I concluded that "...it appears there is potential for environmental concerns on the subject property".

Between June 18 and June 21, 1993, Delta performed a "Phase III" Environmental Assessment as summarized in an undated report by Patricia A. Crump and Daniel S. Whitman of Delta. Phase III involved the drilling and installation of six (6) groundwater monitoring wells: MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6. Soil samples from the borings for the monitor wells were analyzed for BTEX and TPH (see Table 1 –

"Phase III Soil Sampling Analytical Results"). Petroleum hydrocarbons were detected in soil samples from all borings. Groundwater samples collected from each monitor well were analyzed for BTEX, TPH, and TPH-G. Benzene was detected in groundwater samples from wells MW-1 through MW-5. Toluene was detected in water samples from MW-1, MW-3, and MW-4. Ethylbenzene and xylenes were detected in all groundwater samples, but apparently exceeded DEQ action levels only in well MW-3. Apparently no constituents were detected in the water sample from well MW-6.

Table 1 – PHASE III SOIL SAMPLING ANALYTICAL RESULTS

				Analytical Test Results, mg/kg (ppm)								
Boring	**Sample**	**Depth***	**Date***	**TPH-G**	**TPH-D**	**TPH-ID Gasoline**	**TPH-ID Diesel**	**TPH**	**B**	**T**	**E**	**X**
MW-1	S-2	5-6.5 ft	6/18/93	87	550	>20	<50	110	510	44	150	1,050
MW-2	S-1	5-6.5 ft	6/18/93	29	1,200	>20	>50	1,100	23,000	320	9,800	40,470
MW-3	S-2	5-6.5 ft	6/18/93	62	180	>20	>50	680	3,800	49,000	51,000	289,000
MW-4	S-2	5-65. ft	6/18/93	<10		>20	>50	120	4,600	520	6,000	10,500
MW-5	S-2	5-6.5 ft	6/18/93	13		>20	<50	210	2,900	84	1,300	3,250
MW-6	S-2	5-6.5 ft	6/18/93	<10	23	>20	>50	160	<30	<30	<30	<30

Notes: *"<" = Below Reporting Limit of laboratory, and may be accepted as practically non-detectable, or very low concentration and not; ND = Not Detected at or above reporting limit; TPH = Total Petroleum Hydrocarbons, TPH-G = gasoline-range hydrocarbons, TPH-D = diesel-range hydrocarbons, B=benzene, T=toluene, E=ethylbenzene, X=total xylenes; blank boxes = not analyzed.*

Delta concluded from water level measurements taken during Phase III that the groundwater gradient was approximately 0.001-feet/foot between MW-1 and MW-5 in a west to northwest direction. Groundwater was encountered at approximately seven (7)-feet below ground surface during the drilling of the monitor wells. Silty sands were reportedly beneath the Site, with silty clay occurring at shallow depths.

2.6. FREE PRODUCT

As reported in the "Third Quarterly Ground Water Monitoring Report" by NWE dated June 15, 1995, free product was observed only in Monitor Well MW-3 during sampling on January 24, 1995. As stated in the report: "*Manual removal of free product from MW-3 was conducted on a weekly basis from July 19, 1994 to October 30, 1994; and biweekly from November 6, 1994 until January 24, 1995.*" The free product "*smelled like gasoline, was dark brown-black in color*", and was one (1)-inch thick in MW-3 on July 19, 1994. No measurable layer of free product was observed during sampling of MW-3 on October 2, 1994, after which "*residue*" was observed in the bailer during subsequent sampling events.

As reported in the "Fourth Quarterly Ground Water Monitoring Report" by NWE dated June 22, 1995, free product was observed only in Monitor Well MW-7 (which replaced MW-3) during sampling on June 20, 1995. As stated in the report: "*The bailed free product and ground water from MW-7 is stored in a 55-gallon drum on the site.*"

No free product was reported in any monitor wells on and after September 29, 1995 (Fifth Quarterly Ground Water Monitoring Report).

* Table revised from p. 6, Table 1, Quarterly Report July 1999

* Table revised from p. 6, Table 1, Quarterly Report July 1999

2.7. GROUNDWATER

2.7.1. MONITOR WELLS

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 accessible for obtaining groundwater samples (see Figure 3).

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. (see Appendix F – "Monitor Well Logs (MW-14 and MW-15) and Well Survey"). One monitoring well, MW-11, was installed off-site in a down-gradient direction on August 17, 1996, to the northwest, on "Ed's Muffler & Brakes" property.

The following Table 2 – "Monitor Well Installation Summary" includes reported well installation methods.

Table 2 – 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: 3.5-14.5ft	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.

2.7.2. GROUNDWATER LEVELS

Groundwater levels fluctuate as indicated in the following Table 3 – "Groundwater Levels" and Figure 5 - "Static Groundwater Levels Below Ground Surface", and Figure 6 – "Mean Groundwater Static Levels (Elevation)". From January 1995 through July 1999, water levels have fluctuated beneath the Site up to 6.35-feet.

Table 3 – GROUNDWATER LEVELS (feet)

Monitor Well	Date	SWL Below Casing	SWL Elevation
MW-1	6/21/93	nr	94.65
	1/24/95	3.97	95.70
	6/20/95	4.67	95.00
	9/29/95	6.91	92.76
	2/15/96	3.00	96.67
	4/26/96	3.74	95.93
	10/29/96	5.82	93.85
	1/15/97	2.74	96.93
	1/27/98	4.51	95.16
	7/27/99	5.66	93.71
MW-2	6/21/93	nr	94.59
	1/24/95	2.97	95.82
	6/20/95	3.77	95.02
	9/29/95	6.48	92.31
	2/15/96	1.87	96.92
	4/26/96	3.16	95.63
	10/29/96	5.00	93.79
	1/15/97	2.23	96.56
	1/27/98	3.75	95.04
	7/27/99	5.18	93.32
MW-3	6/21/93	nr	94.57
	1/24/95	2.89	95.68
MW-4	6/21/93	nr	94.54
	1/24/95	3.56	95.74
	6/20/95	4.28	95.02
	9/29/95	7.20	92.10
	2/15/96	2.57	96.73
	4/26/96	3.75	95.55
	10/29/96	5.55	93.75
	1/15/97	2.75	96.55
	1/27/98	4.26	95.04
	7/27/99	5.57	93.43
MW-5	6/21/93	nr	94.52
	1/24/95	4.94	95.72
	6/20/95	5.63	95.03
	9/29/95	8.22	92.44
	2/15/96	3.77	96.89
	4/26/96	5.00	95.66
	10/29/96	6.95	93.71
	1/15/97	4.02	96.64
	1/27/98	5.62	95.04
	7/27/99	5.99	94.42
MW-6	6/21/93	nr	94.58
	1/24/95	4.75	95.54
	6/20/95	5.28	95.01
	9/29/95	7.38	92.99
	2/15/96	3.17	97.12
	4/26/96	4.27	96.02
	10/29/96	6.47	93.82
	1/15/97	3.33	96.96
	1/27/98	5.01	95.28
	7/27/99	6.25	93.76
MW-7	6/20/95	4.61	94.34
MW-8	6/20/95	4.68	94.94
MW-9	6/20/95	4.88	94.83
	9/29/95	6.73	92.99
	2/15/96	3.39	96.32
	4/26/96	4.42	95.30
	10/29/96	5.66	94.06
	1/15/97	2.34	97.38
	1/27/98	4.91	94.81
	7/27/99	5.64	93.78
MW-10	9/18/96	5.18	93.59
	10/29/96	4.94	93.83
	1/15/97	2.03	96.74
	1/27/98	3.61	95.16
	7/27/99	4.82	93.68
MW-11	9/18/96	6.54	93.44
	10/29/96	6.37	93.61
	1/15/97	4.38	95.60
	1/27/98	5.66	94.32
	7/27/99	6.42	93.22
MW-12	9/18/96	7.19	93.35
	10/29/96	6.68	93.86
	1/15/97	4.72	95.82
	1/27/98	4.96	95.58
	7/27/99	6.88	93.38
MW-13	9/18/96	5.19	94.92
	10/29/96	6.29	93.82
	1/15/97	3.13	96.98
	1/27/98	4.86	95.25
	7/27/99	6.00	93.85

Notes: *SWL in feet below top of casing.*
Water levels not observed during excavation (through December 1999).

2.7.3. GROUNDWATER GRADIENTS

A survey by Barbieri & Associates, Inc., 7017 NE Hwy 99, Suite 204, Vancouver, WA 98665 of monitor well PVC casing tops was completed on July 27, 1999, and on February 1, 2000 (MW-14 and MW-15) based on relative elevations and X-Y coordinates. The groundwater flow direction is estimated to be north-northwesterly based on July 1999 static water level measurements (see Figure 8 – "July 1999 Groundwater Gradient"). This flow direction would be expected since the Willamette River flows northerly to the west of the Site. The inferred groundwater gradient from Monitor Well MW-13 (4884.4892N, 5056.2117E) to Monitor Well MW-11 (5035.1486N, 4984.8006E) is approximately 0.63-feetV per 150.7-feetH, or 0.0042-feet per foot. Based on water level measurements taken in July 1999, an isolated high groundwater peak occurred in the vicinity of Monitor Well MW-5. The cause of this high groundwater is unknown, however a zone of low permeability, such as, the excavated partly visqueen-enveloped auto parts dump encountered in the northwest area of the remedial excavation could have caused it.

2.7.4. GROUNDWATER ANALYSES

A summary of previously reported groundwater sampling analyses is shown below in the Table 4 – "Groundwater Sampling Analyses" and in Figure 7 – "Groundwater Analyses (Selected Wells)".

Table 4 – GROUNDWATER SAMPLING ANALYSES (µg/l except TPH-Dx mg/l)

Well	Date	B	T	E	X	TPH Gas	MTBE	TPH-Dx
MW-1	6/22/93	**910**	**1,300**	470	2,090			
	7/18/94	**770**	14	264	272			
	10/28/94	**729**	16	269	145			
	1/24/95	**62**	29	349	315			
	6/20/95	**619**	10	66	377			
	9/29/95	**3,700**	43	**1,050**	895			
	2/15/96	**727**	8	92	261			
	4/26/96	**497**	17	180	159			
	10/29/96	**231**	5	18	15			
	1/15/97	**83**	ND	9	13			
	1/27/98	**411**	11	66	82			
	7/24/99	**340**	4.29	9.60	ND	2,330	112	ND
MW-2	6/22/93	**140**	13	20	75			
	7/18/94	**25**	ND	ND	187			
	10/28/94	**53**	ND	4	4			
	1/24/95	**108**	ND	6	8			
	6/20/95	**240**	ND	ND	4			
	9/29/95	**208**	ND	ND	ND			
	2/15/96	**26**	ND	ND	ND			
	4/26/96	**56**	ND	ND	ND			
	10/29/96	**54**	ND	ND	ND			
	1/15/97	**9**	ND	ND	ND			
	1/27/98	**34**	ND	ND	ND			
	7/23/99	**1.54**	ND	ND	ND	ND	113	ND
MW-3	6/22/93	**1,600**	**3,800**	**1,900**	**10,100**			
	7/18/94	**226**	141	58	286			
	10/28/94	**18,400**	**17,400**	**3,200**	**20,200**			
	1/24/95	**19,900**	**21,200**	**6,170**	**31,500**			
MW-4	6/22/93	**3,500**	**1,500**	420	2,360			
	7/18/94	**7,460**	134	**2,730**	8,120			
	10/28/94	**8,400**	161	**5,320**	4,724			
	1/24/95	**14,900**	**4,200**	**1,630**	7,500			
	6/20/95	**5,130**	281	**3,150**	**16,400**			
	9/29/95	**12,900**	70	**2,090**	733			
	2/15/96	**4,490**	522	**1,500**	2,390			
	4/26/96	**4,330**	257	**1,160**	3,320			
	10/29/96	**490**	15	123	442			
	1/15/97	**4,540**	149	739	2,210			
	1/27/98	**2,960**	133	513	1,070			
	7/25/99	**2,910**	ND	109	ND	10,300	ND	2.57[1]
MW-5	6/22/93	**500**	750	180	1,090			
	7/18/94	**237**	24	ND	187			
	10/28/94	**141**	ND	28	35			
	1/24/95	**726**	10	36	125			
	6/20/95	**150**	18	4	70			
	9/29/95	**386**	3	75	63			
	2/15/96	**23**	ND	ND	9			
	4/26/96	**310**	ND	34	30			
	10/29/96	**350**	2	23	49			
	1/15/97	**33**	ND	2	5			
	1/27/98	**901**	5	17	60			
	7/25/99	**35.7**	ND	ND	ND	**118**	ND	ND

[1] *MW-4 Heavy Oil Hydrocarbons detected at 0.627 mg/l. All other well samples were ND for Heavy Oil Hydrocarbons.*

Table 4 - GROUNDWATER SAMPLING ANALYSES (µg/l except TPH-Dx mg/l) - continued

Well	Date	B	T	E	X	TPH Gas	MTBE	TPH-Dx
MW-6	7/18/94	**14**	7	7	26			
	10/28/94	ND	ND	ND	ND			
	1/24/95	ND	ND	ND	ND			
	6/20/95	ND	ND	ND	ND			
	9/29/95	ND	ND	ND	ND			
	2/15/96	ND	ND	ND	ND			
	4/26/96	ND	ND	ND	ND			
	10/29/96	ND	ND	ND	ND			
	1/15/97	ND	ND	ND	ND			
	1/27/98	ND	ND	ND	ND			
	7/24/99	ND	ND	ND	ND	ND	ND	ND
MW-7	6/20/95	**4,230**	**6,410**	**11,700**	**16,700**			
	9/29/95	**540**	4	117	74			
	2/15/96	**117**	26	13	629			
	4/26/96	**276**	31	70	309			
	10/29/96	**298**	5	16	55			
	1/15/97	**258**	50	60	225			
	1/27/98	**309**	121	315	1,560			
MW-8	6/20/95	**2,830**	312	253	2,830			
	9/29/95	**1,164**	70	211	290			
	2/15/96	**384**	38	111	496			
	4/26/96	**163**	ND	41	208			
	10/29/96	ND	ND	ND	ND			
	1/15/97	**944**	153	130	1,690			
	1/27/98	**522**	63	230	469			
MW-9	6/20/95	ND	ND	ND	2			
	9/29/95	ND	ND	ND	ND			
	2/15/96	ND	ND	ND	ND			
	4/26/96	**71**	ND	12	9			
	10/29/96	ND	ND	ND	ND			
	1/15/97	**55**	ND	10	15			
	1/27/98	ND	ND	ND	ND			
	7/23/99	ND	ND	ND	ND	ND	ND	ND
MW-10	9/18/96	ND	ND	ND	ND	ND		
	10/29/96	ND	ND	ND	ND			
	1/15/97	ND	ND	ND	ND			
	1/27/98	ND	ND	ND	ND			
	7/23/99	ND	ND	ND	ND	ND	ND	ND
MW-11	9/18/96	ND	ND	ND	ND	ND		
	10/29/96	ND	ND	ND	ND			
	1/15/97	ND	ND	ND	ND			
	1/27/98	ND	ND	ND	ND			
	7/24/99	ND	ND	ND	ND	ND	ND	0.542
MW-12	9/18/96	ND	ND	ND	ND	ND		
	10/29/96	ND	ND	ND	ND			
	1/15/97	ND	ND	ND	ND			
	1/27/98	ND	ND	ND	ND			
	7/24/99	ND	ND	ND	ND	ND	ND	ND
MW-13	9/18/96	ND	ND	ND	ND	ND		
	10/29/96	ND	ND	ND	ND			
	1/15/97	ND	ND	ND	ND			
	1/27/98	ND	ND	ND	ND			
	7/23/99	ND	ND	ND	ND	ND	ND	ND

Table 4 Notes: ND = Not Detected at or above reporting limit; TPH-Gas = gasoline-range hydrocarbons, TPH-Dx = diesel-range hydrocarbons, B=benzene, T=toluene, E=ethylbenzene, X=total xylenes;, MTBE = methyl tert-butyl ether; blank boxes = not analyzed. Gasoline hydrocarbons were analyzed per NWTPH-Gx Method and BTEX/MTBE were analyzed per EPA Method 8020A. Diesel and Heavy Range Hydrocarbons were analyzed per NWTPH-Dx Method. Total xylenes include m,p- and o-xylenes.

2.7.4.1 Benzene Concentrations in Groundwater

Benzene is a volatile monoaromatic hydrocarbon found in gasoline. Hydrocarbon mixtures separate and partition based on the makeup of individual chemicals. Benzene tends to degrade faster than toluene; toluene faster than ethylbenzene; ethylbenzene faster than xylenes. A relatively high ratio of benzene to toluene, toluene to ethylbenzene, and ethylbenzene to xylenes in groundwater could indicate fresher gasoline while the higher inverse ratios could tend to indicate fresher gasoline occurring in soil. In general, the more water soluble and volatile compounds are lost most rapidly from contaminated soil. Benzene is depleted relatively rapidly from gasoline-saturated soil, while ethylbenzene and xylenes tend to increase in concentration.[2] Benzene is ten times more soluble than ethylbenzene and xylenes and therefore is leached ten times faster, assuming dissolution rather than volatilization is the dominant weathering process.

A series of chronological gradient maps indicating benzene concentrations in groundwater are included in Figures 10A through 10F – "Benzene Concentration Contours (Groundwater)". The data used for the contours is shown in Table 4.

The benzene contours in Figure 10F for June 22, 1993 indicate prior leakage, apparently due to the gasoline pipeline breakage in January 1993. The higher benzene concentrations appear to be downgradient, within the vicinity of Monitor Well MW-4, indicating that a large portion of the original benzene from an apparent source near MW-2 along the gasoline pipelines had been depleted and migrated downgradient. A little over a year later, on July 18, 1994, the concentrations had greatly decreased near Monitor Well MW-2 and the pipeline, and increased northwesterly as dissolution occurred. The contours of July 18, 1994 may also indicate a slight depression of the groundwater table due to the weight of the product floating on the water. Free product was collected from MW-3 (same location as MW-7) on July 19, 1994. MW-3 (MW-7) is located immediately north of the gasoline pipeline.

On September 3, 1994, NDE Environmental Corp., Austin, TX tested the gasoline lines. The Regular and Unleaded lines passed, but the Premium gasoline line leak detector failed the test (see Appendix C). Mean benzene concentrations from groundwater samples are shown in Figure 9 – "Benzene Groundwater Mean Concentrations". A peak in the concentrations occurs in late 1994 and early 1995. The benzene concentration contours for January 24, 1995 (see Figure 10E) indicate a large increase along the gasoline pipeline and near MW-2. This indicates that the replacement gasoline pipeline may have leaked, or the elbows (or pipeline bends) may have again leaked in late 1994 through early 1995. As discussed below, an area of high concentration of gasoline contaminated soil was excavated from around MW-2 and the gasoline pipeline elbows/bends as it turned southward toward the pump islands.

After the installation of a submersible pump in MW-8 in late January 1995, the benzene concentration contours through 1997 indicate the decreasing concentrations as the groundwater was pumped through MW-8. For example, the benzene concentration contours of February 15, 1996 (Figure 10C) indicate hydrodynamic control by pumping had been established. In early 1996, apparently the submersible pumps required maintenance and were replaced in MW-8 and MW-7 on May 2, 1996. Dissolution and partitioning of benzene from the contaminated source soil apparently continued to occur until the time of remedial excavation.

2.7.4.2 Benzene to Toluene Ratio Concentrations in Groundwater

The ratio of benzene to toluene concentration in groundwater samples is shown in Figure 11 – "Ratio Benzene to Toluene (Groundwater)". The higher ratios may indicate fresher gasoline because of the higher

[2] *"Composition of Petroleum Mixtures"*, in Total Petroleum Hydrocarbon Criteria Working Group Series, Amherst Scientific Publishers, May, 1998, Volume 2, p.12

solubility of benzene near the source, or it could indicate higher downgradient concentrations of benzene because of high mobility and movement away from the source as a pumped aqueous-phase contaminant plume. The highest ratios occur from samples collected in Monitor Wells MW-1, MW-4, MW-5 and MW-7 from 1995 through 1999. A secondary grouping of relatively higher ratios appears to be associated with Monitor Well MW-1 from 1994 through 1998, although higher ratios shown for MW-4 may be indicative of benzene being drawn toward the nearby pumping well MW-8.

The relatively high ratio due to sample results collected from MW-1 appears to be associated with a pipeline leak at the nearest pump island. This is somewhat confirmed by a slight southeasterly bulge of high benzene concentrations (>800µg/l) contour in Figures 10C – "Benzene Concentration Contours (Groundwater)".

2.7.4.3 MTBE Concentrations in Groundwater

MTBE (methyl tertiary butyl ether) has been regionally added to gasoline to enhance octane and to comply with the Clean Air Act mandates. It was approved by EPA for use in 1979 and was added to gasoline during the 1980's at approximately 2-5% by volume as an octane booster. In 1992, it was blended at 10-15% by volume for use in some regions in the wintertime oxygenated fuel program. In 1996, it began to be used year around at 11% by volume in many statewide reformulated gasoline programs (especially California and New York).

Oregon does not require MTBE to maintain reformulated gasoline compliance with ozone standards. Although some areas in Oregon maintain compliance with carbon monoxide standards during the winter months, ethanol rather than MTBE has been predominantly used to meet the requirements of the 1990 Clean Air Act.

The Oregon DEQ states that MTBE has entered the State as a residual component of gasoline from states such as California, although it admits that low levels of MTBE may have been added to maintain adequate octane levels by suppliers. In screening chemicals for risk assessment, DEQ uses a preliminary remediation goal concentration of 20 µg/l (micrograms per liter) and uses this value as an acceptable cleanup level. Indications are that EPA will ban MTBE as a gasoline additive in the near future.

MTBE is more volatile than benzene and less volatile than xylene. MTBE was detected in groundwater samples from wells MW-1 and MW-2 on June 24, 1999 at 112 µg/l and 113µg/l, respectively. These two wells are located to the north and south of the remedial excavation (see Figure 2). As discussed below, MTBE was detected in soil samples collected near MW-2; however, MTBE was not detected in soil samples collected from the excavation near MW-1. Gasoline contaminated soil was encountered in the vicinity of the pump island near MW-2 during remedial excavation and could be the source of detected MTBE.

2.8. GEOLOGY AND HYDROGEOLOGY

2.8.1 General

The Site area is within Pleistocene fine-grained facies of coarse sand to silt deposited by catastrophic floods.[3] 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

[3] "*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.

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 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.

2.8.2 Site Specific

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 (Figure 18). Sandy cobbly gravel and a fine-medium sand unit underlie the approximate four (4)-foot thick clay unit (Figure 20). 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 (Figure 21). All excavated soil and dump material was disposed off-site.

A typical cross-section of material encountered during remedial excavation is shown in Figure 12 – "Pre-Excavation Cross-Section A-A'". The upper part of the silty clay layer is shown in Figure 18 – "Contact Fill and Upper Part of Silty Clay".

3. REMEDIAL EXCAVATION

3.1. EXCAVATION

3.1.1. Tanks And Sheet Piling

Four (4) underground steel storage tanks were excavated and disposed to Northwest Truck Parts Recycling on October 13, 1999 by OR UST Service Provider Licensee RE ID 774, ADDR ID 111589, Pacific Northern Environmental, Corp., 1081 Columbia Blvd., Longview, WA 98632, whose services and responsibilities included removing the previous Petroleum UST System and installing the new Petroleum UST System at the Site pursuant to appropriate regulations (see Appendix D - "UST Recycler Receipt"). The UST's were one (1) diesel with a nominal capacity of 8,000-gallons, and three (3) gasoline each with a nominal capacity of 12,000-gallons from a 'tank field' located in the north-central portion of the Site. An inspection of the tanks indicated no visible holes or other areas of potential rupture (see Figure 14 – "Excavated Underground Storage Tanks"). Petroleum hydrocarbon smear was visible near the bottom outside of the tanks due to the tanks being partly below groundwater levels.

The initial excavation began with removing the surface concrete above the UST's on September 23, 1999. As the uncovering of the diesel UST continued, soil collapse progressed northward toward the adjacent Ed's Muffler Building (see lower photograph, Figure 4 and upper photograph, Figure 13). Due to the potential of further erosion toward and under the building, and to avoid future liability, the Landowner decided to install a steel sheet pile retaining wall, approximately fifty-two (52)-inches from Ed's Muffler Building (see Figure 13 – "Steel Sheet Piling Retaining Wall"). The nominal depth of the sheet piling was thirty (30)-feet below surface. The sheet pile wall was completed on October 7, 1999.

3.1.2. Other Piping

Besides the gasoline pipelines, a water line, natural gas line, and electric lines for the cathodic protection system were excavated. The lines were within sand-filled trenches, which may have served as conduits for petroleum product migration (see Figure 15 – "Pipelines and Sand-Filled Trenches").

3.1.3. Extent of Excavation

After the underground storage tanks were removed, the excavation was extended vertically to a nominal depth of twelve (12)-feet, up to approximately fifteen (15)-feet in places, to remove petroleum contaminated soil in the vicinity of the previous tanks. The excavation proceeded generally to the east and then south toward the previous gasoline pump islands. Except for the area where the UST's were previously located, the nominal depth of the excavation was nine (9)- to ten (10)-feet below ground surface. The limits of excavation were guided by soil sample analytical results. Approximately 5,000-tons of petroleum contaminated soil was excavated and disposed at TPS Technologies, Portland, Oregon.

A map of the approximated excavation depths is shown in Figure 19 – "Excavation Map Final Depths". A cross section depicting the backfilled excavation is shown in Figure 20 – "Post-Excavation Cross-Section B-B'".

Typical petroleum contaminated soil and groundwater encountered are shown in Figure 16 – "Typical Contaminated Soil and Groundwater". Groundwater recharge into the excavation was pumped into nearby holding tanks, aerated, and discharged into an on-site storm drain after water analysis results indicated the water was below existing NPDES Permit levels (see Figure 17 – "Groundwater Recharging Into Excavation"). Up to six (6) holding tanks were required during excavation, each holding a nominal 16,800-gallons, with each filled and emptied at least twice, depending upon the need to drawdown the groundwater level during excavation.

The excavation was extended westward following installation of the new UST's when access to the western area became available. Apparently, an unknown dump had been created following demolition of the previous station, approximated to be around 1962 by the Landowner. A grab sample collected and analyzed from water seeping through the dump area resulted in non-hazardous levels of detectable volatile organics. 152-tons of soil and 10 rubber truck tires were disposed at the Columbia Ridge Landfill, Arlington, Oregon, and, 80-tons of soil was disposed at the Hillsboro Landfill, Hillsboro, Oregon. from the auto parts-building materials dump (see Figure 21 – "Auto Parts and Building Materials Dump Area").

3.2. SOIL SAMPLING

3.2.1. Soil Sample Locations

Field screening was used as a general guideline to delineate areas of possible contamination. Screening results were used to aid in the selection of soil samples submitted to the laboratory for chemical analysis. Screening methods included: a) visual, b) water sheen, and c) PID headspace. The precision and accuracy of field screening were not quantified.

During visual screening, the soil was observed for petroleum residuals, anomalous color, and stains indicative of possible contamination. Periodically, a portion of the sample was placed in water and observed for signs of sheen. Changes to the surface of the water were noted including color, iridescence, how rapid the sheen flowed and dissipated. Headspace screening included placing a portion of the sample in plastic bags, gently shaking the bag, and allowing it to remain closed for about 5 minutes before headspace vapors were measured.

New disposable gloves were worn when collecting soil and water samples. Soil samples were collected from a trac-hoe bucket immediately after the bucket was raised from the excavation and sample location. Samples were transferred into new sample glass containers supplied by the laboratory. Sample container volumes and preservation methods were furnished by the laboratory and were compatible with the method QC analyses on a laboratory-batch basis. Sample labels were completed for each sample. Immediately following the collection of each sample, they were stored on a cooler with ice until delivered to the analytical laboratory. Chain of custody procedures were followed, including a form and sample request form inside each shipping container.

The cleanup goal was to excavate contaminated soil to below potential risk-assessment levels. Where practical, excavation reached non-detectable hydrocarbon levels, typically within the upper foot or so of the grayish-green silty clay underlying the backfill material (see Figure 20 – "Post-Excavation Cross-Section B-B´").

Soil samples were named using the daily excavation limits as a convention. Therefore, "east wall" samples, for example, may appear on the sample location map in the middle of the final extent of excavation (see Figure 22 – "Excavation Sample Location Map"), but were collected from the east side of the excavation as it progressed.

3.2.2. Soil Analyses

Soil samples were analyzed for gasoline (as NWTPH-Gx), diesel (as NWTPH-Dx), aromatics benzene, toluene, ethylbenzene, and xylenes, and octane enhancer MTBE (methyl tertiary butyl ether) as directed by Oregon DEQ. The laboratory reports are included in Appendix G – "Laboratory Reports". The following is a summary of detections for all analyses (excluding non-detection and tar sample):

Constituent	Mean (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)
TPH Gasoline	488.7	0.229	11,700
TPH Diesel	257.2	0.83	1,220
Benzene	28.8	0.0286	1,700
Toluene	52.8	0.0676	1,260
Ethylbenzene	13.9	0.0025	188
Xylenes	84.2	0.0026	1,390
MTBE	1.91	0.003	12.4

A summary of all soil sample analyses is included in Table 5.

Table 5 – "EXCAVATION SOIL SAMPLE ANALYSES" following page

Notes to accompany Table 5 – "Excavation Soil Sample Analyses":

(A) Reporting Limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.

(B) Detected hydrocarbons in the diesel range do not have distinct diesel pattern and may be due to heavily weathered diesel or possibly biogenic interference.

(C) The detected hydrocarbons appear to be due to the overlap of weathered gas, the overlap of the heavy-oil range, as well as, weathered diesel.

(D) Detected hydrocarbons in the diesel range appear to be due to weathered gasoline.

(E) The detected hydrocarbons for this sample appear to be due to the overlap of the gas range as well as the heavy/oil range, but there is a trace of weathered diesel present.

(F) Detected hydrocarbons in the diesel range appear to be due primarily to the overlap of gas and heavy oil, but there is weathered diesel present.

(G) Detected hydrocarbons in the diesel range appear to be primarily due to the overlap of weathered gasoline, though chromatogram indicates the presence of diesel.

(H) Hydrocarbon pattern and range are consistent with a combination of weathered gasoline and heavily weathered diesel.

(I) The detected hydrocarbons appear to be due to the overlaps of the gas and heavy/oil range as well as diesel.

Table 5 - EXCAVATION SOIL SAMPLE ANALYSES

milligrams per kilogram ("mg/kg")

SAMPLE	Depth BGS	Gasoline	Diesel	Heavy Oil	Benzene	Toluene	EthylBenzene	Xylenes	MTBE
NORTH WALL									
NW-13-12'	12.0	ND	ND	ND	ND	ND	ND	ND	ND
NW-17-9'	9.0	5.10	ND	ND	0.0531	ND	ND	ND	ND
NW-18-9'	9.0	38.5	ND	ND	0.209	0.182	**1.03**	**1.20**	ND
NW-19-9'	9.0	5.49	ND	ND	ND	ND	ND	ND	ND
NW-20-9'	9.0	6.22	ND	ND	ND	ND	ND	ND	**0.402**
NW-22-9'	9.0	15.1	ND	ND	0.247	ND	0.111	0.232	ND
NW-27-14'	14.0	ND	ND	ND	0.263	ND	ND	ND	ND
NW-28-14'	14.0	25.6	ND	ND	0.297	ND	0.163	0.764	ND
NW-29-15'	15.0	3.69	ND	ND	ND	ND	ND	ND	ND
NW-32-6'	6.0	8.82	ND	ND	ND	ND	ND	ND	ND
NW-73-4'	4.0	49.3	ND	**453**	**1.78**	**3.03**	**1.70**	**7.13**	**3.97**
NW-79-7'	7.0	35.5	ND	**271 (A)**	**1.46**	0.0883	0.267	**1.70**	ND
NW-84-7'	7.0	7.39	ND	ND	ND	ND	ND	ND	ND
WEST WALL									
WW-1-4'	4.0	105	ND	ND	0.210	0.147	**1.70**	0.827	ND
WW-2-12'	12.0	5.77	ND	ND	0.257	ND	ND	ND	ND
WW-3-4'	4.0	12.7	ND	62.5	0.390	ND	ND	0.476	ND
WW-4-12'	12.0	2.69	ND	ND	0.0849	ND	ND	ND	ND
WW-5-4'	4.0	101	ND	**233**	**1.05**	0.321	**3.55**	0.785	ND
WW-6-12'	12.0	9.32	ND	ND	0.181	ND	ND	ND	ND
WW-38-4'	4.0	32.6	ND	ND	0.123	0.0676	0.471	**1.90**	ND
WW-39-12'	12.0	4.67	ND	ND	0.0945	ND	ND	ND	ND
WW-40-4'	4.0	17.8	ND	81.4	0.327	ND	0.0768	0.239	ND
WW-41-12'	12.0	8.56	ND	ND	0.0979	ND	0.0504	ND	ND
WW-42-4'	4.0	**717**	ND	**244**	**1.50**	ND	**14.9**	0.791	ND
WW-43-12'	12.0	ND	ND	ND	ND	ND	ND	ND	ND
WW-44-4'	4.0	71.5	ND	**296**	**1.51**	0.321	**2.58**	**6.26**	ND
WW-45-12'	12.0	ND	ND	ND	0.0966	ND	ND	ND	ND
WW-82-7'	7.0	8.56	ND	ND	ND	ND	ND	ND	ND
WW-86-8'	8.0	7.55	90.2	**305**	ND	ND	ND	ND	ND
SOUTH WALL									
SW-7-4'	4.0	**3,180**	**587**	**193 (G,I)**	ND	**6.3**	**50.7**	**189**	ND
SW-8-12'	12.0	16.7	ND	ND	0.756	ND	0.123	0.552	ND
SW-9-4'	4.0	**1,160**	**234**	**274 (G,I)**	**2.30**	**2.21**	**20.6**	**97.4**	ND
SW-10-12'	12.0	**1,110**	**424**	88.3 (G)	**2.94**	ND	**15.8**	**89.8**	ND
SW-11-4'	4.0	**420**	**289**	**114 (G)**	**1.58**	**5.85**	**6.80**	**45.0**	ND
SW-12-11'	11.0	**738**	ND	ND	**3.55**	**6.98**	**11.2**	**60.5**	ND
SW-13-8'	8.0	**2,870**	**593**	**234 (G,I)**	**12.8**	**68.6**	**52.9**	**314**	ND
SW-23-4'	4.0	**328**	85.0	**178 (E)**	**2.99**	**1.59**	**5.48**	**26.6**	ND
SW-24-8'	8.0	**1,290**	**167**	71.6 (E)	**6.27**	**11.9**	**18.7**	**111**	ND
SW-25-4'	4.0	39.5	52.1	**125 (E)**	0.117	0.107	0.383	**1.32**	ND
SW-26-8'	8.0	**1,390**	**259**	72.5 (E)	**5.39**	**37.4**	**20.9**	**123**	ND
SW-58-5'	5.0	3.31	27.2	102	0.0933	ND	ND	ND	ND
SW-59-5.5'	5.5	60.0	ND	**231**	**2.35**	0.324	0.387	**1.58**	ND
SW-60-4.5'	4.5	ND	ND	67.1	ND	ND	ND	ND	ND
SW-61-4.5'	4.5	ND	ND	**208**	ND	ND	ND	ND	ND
SW-62-4'	4.0	ND	ND	ND	ND	ND	ND	ND	ND
SW-76-8'	8.0	**237**	ND	69.7	**9.94**	0.717	**11.5**	**8.70**	**5.51**
SW-80-7'	7.0	96.0	ND	ND	0.328	ND	0.513	0.135	ND
EAST WALL									
EW-1-6'	6.0	2.86	ND	82.1	ND	ND	ND	ND	ND
EW-2-4'	4.0	**95.2**	35.2 (D)	ND	**1.62**	0.312	**2.80**	**2.19**	**1.67**
EW-33-4'	4.0	**3,290**	ND	66.7	**22.9**	**149**	**72.0**	**383**	ND
EW-34-4'	4.0	**11,700**	ND	**241**	**202**	**1,260**	**188**	**1,390**	ND
EW-46-4'	4.0	2.55	ND	**419**	ND	ND	ND	ND	0.579
EW-52-4'	4.0	ND	ND	ND	ND	ND	ND	ND	**0.225**
EW-55-9'	9.0	51.2	ND	ND	0.442	ND	**1.15**	ND	ND
EW-74-5'	5.0	14.5	43.9	96.7 (B)	0.903	0.151	0.215	0.735	ND
BOTTOM									
B-1-15'	15.0	ND	ND	ND	0.730	ND	ND	ND	ND
B-2-8'	8.0	**2,290**	**1,220**	58.2 (H)	**18.7**	**116**	**34.9**	**191**	ND
B-3-14'	14.0	3.95	ND	ND	ND	ND	ND	ND	ND
B-4-8'	8.0	22.7	ND	ND	1.01	0.423	0.523	**2.92**	ND
B-4-12'	12.0	8.75	ND	ND	0.253	ND	0.280	0.865	ND
B-30-9'	9.0	**1,350**	**224**	73.4 (E)	**5.04**	**26.1**	**20.7**	**117**	ND
B-31-9'	9.0	44.2	ND	ND	**2.88**	0.193	**1.33**	**3.56**	**0.264**
B-32-6'	6.0	**181**	ND	ND	**4.03**	0.502	**3.47**	**19.2**	**0.867**
B-35-6'	6.0	12.4	ND	ND	0.0543	ND	ND	ND	**12.4**
B-36-6'	6.0	67.3	ND	ND	**2.66**	ND	0.567	0.723	**1.73**
B-37-9'	9.0	28.0	ND	ND	**1.44**	ND	**1.19**	**1.36**	**0.819**
B-47-8'	8.0	81.2	ND	ND	**1.17**	ND	**2.00**	**4.35**	**0.220**
B-48-5'	5.0	3.10	ND	53.3	ND	ND	ND	ND	ND
B-49-8'	8.0	**247**	ND	ND	0.626	**1.15**	**3.49**	**13.7**	ND
B-50-8'	8.0	37.0	ND	ND	**4.05**	0.0885	**1.71**	**3.72**	**2.74**
B-51-8'	8.0	**128**	ND	ND	**2.08**	0.607	**2.80**	**9.78**	ND
B-53-9'	9.0	**230**	ND	ND	**2.78**	**2.33**	**3.98**	**20.2**	**2.23**
B-54-9'	9.0	16.9	ND	ND	0.203	ND	0.0666	ND	**0.264**
B-56-9'	9.0	6.13	ND	ND	0.0554	ND	ND	ND	ND
B-57-9'	9.0	4.46	ND	ND	0.372	ND	0.220	ND	ND
B-63-10.5'	10.5	2.87	ND	ND	0.712	ND	0.232	ND	ND
B-64-9.5'	9.5	26	ND	ND	**3.27**	0.0789	1.19	**3.57**	**0.968**
B-65-9.5'	9.5	17	ND	ND	**5.18**	ND	0.697	**2.15**	ND
B-66-9.5'	9.5	8.3	ND	ND	**2.15**	0.39	0.21	**1.23**	**0.447**
B-67-9.5'	9.5	21.4	ND	ND	**3.44**	0.272	0.788	**2.18**	ND
B-68-14'	14.0	ND	ND	ND	ND	ND	ND	ND	ND
B-69-14'	14.0	ND	ND	ND	ND	ND	ND	ND	ND
B-70-14'	14.0	ND	ND	ND	ND	ND	ND	ND	ND
B-71-14'	14.0	34.6	41.7	92.6 (C)	0.0644	0.346	0.311	**1.60**	ND
B-72-12.5'	12.5	ND	ND	ND	ND	ND	ND	0.331	ND
B-75-9.5'	9.5	ND	ND	ND	0.266	ND	0.0805	ND	**1.52**
B-77-9'	9.0	4.24	ND	ND	ND	ND	ND	0.202	ND
B-78-12'	12.0	5.02	ND	ND	ND	ND	ND	ND	ND
B-81-7.5'	7.5	5.01	ND	ND	ND	ND	ND	ND	ND
B-83-9.5'	9.5	7.45	ND	ND	ND	ND	ND	ND	ND
B-85-9.5'	9.5	7.40	ND	ND	ND	ND	ND	ND	ND
ISLAND AREA									
IB-1-8'	8.0	**147**	ND	ND	**3.07**	ND	**3.17**	**9.05**	**0.493**
IB-2-8'	8.0	39.4	ND	ND	**2.44**	ND	0.921	**4.07**	**3.36**
IB-3-8'	8.0	82.8	ND	ND	**2.58**	ND	**2.64**	**5.93**	**1.51**
IB-4-8'	8.0	**187**	ND	ND	**6.58**	ND	**2.78**	**3.93**	ND
IB-5-8'	8.0	16.4	ND	ND	ND	ND	ND	ND	ND
IB-6-2.5' (tar)	2.5	**2,920**	**5,400**	**14,700 (F)**	**60.8 (1)**	ND	**87.3**	ND	ND
IB-7-2.5'	2.5	**2,760**	ND	ND	**7.65**	**55.2**	**48.0**	**160**	ND
IB-8-4'	4.0	36.8	ND	ND	0.157	ND	0.0701	ND	ND
IB-9-4.5'	4.5	**4,460**	ND	**113**	**33.4**	**194**	**111**	**576**	ND
DUMP									
D-1-5	5.0	NA	ND	**2,010 (A)**	**1,700**	ND	**111**	**860**	ND
D-2-SPOIL	0.0	NA	ND	**16,100 (A)**	**13,200**	**613**	**1,120**	**5,178**	ND

3.2.3. Soil Contamination Distribution

Each analyzed constituent result was contoured to evaluate distribution within the excavation. The contours are shown in Figures 23A through 23G. Certain analyses resulted in less definitive characterization of petroleum products. For example, Sample B-71-4', located approximately central to the excavation, apparently contained a mixture of weathered gasoline and diesel (see Figure 24 – "Chromatogram Soil Sample B-71-4'"). Other samples containing apparent multiple interpretations of petroleum are listed above as "Notes to accompany Table 5". This would indicate that there was a possible mixture of diesel and gasoline beyond the highest diesel concentrations shown in Figure 23B.

Based on the soil sample analytical results contours of gasoline (as TPH) and related constituents, BTEX, and MTBE, the highest concentration patterns are:

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.

These three areas of probable sources of gasoline leakage are further indicated by the Total Xylenes contours (Figure 23F) since the xylenes would be the least rapidly depleted by groundwater dissolution or biodegradation and would have the higher concentrations over time. These patterns are also consistent with those found for groundwater contamination (see discussion Section 2.7.4).

The high concentrations of gasoline and related constituents north of the office may be related to leakage migration along the natural gas pipeline trench (see Figure 2 for alignment); and/or overspill from the gasoline tanks located immediately to the north; and/or leakage migration along the gasoline pipeline trench. The higher permeability of the prior UST backfill material may have allowed 'ponding' of the product that could not rapidly dissipate into the area of the dump where some interruption of groundwater flow (due to the partial envelopment in visqeen) may have consequently resulted in higher soil contamination north of the office. However, water and/or product migration around the dump area would have been possible. Higher concentrations south of the prior UST's could have also been due to reversals in groundwater gradient at some time in the past.

The TPH diesel concentration contour (Figure 23B) indicates that leakage may have been near the fill pipe of the UST. No visible holes or fractures were seen in the diesel UST that was excavated. The higher concentrations of diesel contaminated soil extends north of the location of the prior diesel tank and southward toward the service station office. This pattern, as well as the similar pattern for gasoline, may be related to the higher permeability of the UST backfill.

A linear regression fit of all detected gasoline and diesel in soil samples is shown in Figure 25 – "TPH Linear Regression and Sample Depth Plots". The plots indicate a decrease in concentration with depth. The slope of the line fit coincides with the approximate depth of the underlying grayish-green silty clay unit, considered to be a natural aquitard, although distinct monitoring above and below this unit has not been established. In general, the sample results reflect the annual vertical movement of the water table. The lowest concentrations of gasoline and diesel occur at the greatest depth of sampling (about fourteen (14)-feet).

3.2.3.1 Ratio Concentrations In Soil

The ratio of benzene to toluene concentration in soil samples is shown in Figure 26 – "Concentration Ratios (Soil)". In general, the more water soluble and volatile compounds are lost most rapidly from contaminated soil. Benzene is depleted relatively rapidly from gasoline-saturated soil, while ethylbenzene and xylenes tend to increase in concentration. Benzene is ten times more soluble than ethylbenzene and xylenes and therefore is leached ten times faster, assuming dissolution rather than volatilization is the dominant weathering process. A lower ratio would tend to indicate older gasoline; for example, 50ppm benzene to 10 ppm toluene would be a ratio of 5:1; whereas 10 ppm benzene (depleted) to 50 ppm xylenes (increased concentration) would be a lower ratio of 1:5.

Based on Figure 26, the highest benzene to toluene ratios occur in soil samples B-67-9.5', SW-76-8', B-31-9', NW-79-7', B-64-9.5', and B-50-8'. The second highest grouping of ratios appears to include samples WW-44-4', EW-2-4', B-66-9.5', EW-74-5', SW-59-5.5', and B-32-6'. These two groups appear as breaks in the slope and could indicate separate leakage events.

A high ratio, approximately 10:1, of toluene to ethylbenzene appears to indicate fresh gasoline. As shown in the lower Figure 27 – "Toluene to Ethylbenzene Concentration Ratio (Soil)", samples EW-33-4' and EW-34-4' have high ratios of toluene to ethylbenzene.

The highest ratios of benzene to xylenes (Figure 26) occur in samples SW-59-5.5', B-67-9.5', IB-4-8', B-66-9.5', WW-42-4', B-65-9.5', SW-80-7', and B-36-6'.

While not definitive, the ratios indicating fresher gasoline tend to cluster in samples collected near the bend in the easternmost gasoline pipeline where it turns south to the pump islands, and, northeast of the service station office.

3.3. DEQ REPORTS

3.3.1. Previous Groundwater Sampling

Previous groundwater sampling is summarized in a report submitted to the Oregon Department of Environmental Quality ("DEQ") titled "Quarterly Report, July 1999, Groundwater Monitoring, Flying J-Milwaukie #2, DEQ Site No. 03-93-0008", dated August 4, 1999 by GeoPro Geologic Services. Planned remedial excavation and upgrade of underground storage tanks was submitted as a "Work Plan" dated August 11, 1999 and subsequently approved by DEQ.

During excavation, Monitor Wells MW-2, MW-4, MW-7, and MW-8 were decommissioned by over-excavation. A decommissioning report was submitted to the Oregon Department of Water Resources.

3.3.2. New MW-14 and MW-15

Two (2) additional groundwater monitoring wells, MW-14 and MW-15 (see Figure 3), were installed at the direction of DEQ. The geologic and construction logs are included in Appendix F – "Monitor Well Logs MW-14 and MW-15 and Well Survey".

3.3.3. Future Monitoring

Following quarterly groundwater sampling as directed by DEQ, an assessment of results will be made in quarterly reports, after which a Risk-Based Assessment Report could propose outlining steps for no further action.

4. INTERPRETATIONS AND CONCLUSIONS

4.1. CONTAMINANT SOURCES

4.1.1. Gasoline Pipeline

On February 18, 1993, an 'Initial Report Form For UST Cleanup Project' was prepared by Flying J Inc. for a reportedly unleaded gasoline pipeline release that apparently occurred on January 12, 1993. During remedial excavation in September 1999, an abandoned set of pipelines was found between the UST's and MW-2. Free product, apparently from the pipeline leak, was last reported in monitor wells in 1995.

It is concluded that, although most of the gasoline contamination from this initial 1993 pipeline spill could have partitioned or degraded since 1993, residual product may have been trapped in pockets within the backfill.

4.1.2. Gasoline Pipeline Elbow

Contours of gasoline constituents in groundwater indicate that a significant gasoline leakage source could have apparently continued after the gasoline pipeline was repaired and replaced in 1993. It appears that an elbow, or bending of the pipe toward the pump islands, may be the source of leakage near the prior location of Monitor Well MW-2.

It is concluded that leakage from near bends in gasoline pipelines could have occurred since 1993.

4.1.3. Pump Islands

Benzene to toluene groundwater concentration ratios from samples collected in 1995 through 1998 from Monitor Well MW-1 indicates an apparent gasoline pipeline leak near the southwesternmost pump island.

High concentrations of TPH as gasoline and xylenes were detected in soil samples collected during excavation northeast of MW-1.

It is concluded that leakage from near the southern pump islands could have occurred since 1993.

4.1.4. Diesel UST

On January 23, 1998, the diesel UST failed a leak detection test. In March 1999, diesel was not offered because water was discovered in the product during pumping.

It is concluded that most, if not all, of the diesel contamination occurred after the purchase of the property in February 1994.

4.2. CONTAMINATION EXTENT

Confirmation soil samples were collected at the extent of the excavation or limit of apparent contamination. The selected sample locations were based on visual and laboratory analyses. The southern extent of the excavation was limited by the need to allow vehicle traffic access to Jiffy Lube. The excavation was also limited south of monitor well MW-5, and east of the office building, to retain the safety integrity of the office building.

4.2.1. Diesel

Diesel apparently spilled from near the UST fill pipe and/or from breaks in the pipeline to the nearby diesel pump. Contours (Figure 23B) of diesel soil contamination indicate that diesel may have spread into soil surrounding the prior UST tank field and also spread easterly and southerly, possibly due to changes in groundwater flow, vertically and horizontally.

Minor diesel (27.2 mg/kg) was detected in soil sample SW-58-5' at the southern extent of the excavation, although laboratory notes indicate that the constituent may be weathered gasoline. Minor diesel (90.2 mg/kg) was also detected in soil sample WW-86-8' collected north of the auto part-building dump and northern extent of the excavation. However, analysis of soil sample NW-84-7', collected approximately five (5)-feet from sample WW-86-8', resulted in non-detection of diesel.

Minor diesel (43.9 mg/kg) was detected in soil sample EW-74-5', at the northeastern extent of the excavation, adjacent to the previous location of the storm drain (and property boundary). Diesel was detected at 41.7 mg/kg in soil sample B-71-14', collected at the central-bottom of the excavation.

These locations of diesel detection in soil samples collected from the excavation limits are not considered to be significant contamination and would be expected to continue degradation overtime. Apparently, some of the detected diesel in the soil may be weathered gasoline.

4.2.2. Gasoline

Benzene concentrations in groundwater contours appear to peak in late 1994 and early 1995 (Figures 10E and 10F). Benzene contours for January 24, 1995 (Figure 10E) indicate a large concentration increase along the gasoline pipeline, indicating that the replacement gasoline pipeline may have leaked, and/or the elbows (or pipeline bends) may have leaked. An area of high concentration of gasoline contaminated soil was excavated from around MW-2, as well as, around the gasoline pipeline elbows/bends as they turned southward toward the pump islands. Benzene to toluene groundwater concentration ratios from samples collected in 1995 through 1998 indicates an apparent gasoline pipeline leak near the southwesternmost pump island (Figure 11).

Gasoline was detected in soil samples NW-84-7' (7.39 mg/kg), NW-79-7' (35.5 mg/kg), WW-82-7' (8.56 mg/kg), and WW-86-8' (7.55 mg/kg) collected at the northwestern extent of the excavation. Minor gasoline was also detected in soil samples collected along the northern sheet-pile wall extent of excavation, at concentrations from 5.10 mg/kg (NW-17-9') to 25.6 mg/kg (NW-29-15'). Minor gasoline was detected in soil samples NW-73-4' (49.3 mg/kg) and SW-76-8' (237 mg/kg), at the north and eastern extents of the excavation within the area of the previous storm drain. Slightly higher concentrations of gasoline were detected in soil sample SW-59-5.5' (60.0 mg/kg) collected at the extent of the excavation along the east side of the office building. At the extent of the southern limit of the excavation, east of monitor well MW-1, analysis of soil sample IB-4-8' resulted in 187 mg/kg, however, the excavation was extended southerly based on visual observations.

Except for soil sample SW-76-8' in which benzene was detected at 9.94 mg/kg, the benzene concentrations in the above soil samples ranged from non-detect to less than 3 mg/kg. MTBE was not detected in any confirmation soil samples collected at the extent of the excavation except SW-76-8' (5.51 mg/kg) near the previous storm drain location.

4.2.3. Auto Parts-Building Dump

The auto parts-building material dump area was apparently created around 1962. Soil sample D-1-5' was collected from within the dump area, and soil sample D-2 was collected from a temporary stockpile of dump material. The auto parts-building material was disposed off-site.

Soil samples B-81-7.5', B-83-9.5', B-85-9.5', WW-82-7', WW-86-8', and NW-84-7' were collected from the northwesternmost area of the dump, near the property boundary. Except for soil sample WW-86-8', the results of analyzing the soil samples indicated low concentrations of gasoline below nine (9) mg/kg. Soil sample WW-86-8' (8-feet bgs) contained gasoline (7.55 mg/kg), diesel (90.2 mg/kg) and heavy oil (305 mg/kg) constituents.

Soil samples B-83-9.5', B-85-9.5', WW-82-7', WW-86-8', and NW-84-7', collected essentially downgradient from the dump, were also analyzed for total metals. The following Table 6 summarizes the results of metals analyses.

Table 6 – AUTO PARTS-BUILDING DUMP: SOIL METALS ANALYSES

mg/kg

SAMPLE	DEPTH, BGS	Barium	Cadmium	Chromium	Lead	Silver	Mercury
B-83-9.5'	9.5	160	0.573	26.6	18.8	ND	ND
B-85-9.5'	9.5	172	ND	24.7	18.2	ND	ND
WW-82-7'	7	186	ND	21.8	ND	ND	ND
WW-86-8	8	118	ND	21.9	17.7	ND	ND
NW-84-7'	7	231	0.797	28.4	19.8	ND	ND

Two soil samples, D-1-5' and D-2-SPOIL, were collected and analyzed to characterize constituents in the auto parts-building dump. These two soil samples were analyzed for diesel and heavy oil hydrocarbons, total metals, polychlorinated byphenyls, and volatile organic compounds. Sample D-2-SPOIL was also analyzed for TCLP lead and benzene.

The following Table 7 summarizes the detectable results of analyzing samples D-1-5' and D-2-SPOIL.

Table 7 – AUTO PARTS-BUILDING DUMP: DETECTED RESULTS (SOIL)

mg/kg

CONSTITUENT	D-1-5'	D-2-SPOIL
Heavy Oil Range Hydrocarbons	2,010*	16,100*
Barium	182	186
Cadmium	1.25	1.38
Chromium	41.5	25.3
Lead	82.5	188 (TCLP=ND mg/l)
Arsenic	7.57	14.7
Aroclor 1260	0.0891*	ND
Benzene	1.7	13.2 (TCLP=0.0563 mg/l)
n-Butylbenzene	0.113	ND
Ethylbenzene	0.111*	1.120
Isopropylbenzene	0.116*	0.191
n-Propylbenzene	0.359	0.248
Toluene	ND	0.613
1,2,4-Trimethylbenzene	0.887	0.117*
1,3,5-Trimethylbenzene	0.860	0.160
0-Xylene	ND	0.398
m,p-Xylene	0.860	4.780

**see lab note*

A water grab sample taken from the bottom of the auto parts dump excavation, at about 9.5-feet bgs, (sample WG-1-9.5') was analyzed for volatile organic compounds, gasoline hydrocarbons, total metals, and, diesel and heavy range hydrocarbons. The following Table 8 summarizes the detectable results of analyzing water sample WG-1-9.5'.

Table 8 – AUTO PARTS-BUILDING DUMP: DETECTED RESULTS (WATER) - mg/l

CONSTITUENT	WG-1-9.5'
Gasoline Range Hydrocarbons	0.229
Diesel Range Organics	0.830
Arsenic	0.191
Barium	11.6
Cadmium	0.0140
Chromium	0.947
Lead	2.45
Silver	0.00790
Selenium	0.0125
Methyl tert-butyl ether	0.00305
Benzene	0.0286
Carbon disulfide	0.0125
cis-1,2-Dichlorothene	0.0998
Ethylbenzene	0.00250
Isopropylbenzene	0.00221
n-Propylbenzene	0.00152
Tetrachloroethene	0.00100
1,2,4-Trimethylbenzene	0.00122
Vinyl chloride	0.0112
m,p-Xylene	0.00266

5. 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 and excavation and associated services were performed under separate agreement with the landowner and Consultant makes no claim of responsibility for services provided by others. This report is restricted to geologic services as requested by the Client.

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, or adjacent, or nearby property, which in fact is unaffected by contaminated or hazardous materials at the time of exploration or sampling, may later, due to natural causes including groundwater movement 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 neither 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.

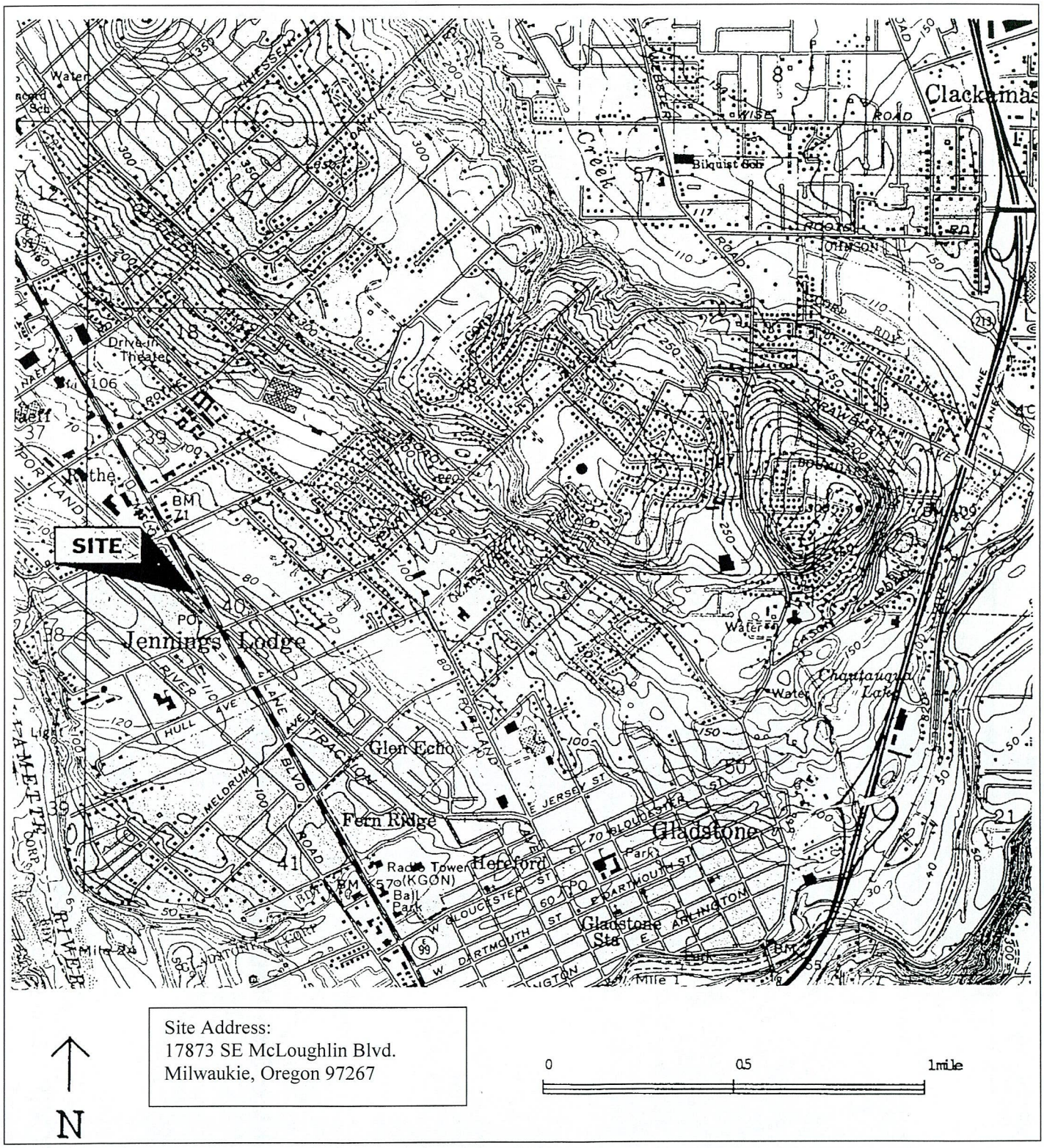
Portions of an Agreement to perform professional services for the Client may or may not be disclosed in this report. Final approval of environmental investigations and remediation is authorized only by appropriate governmental agencies.

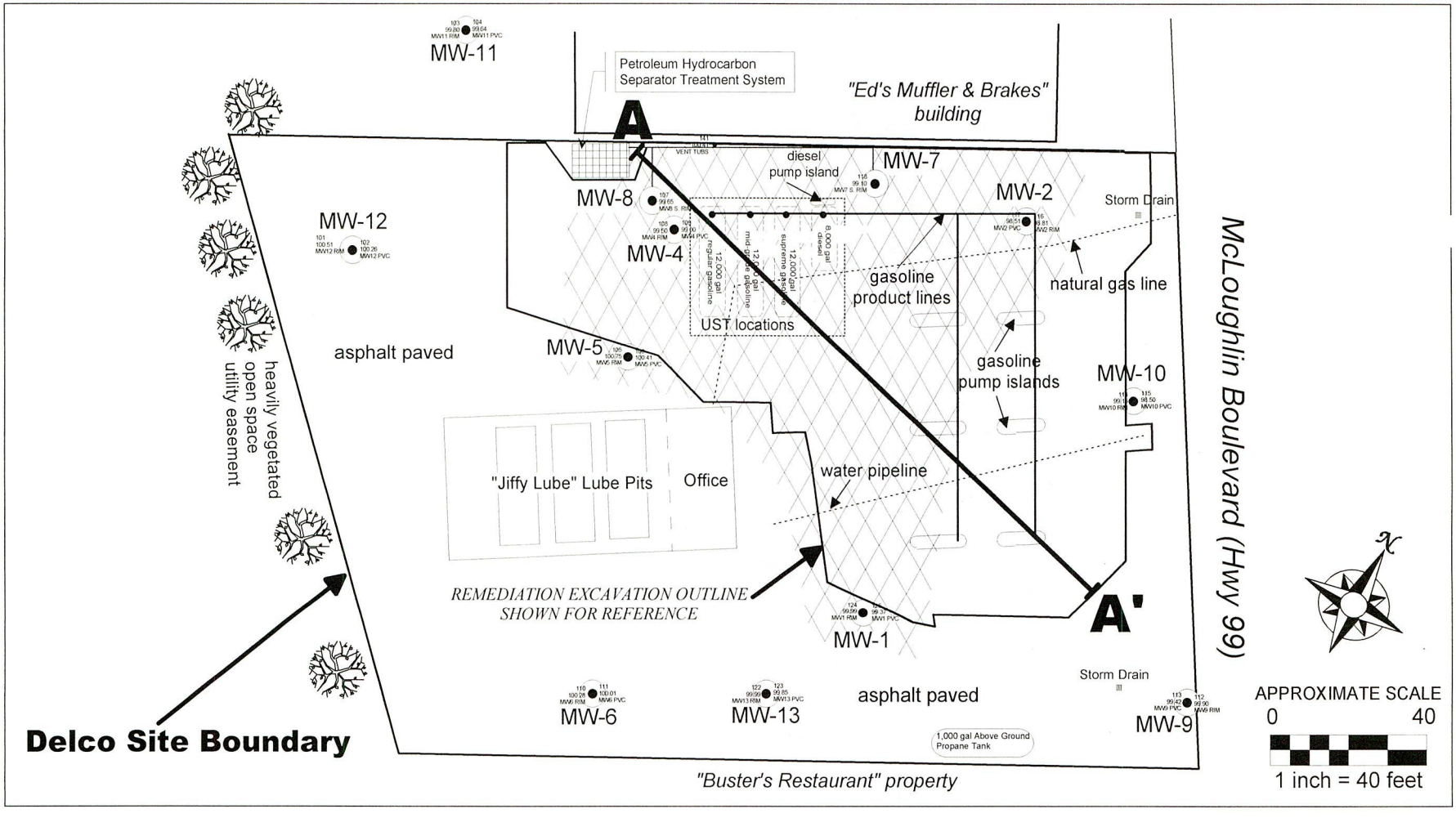
Respectfully submitted,

Richard C. Kent, R.G.
Professional Geologist

Figure 1 - LOCATION MAP

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





MW-13 Groundwater Monitor Well Location

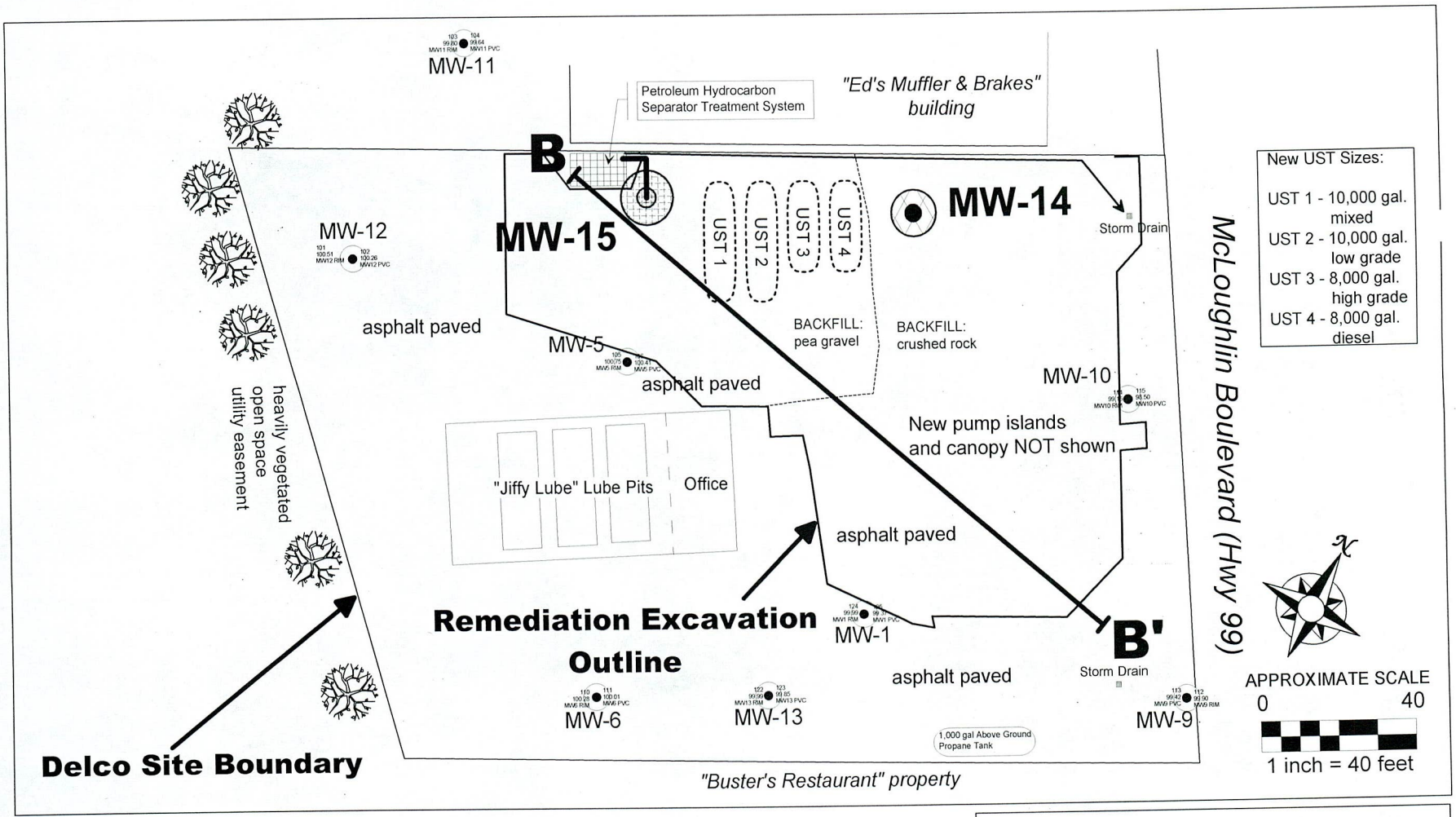
pre-excavation estimated area of groundwater contamination

Figure 2
PRE-EXCAVATION SITE MAP AND CROSS-SECTION A-A' INDEX

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

GeoPro Geologic Services
Battle Ground, WA

Project No. 990621



MW-14 New 4" monitor well

MW-15 New 4" Production Well

New 4" PVC pipline to treatment facility and discharge to storm drain

MW-13 Existing Monitor Well Location

GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

Figure 3
POST-EXCAVATION SITE MAP AND CROSS-SECTION B-B' INDEX

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

Figure 4 –EXPOSED DIESEL UST AND GASOLINE PIPELINES

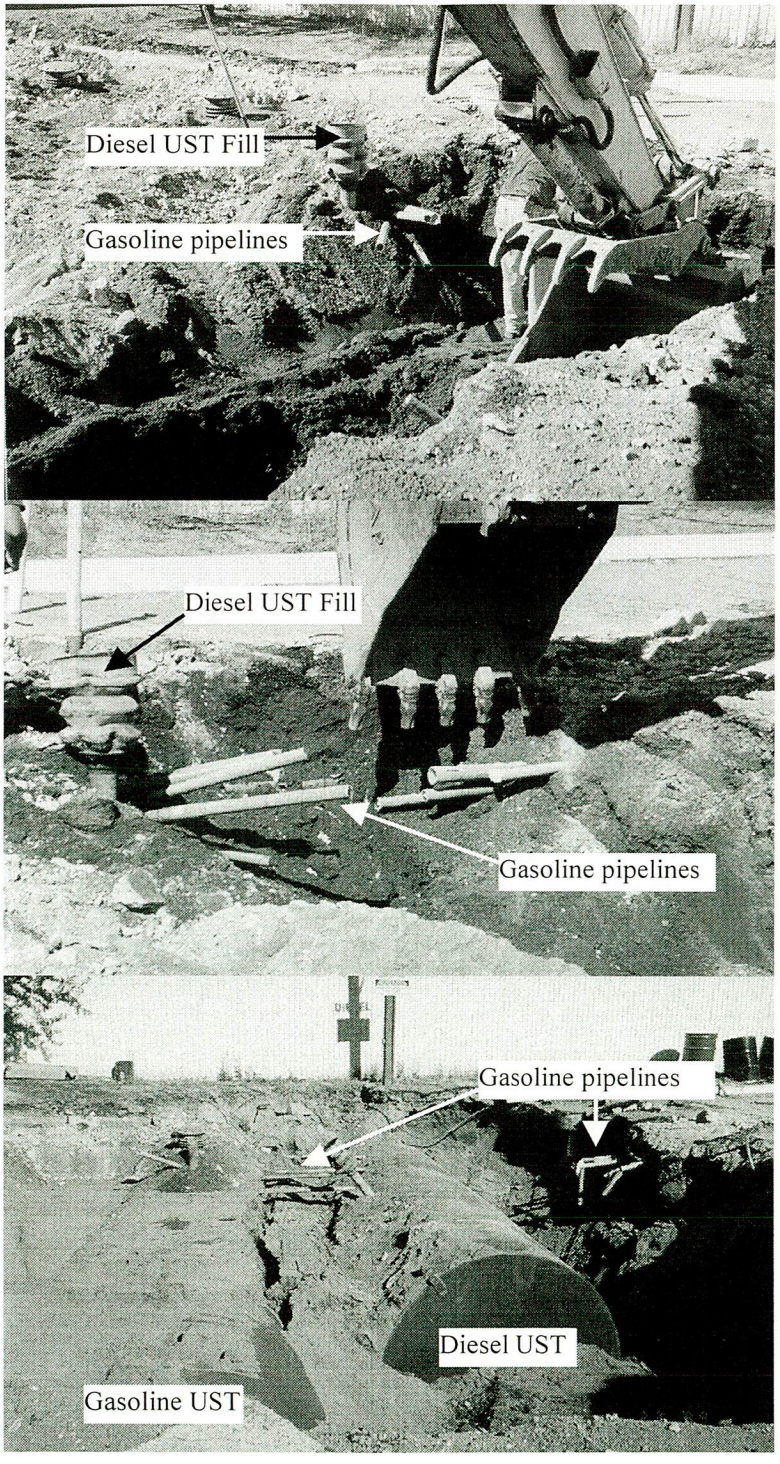


Figure 5 - STATIC GROUNDWATER LEVELS BELOW GROUND SURFACE

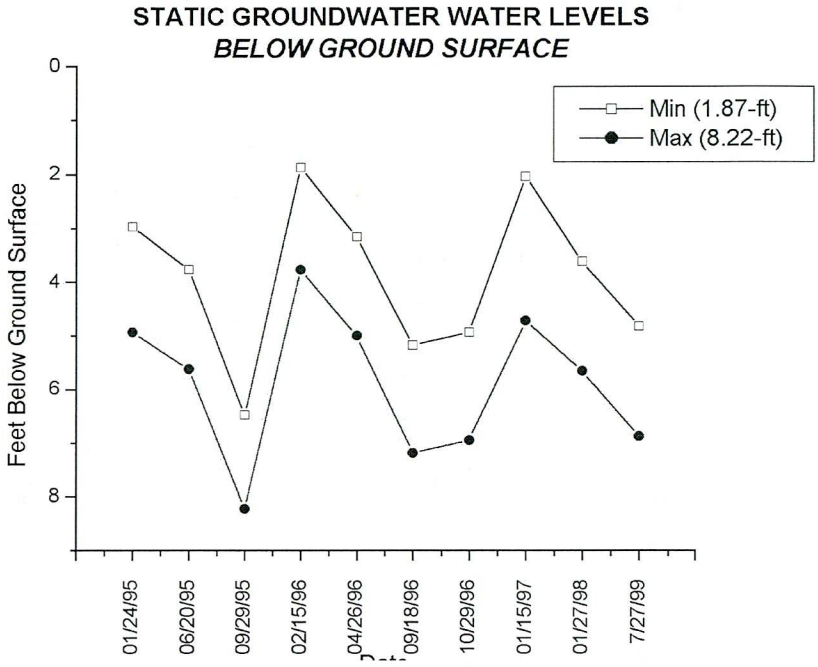


Figure 6 – MEAN GROUNDWATER STATIC LEVELS (RELATIVE ELEVATION)

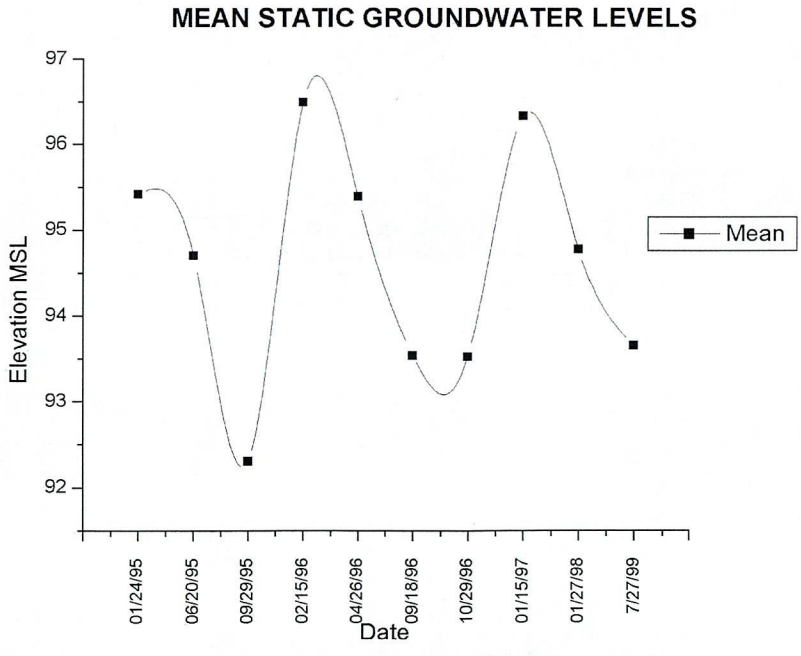


Figure 7 – GROUNDWATER ANALYSES (Selected Wells, ND not shown)

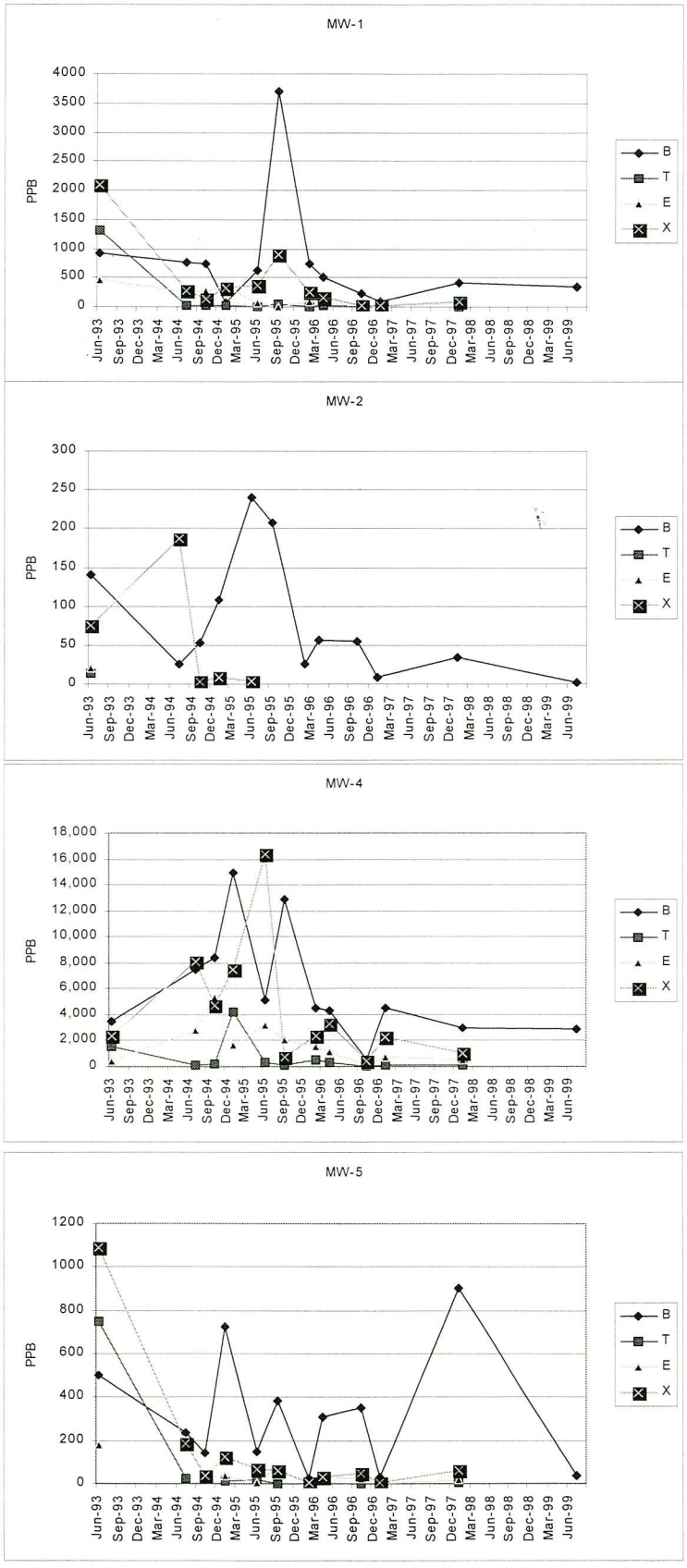


Figure 8 – JULY 1999 GROUNDWATER GRADIENT

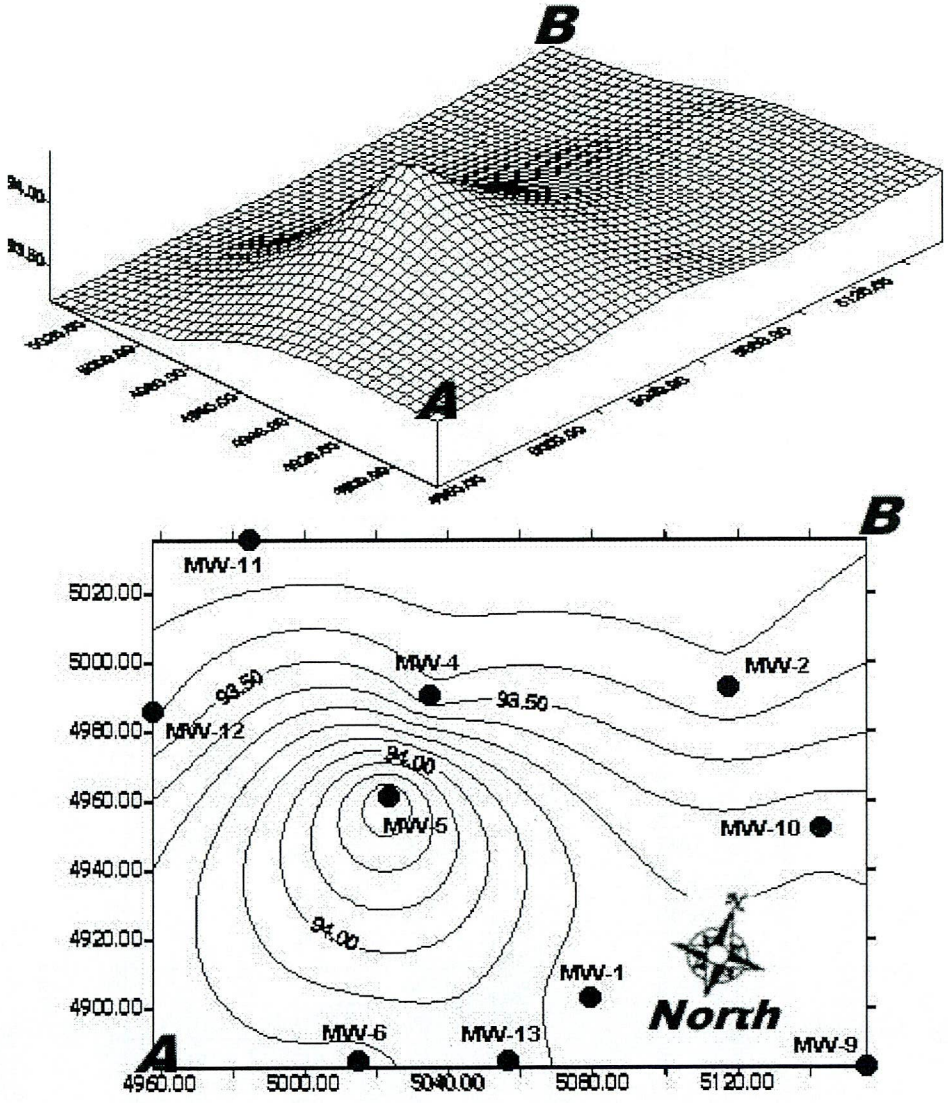
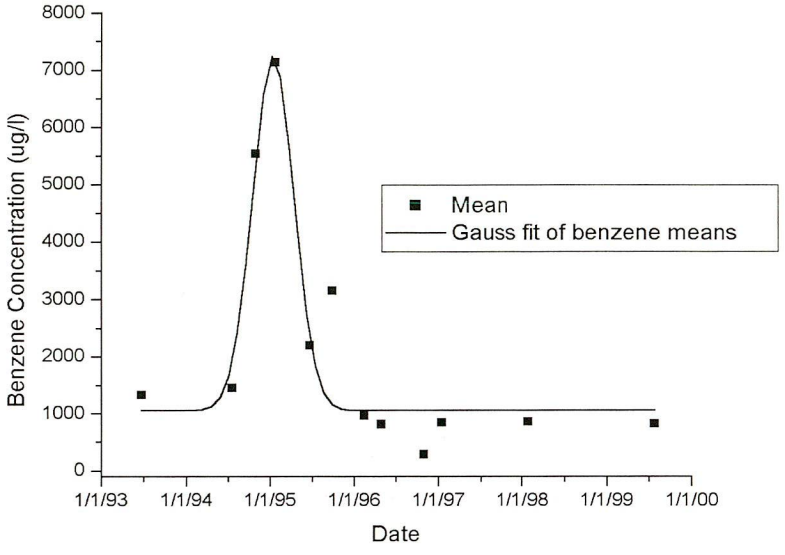
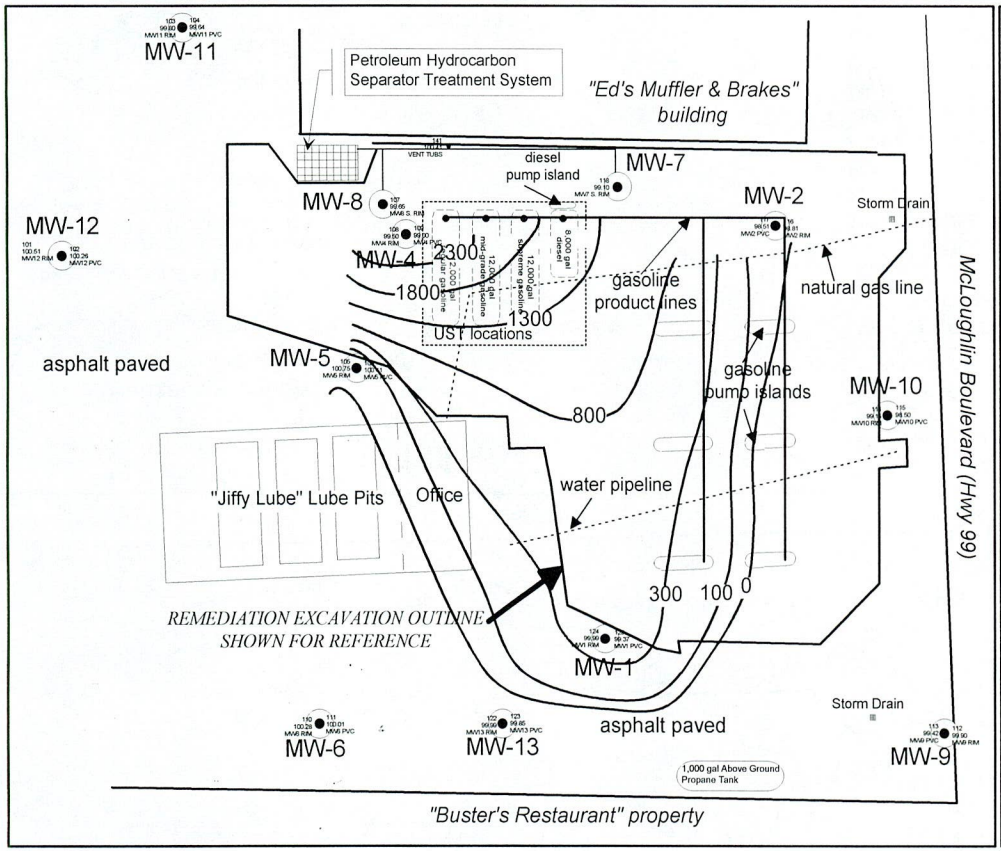


Figure 9 – BENZENE GROUNDWATER MEAN CONCENTRATIONS

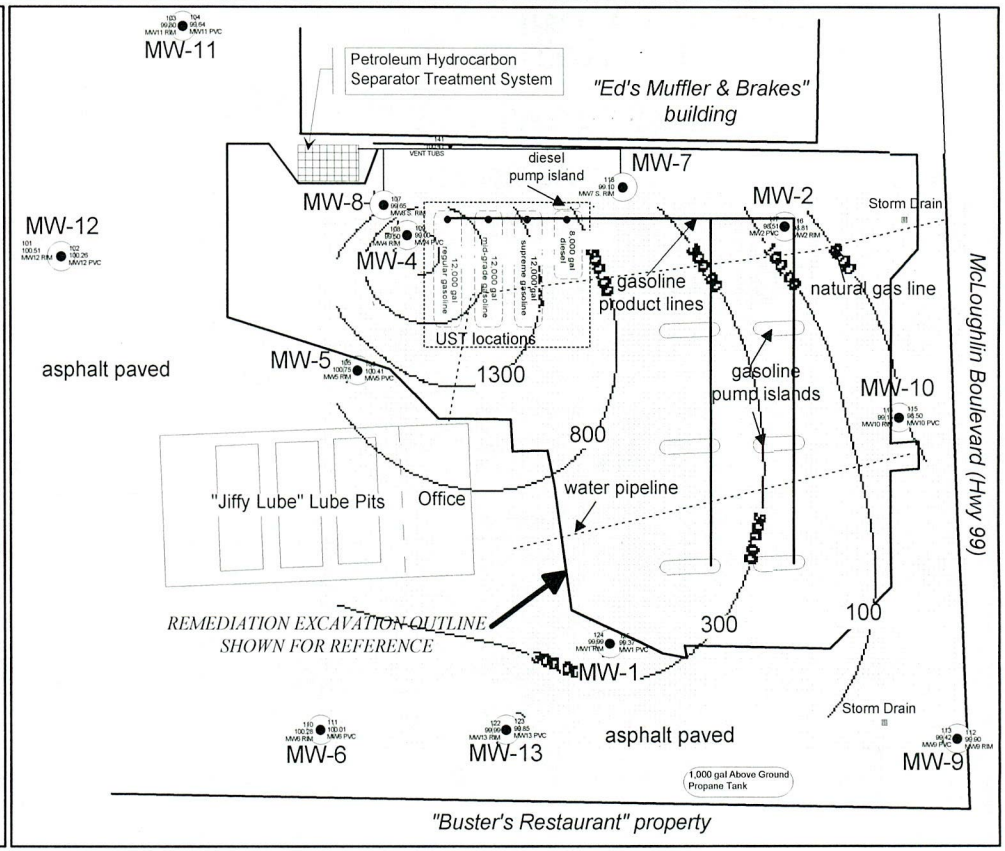


Concentration shown below in µg/l

Date	Mean	Minimum	Maximum
7/23/99	821	1.54	2910
1/27/98	856	34	2960
1/15/97	846	9	4540
10/29/96	285	54	490
4/26/96	815	56	4330
2/15/96	961	23	4490
9/29/95	3150	208	12900
6/20/95	2200	150	5130
1/24/95	7139	62	19900
10/28/94	5545	53	18400
7/18/94	1455	14	7460
6/22/93	1330	140	3500
AVE	*2117*	*67*	*7250*



7/23/99



1/27/98

Benzene groundwater concentration contour (ppb)

Contour Interval (CI) = 500 ppb except 0, 100 and 300 contours

Groundwater Monitor Well Location

MW-13

Well	Install Date
MW-1	6/18/93
MW-2	6/18/93
MW-3	6/18/93 Replaced by MW-7 2/20/95
MW-4	6/18/93
MW-5	6/19/93
MW-6	6/19/93
MW-7	1/27/95 Production (intermittent)
MW-8	1/27/95 Production
MW-9	1/27/95
MW-10	8/12/96
MW-11	8/12/96
MW-12	8/12/96
MW-13	8/12/96

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Project No. 990621

Figure 10A

BENZENE CONCENTRATION CONTOURS (GROUNDWATER)

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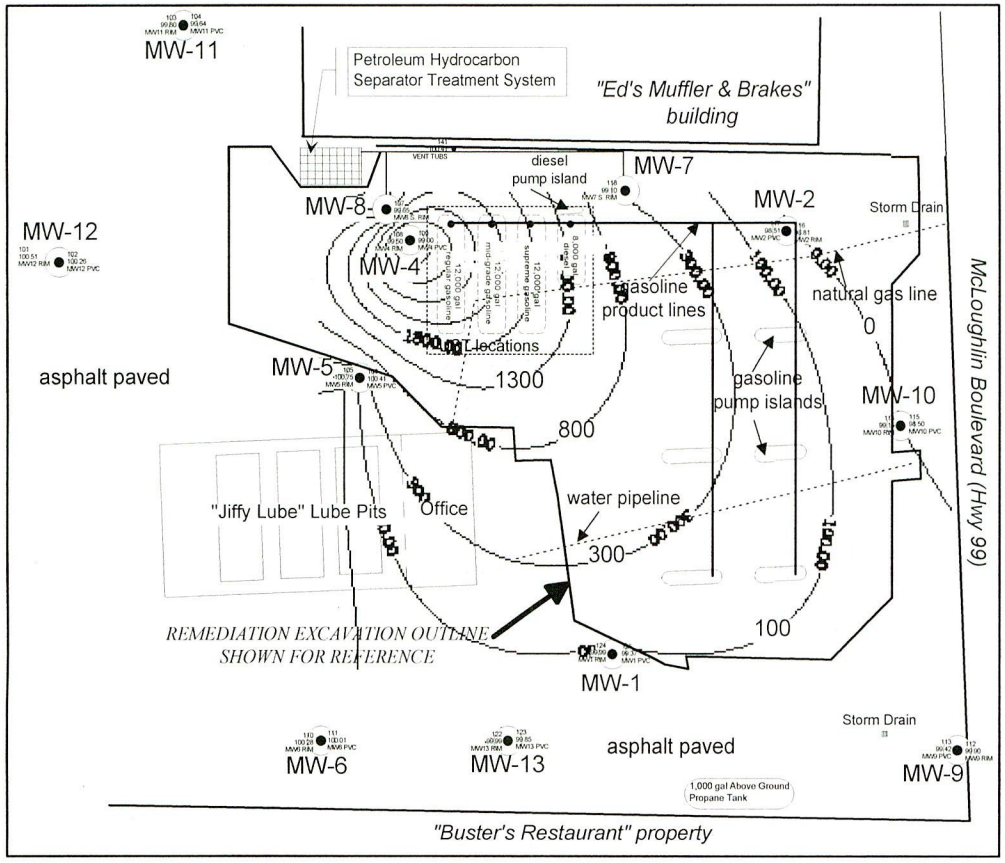
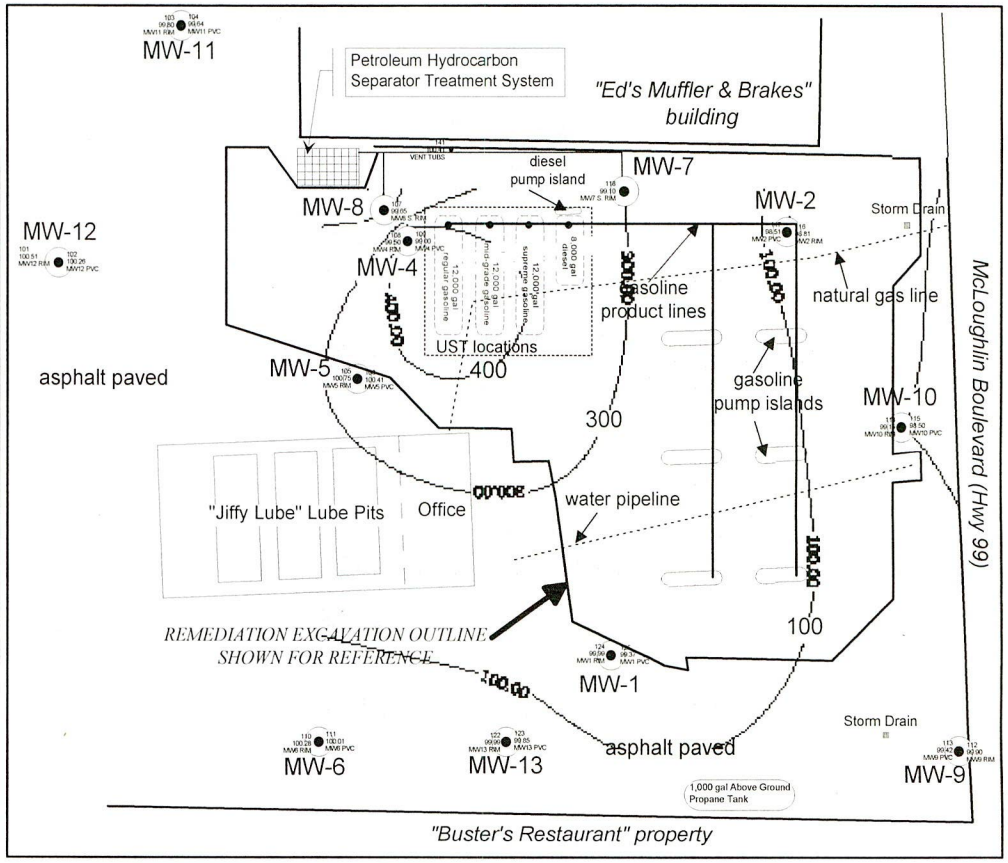
Milwaukie, OR



1/15/97



10/29/96

NOTE: Contour Interval 100 ppb

Benzene groundwater concentration contour (ppb)

Contour Interval (CI) = 500 ppb except 0, 100 and 300 contours

Groundwater Monitor Well Location

MW-13

Well	Install Date
MW-1	6/18/93
MW-2	6/18/93
MW-3	6/18/93 Replaced by MW-7 2/20/95
MW-4	6/18/93
MW-5	6/19/93
MW-6	6/19/93
MW-7	1/27/95 Production (intermittent)
MW-8	1/27/95 Production
MW-9	1/27/95
MW-10	8/12/96
MW-11	8/12/96
MW-12	8/12/96
MW-13	8/12/96

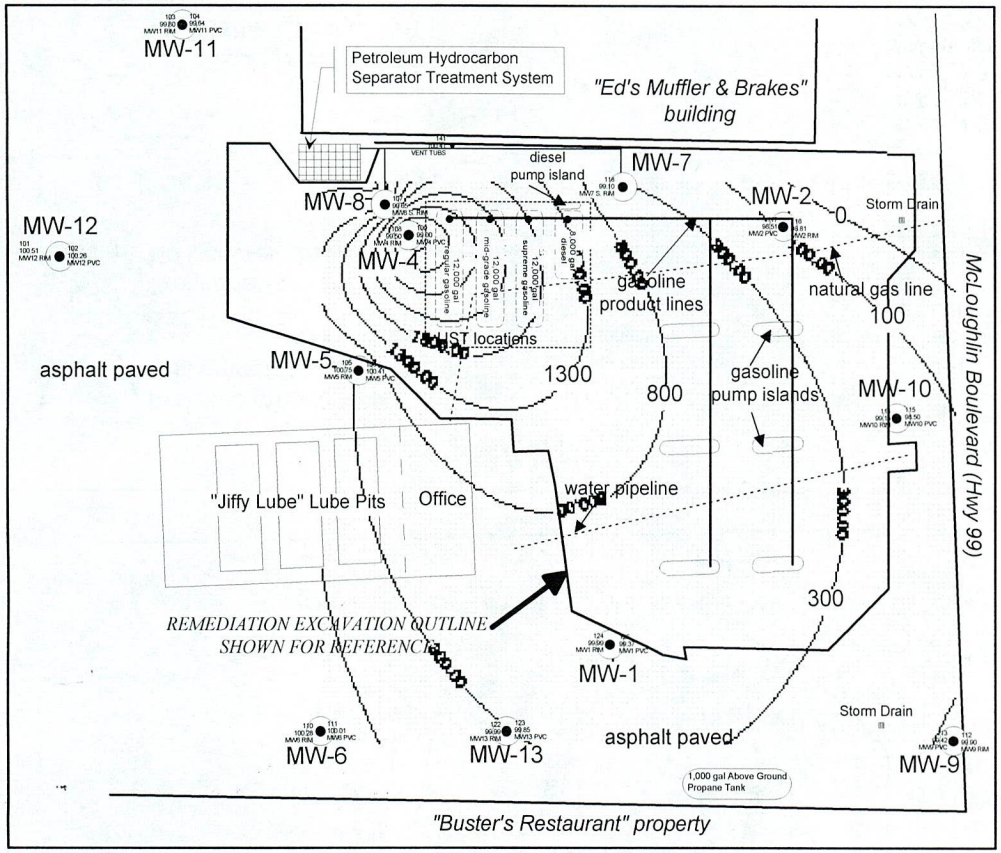
GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

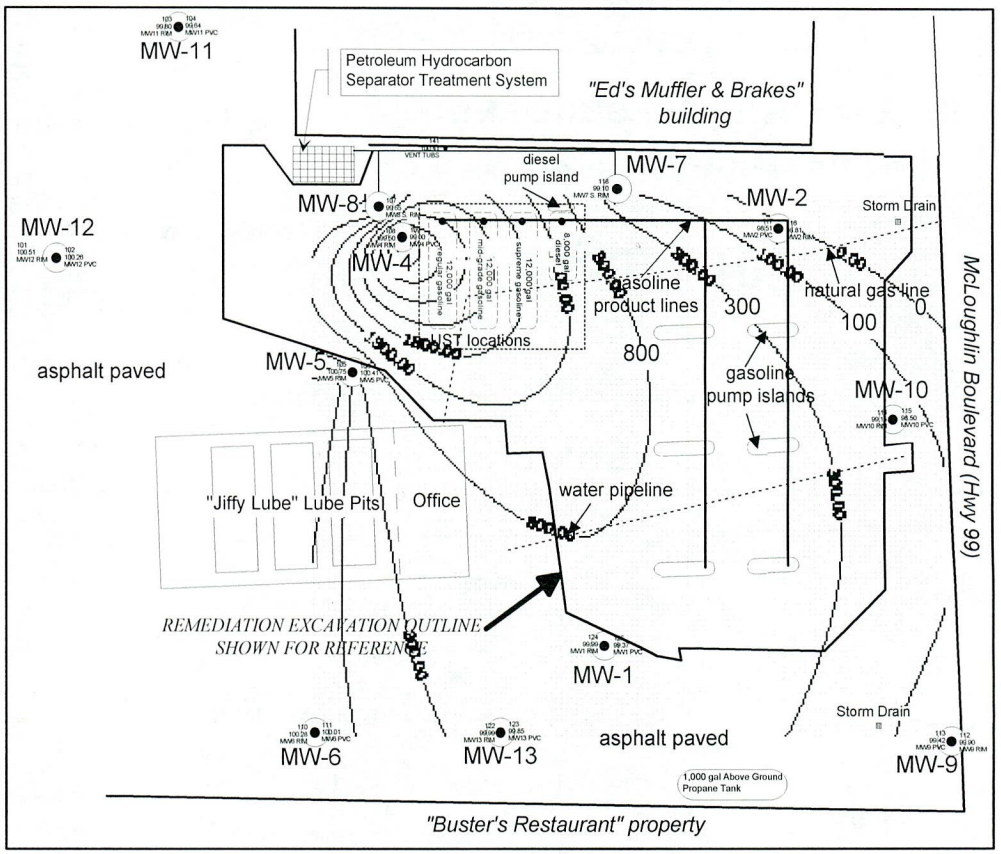
Figure 10B

BENZENE CONCENTRATION CONTOURS (GROUNDWATER)

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



4/26/96



2/15/96

Benzene groundwater concentration contour (ppb)

Contour Interval (CI) = 500 ppb except 0, 100 and 300 contours

MW-13 Groundwater Monitor Well Location

Well	Install Date
MW-1	6/18/93
MW-2	6/18/93
MW-3	6/18/93 Replaced by MW-7 2/20/95
MW-4	6/18/93
MW-5	6/19/93
MW-6	6/19/93
MW-7	1/27/95 Production (intermittent)
MW-8	1/27/95 Production
MW-9	1/27/95
MW-10	8/12/96
MW-11	8/12/96
MW-12	8/12/96
MW-13	8/12/96

Figure 10C

BENZENE CONCENTRATION CONTOURS (GROUNDWATER)

DELCO PETROLEUM CO. LLC
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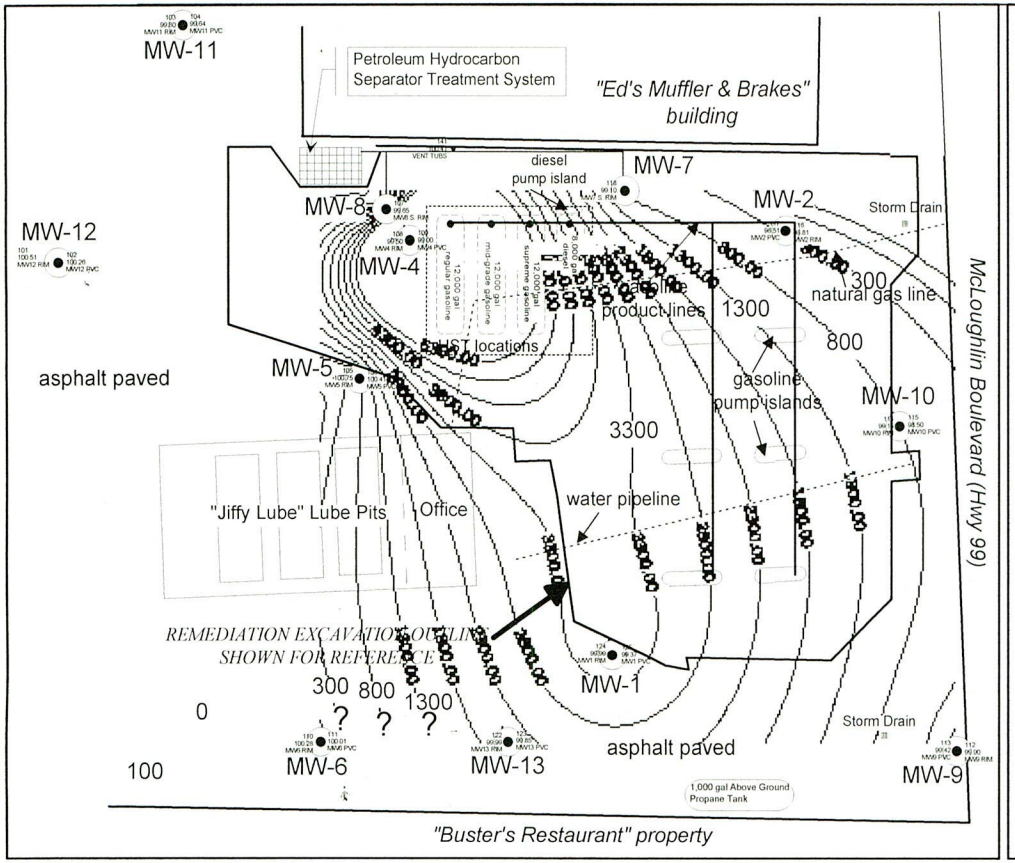
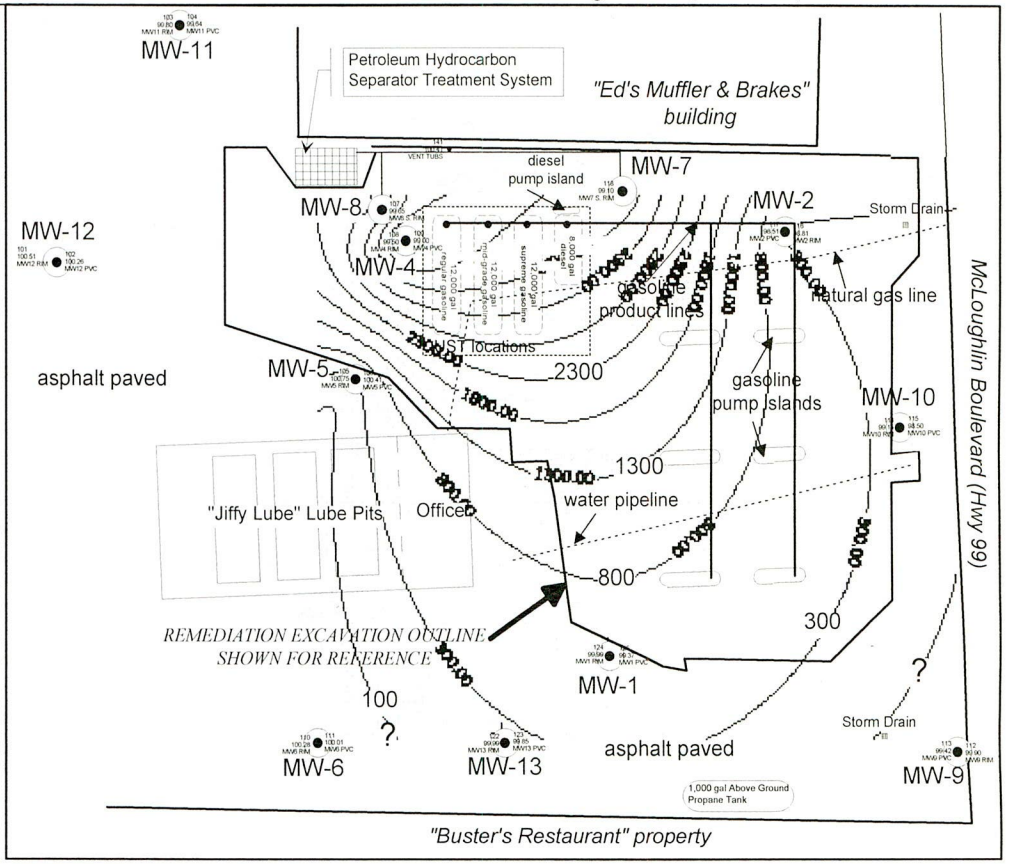
Battle Ground, WA

Project No. 990621



9/29/95



6/20/95

Benzene groundwater concentration contour (ppb)

Contour Interval (CI) = 500 ppb except 0, 100 and 300 contours

Groundwater Monitor Well Location

MW-13

NOTE: Pump and treatment system installed February 1995.

Well	Install Date
MW-1	6/18/93
MW-2	6/18/93
MW-3	6/18/93 Replaced by MW-7 2/20/95
MW-4	6/18/93
MW-5	6/19/93
MW-6	6/19/93
MW-7	1/27/95 Production (intermittent)
MW-8	1/27/95 Production
MW-9	1/27/95
MW-10	8/12/96
MW-11	8/12/96
MW-12	8/12/96
MW-13	8/12/96

Figure 10D

BENZENE CONCENTRATION CONTOURS (GROUNDWATER)

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Battle Ground, WA

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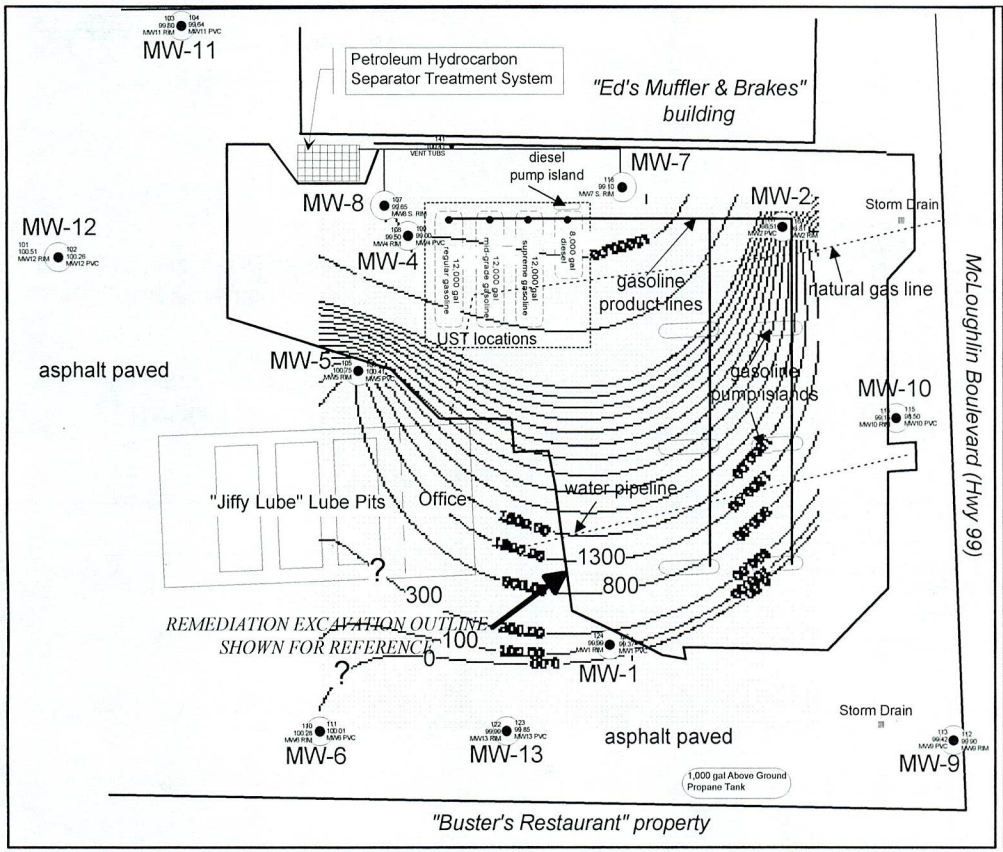
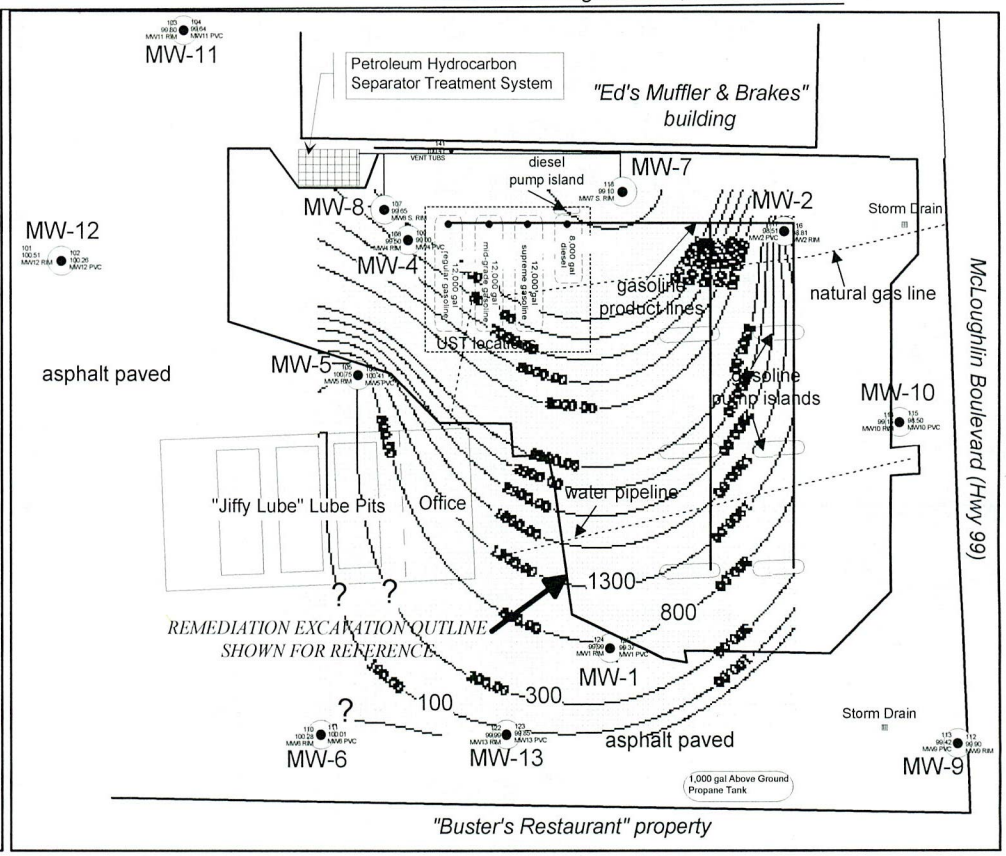


1/24/95



10/28/94

NOTE: Pump and treatment system installed February 1995.

Benzene groundwater concentration contour (ppb)
Contour Interval (CI) = 500 ppb except 0, 100 and 300 contours

MW-13 Groundwater Monitor Well Location

Well	Install Date
MW-1	6/18/93
MW-2	6/18/93
MW-3	6/18/93 Replaced by MW-7 2/20/95
MW-4	6/18/93
MW-5	6/19/93
MW-6	6/19/93
MW-7	1/27/95 Production (intermittent)
MW-8	1/27/95 Production
MW-9	1/27/95
MW-10	8/12/96
MW-11	8/12/96
MW-12	8/12/96
MW-13	8/12/96

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Figure 10E

BENZENE CONCENTRATION CONTOURS (GROUNDWATER)

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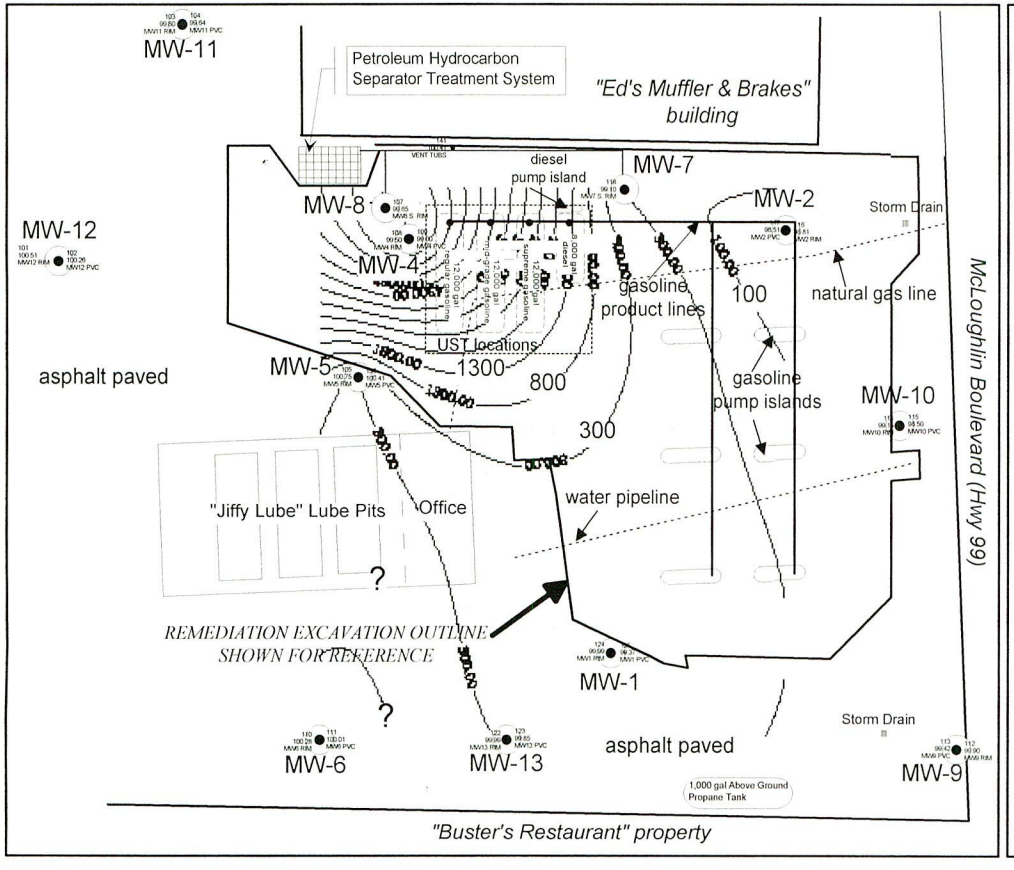
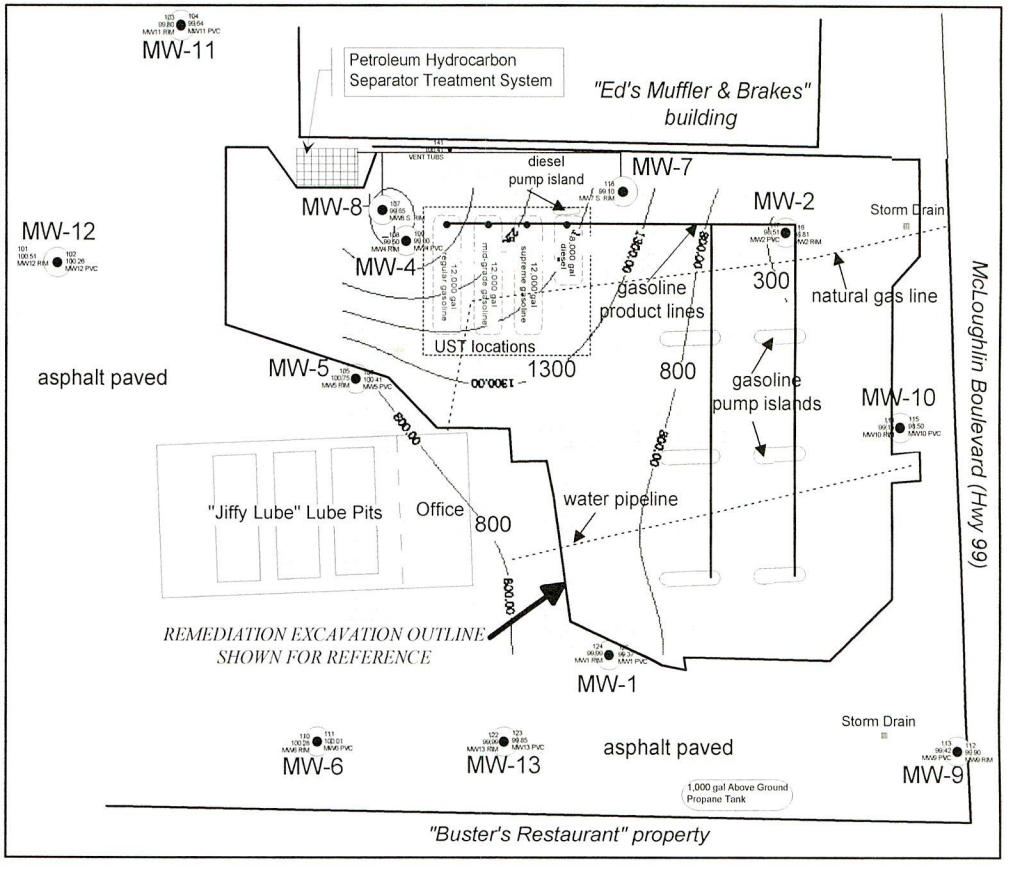


7/18/94



6/22/93

Benzene groundwater concentration contour (ppb)

Contour Interval (CI) = 500 ppb except 0, 100 and 300 contours

Groundwater Monitor Well Location

MW-13

Well	Install Date
MW-1	6/18/93
MW-2	6/18/93
MW-3	6/18/93 Replaced by MW-7 2/20/95
MW-4	6/18/93
MW-5	6/19/93
MW-6	6/19/93
MW-7	1/27/95 Production (intermittent)
MW-8	1/27/95 Production
MW-9	1/27/95
MW-10	8/12/96
MW-11	8/12/96
MW-12	8/12/96
MW-13	8/12/96

Figure 10F

BENZENE CONCENTRATION CONTOURS (GROUNDWATER)

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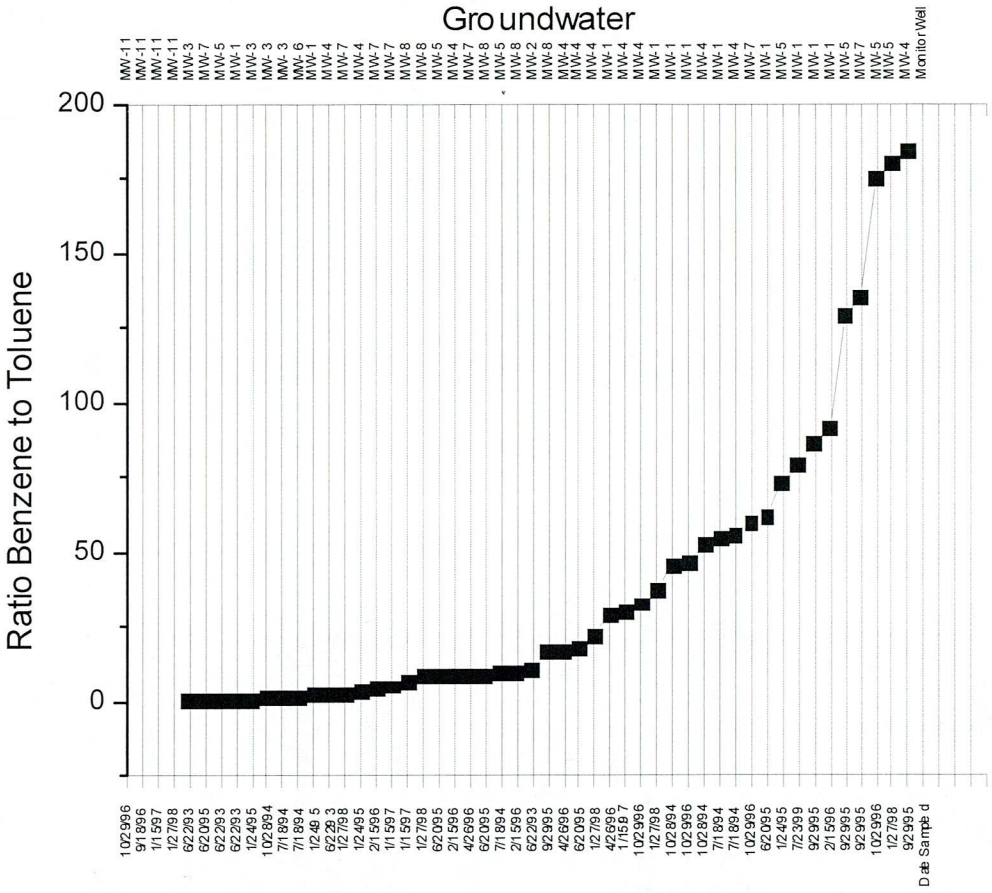
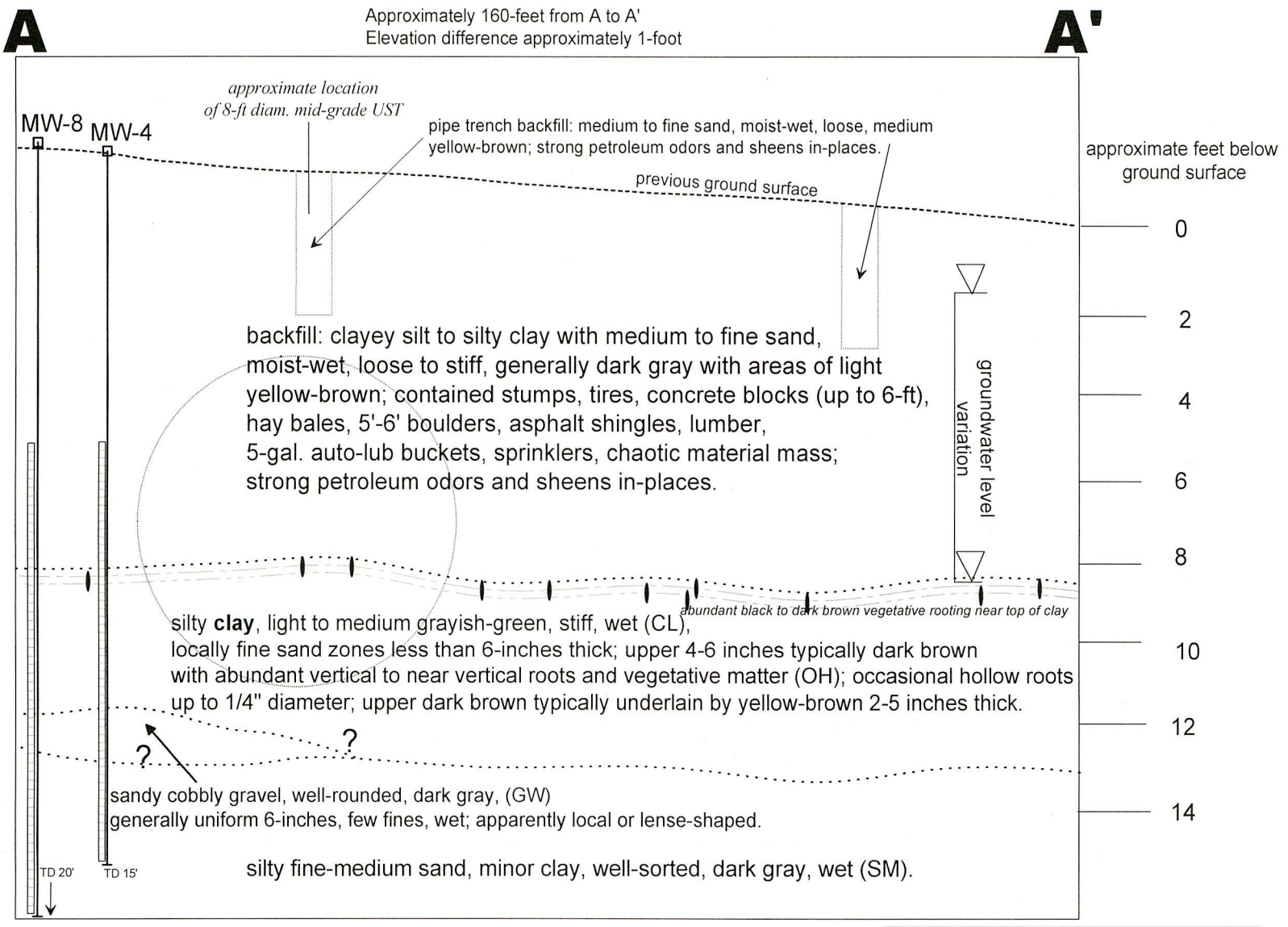
Figure 11 – RATIO BENZENE TO TOLUENE (GROUNDWATER)





4"-MW-8 and 2"-MW-4 screened from
TD (total depth) to 5-feet bgs

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No Scale

Figure 12
PRE-EXCAVATION
CROSS-SECTION A-A'

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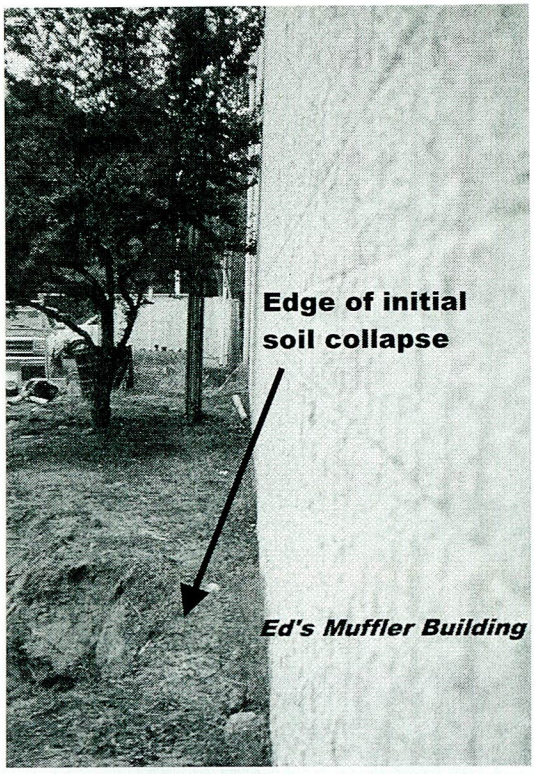
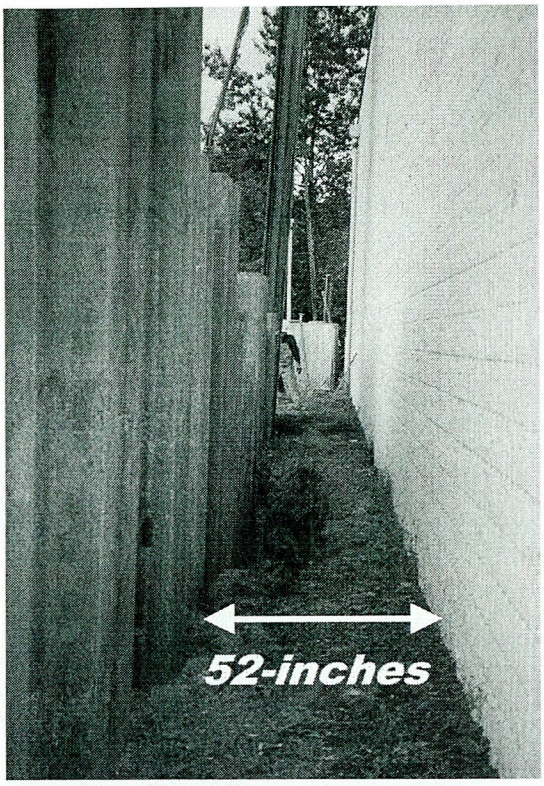
Figure 13 – STEEL SHEET PILING RETAINING WALL





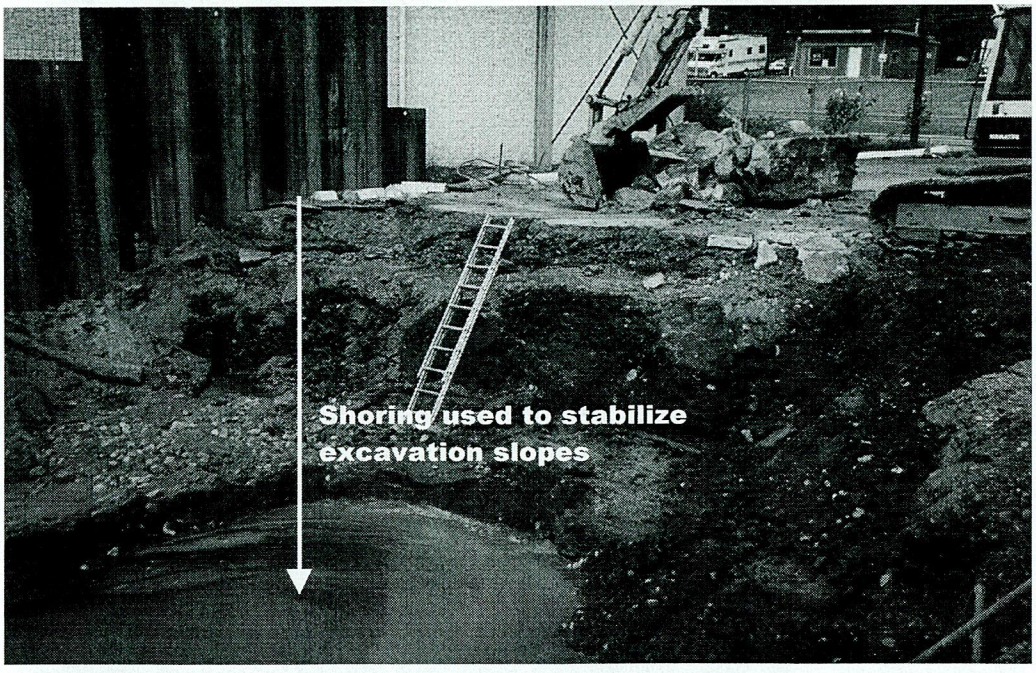
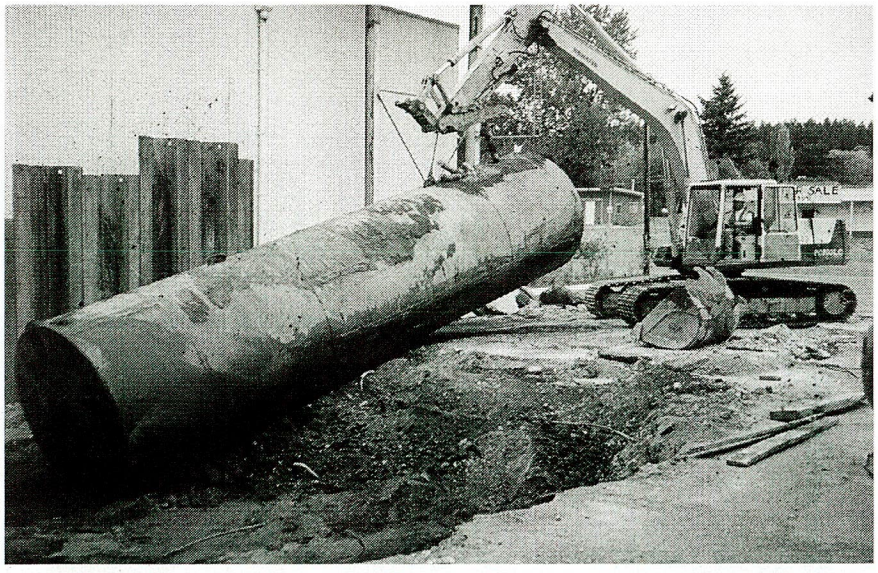
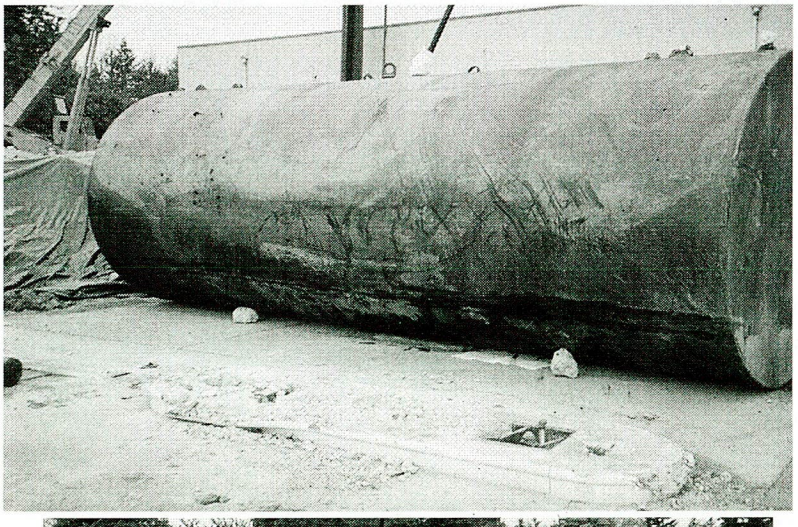


Figure 14 – EXCAVATED UNDERGROUND STORAGE TANKS





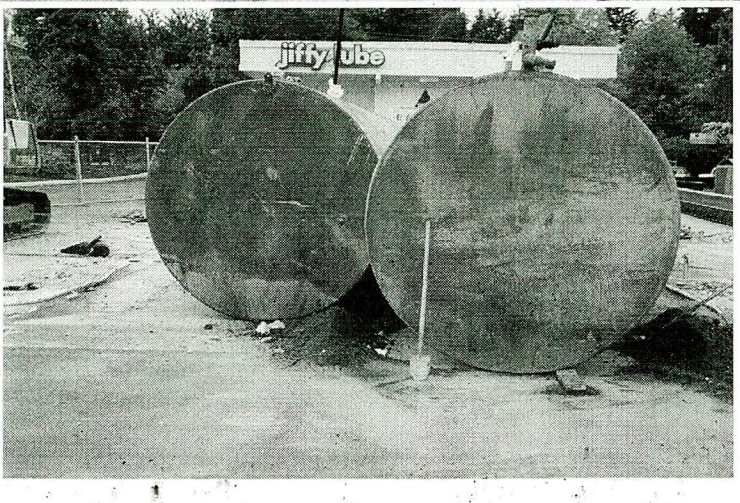
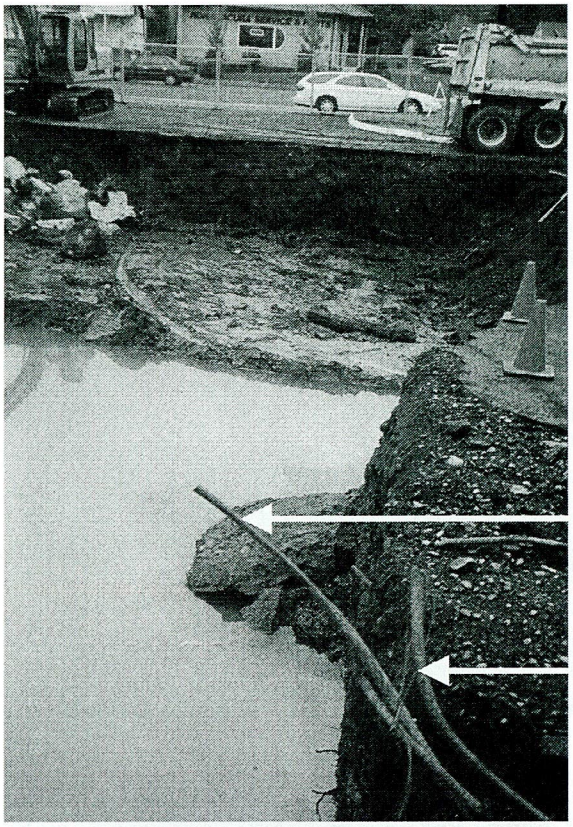


Figure 15 – PIPELINES AND SAND-FILLED TRENCHES



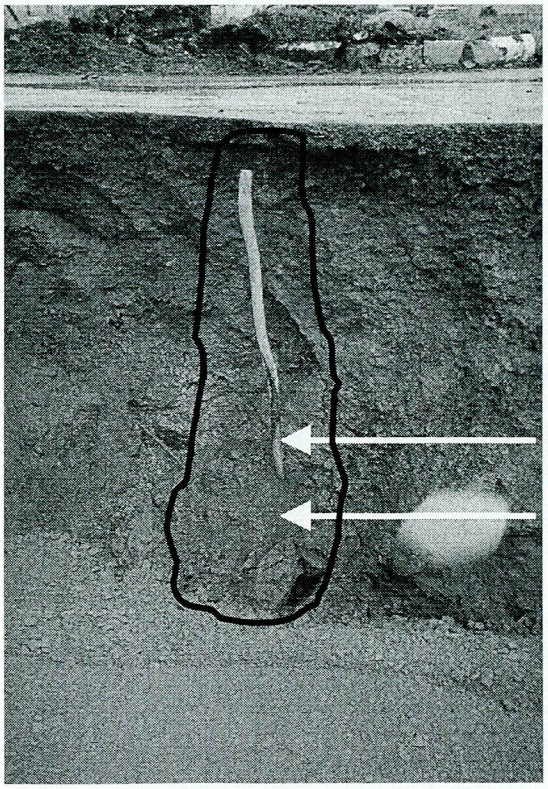
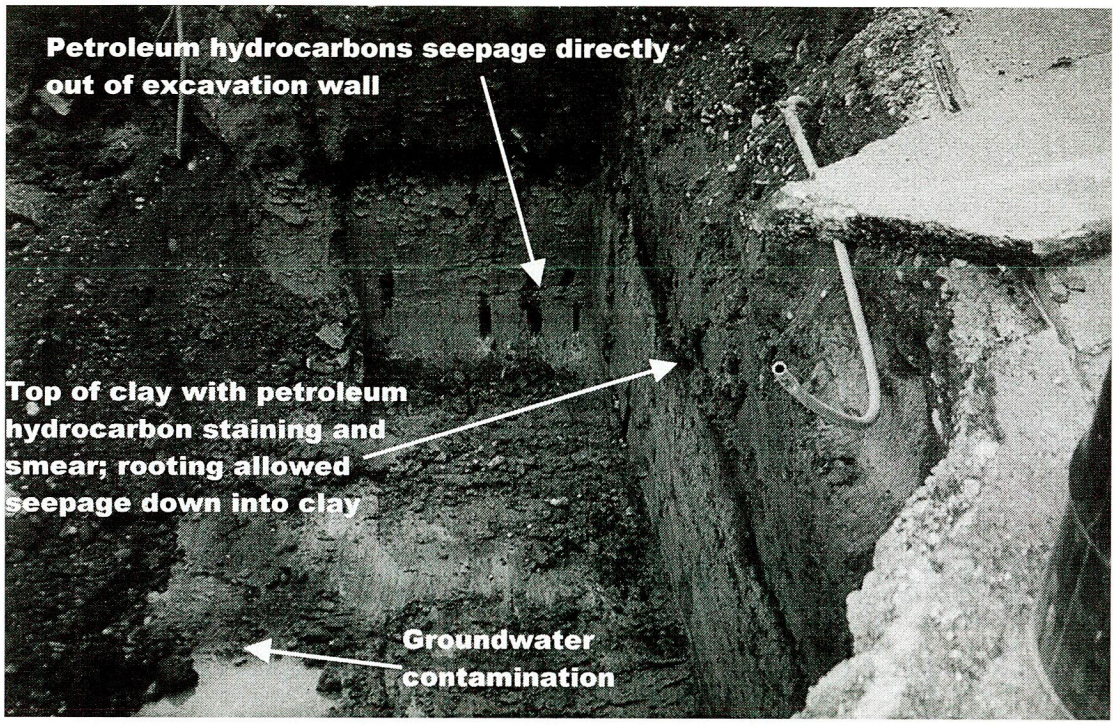


Figure 16 – TYPICAL CONTAMINATED SOIL AND GROUNDWATER



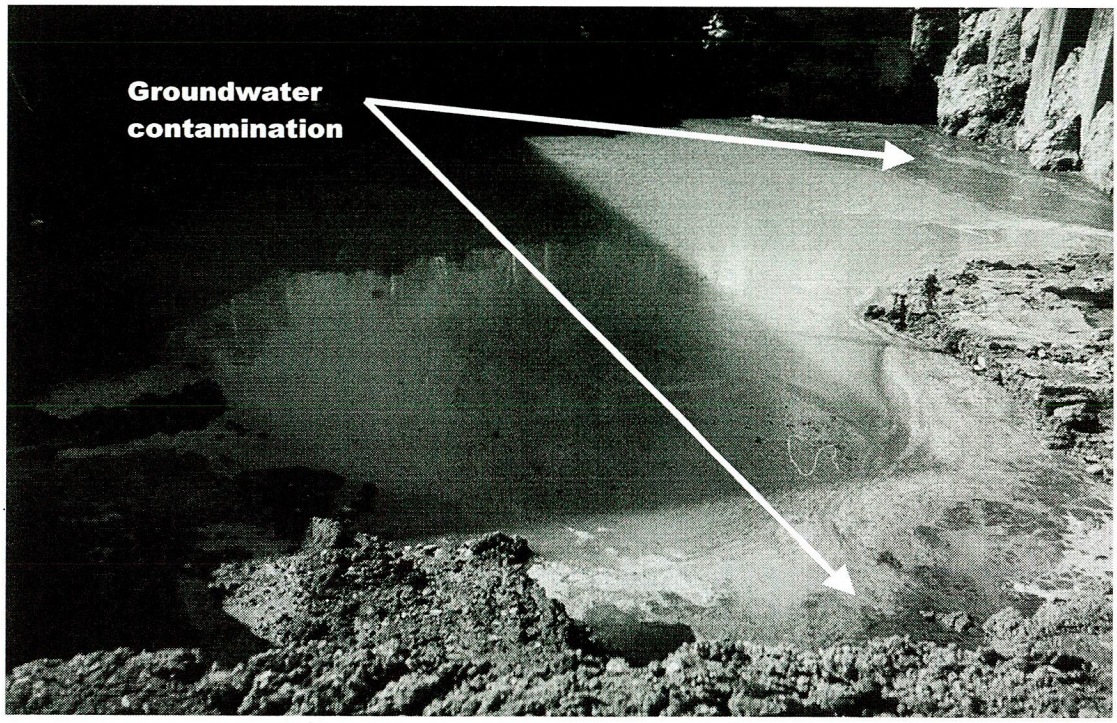
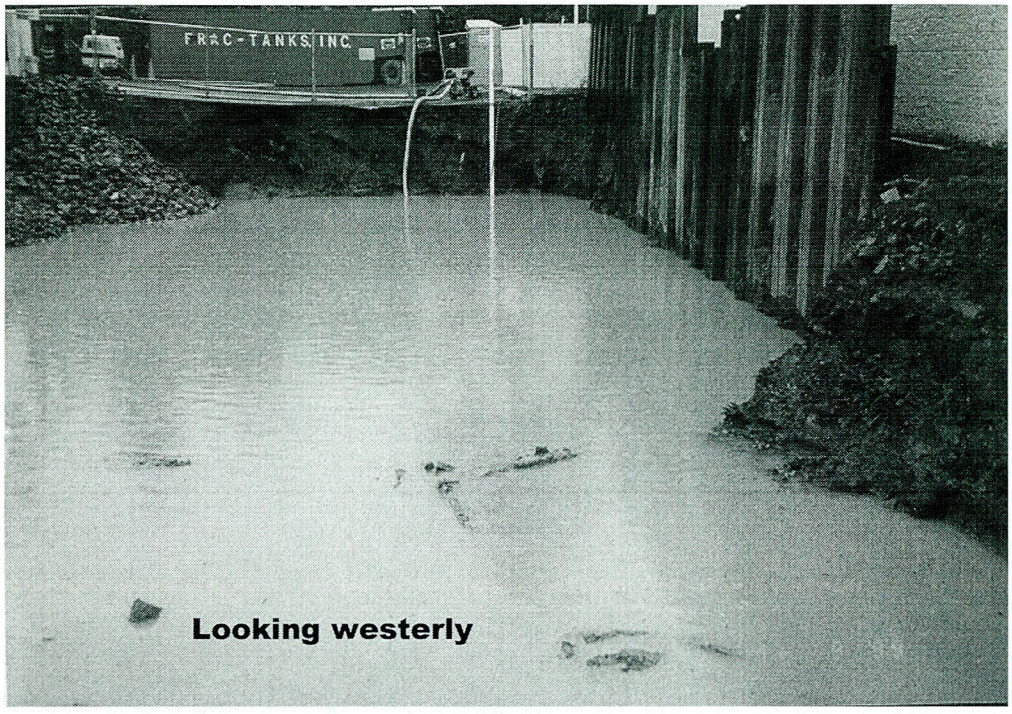


Figure 17 – GROUNDWATER RECHARGING INTO EXCAVATION



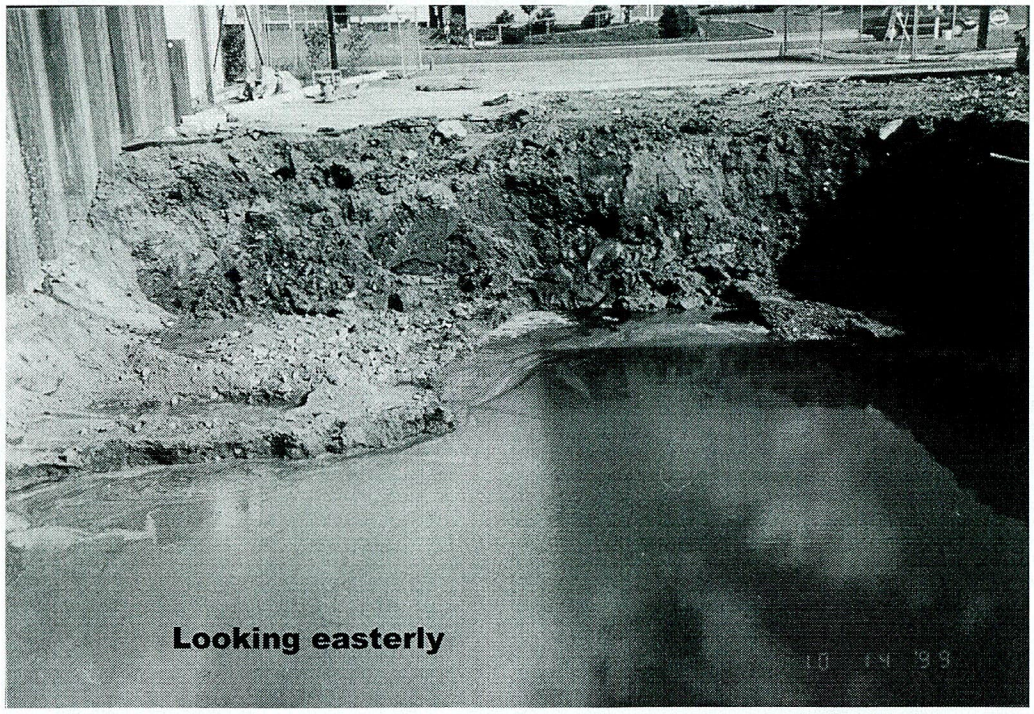
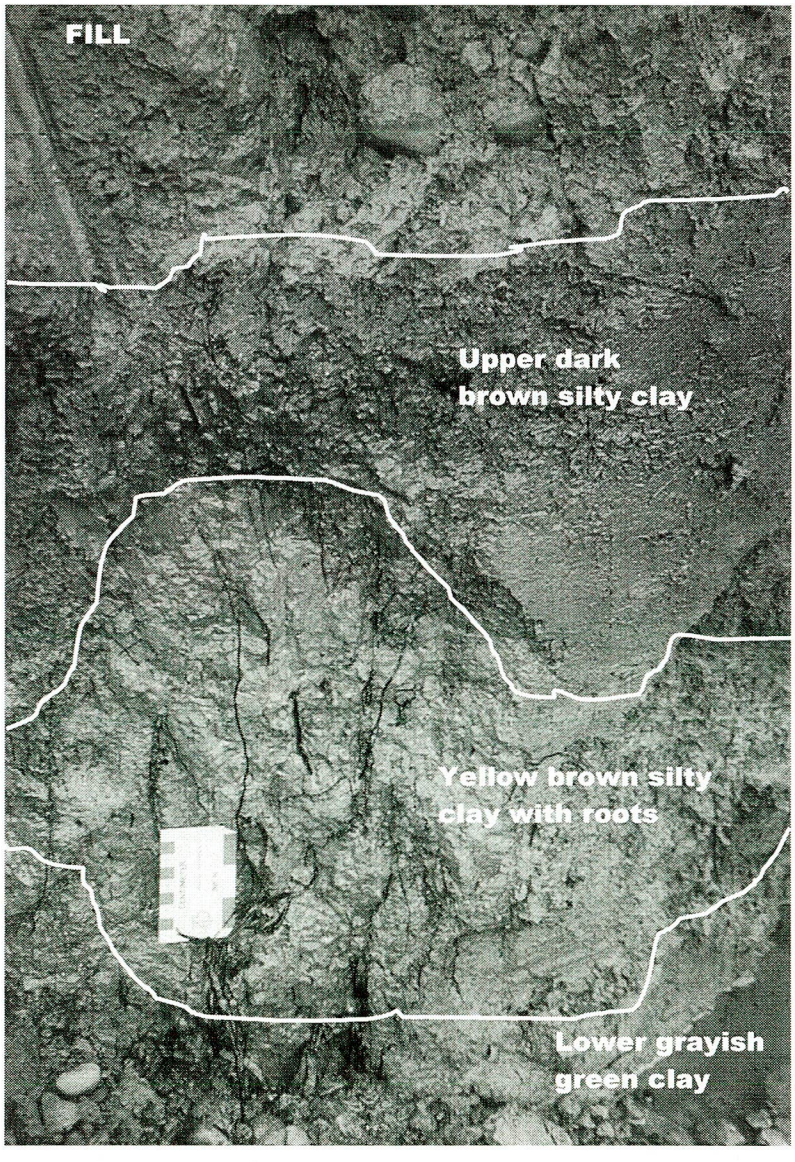
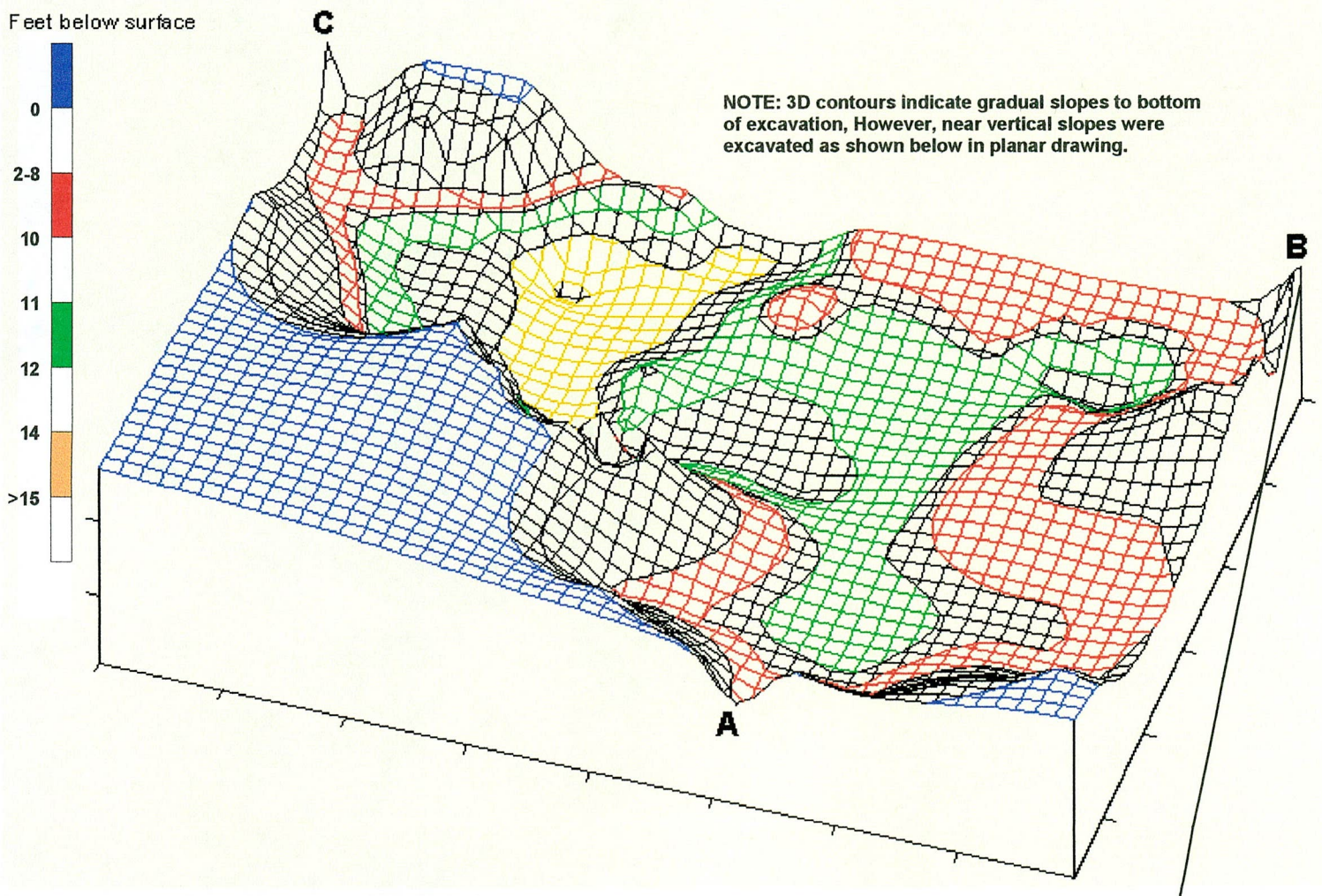
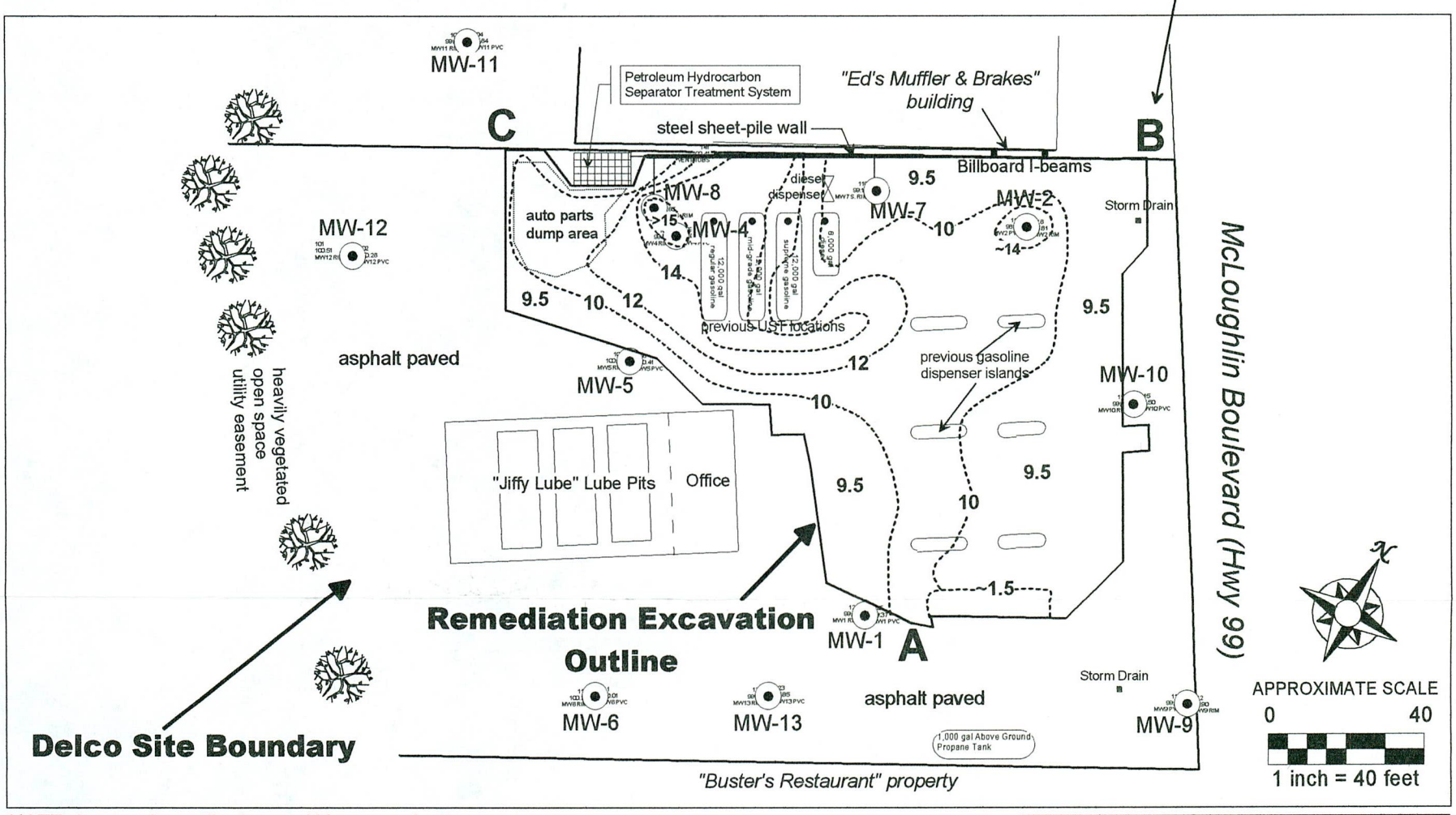


Figure 18 – CONTACT FILL AND UPPER PART OF SILTY CLAY



Note: Approximately 5,006 tons were excavated and disposed at TPS Technologies, Portland, OR, excluding the auto parts dump area (near "C"). Based on the following drawings, it is estimated that approximately 10,700 cubic yards were excavated, including the auto parts dump area.





NOTE: four monitor wells shown within excavation were abandoned by overexcavation to total depth with a trackhoe.

10 — Approximate final excavated depth contour: feet bgs

MW-13 — Monitor Well Location

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Figure 19
EXCAVATION MAP
FINAL DEPTHS

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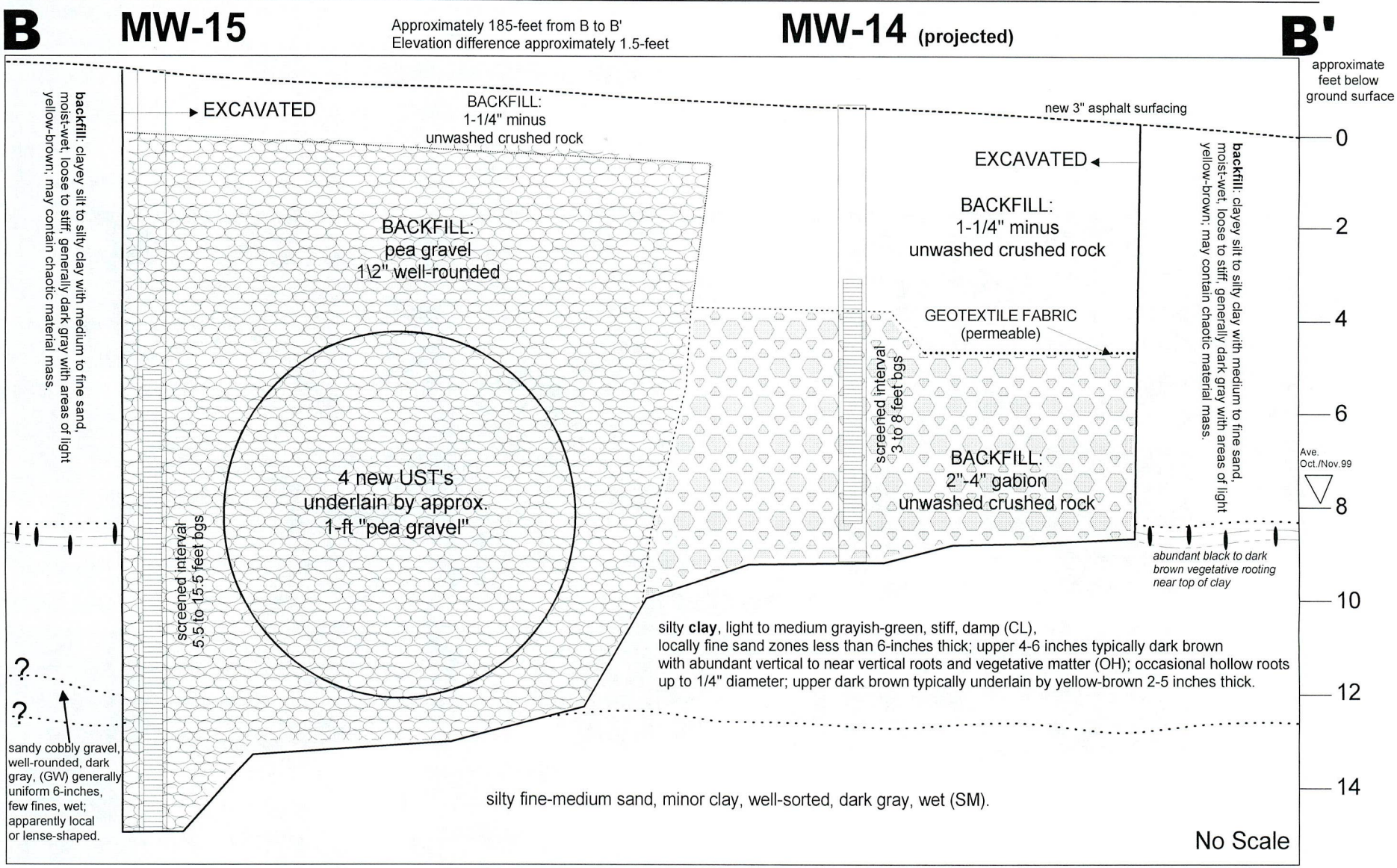

NOTES:
MW-14: between previous monitor wells MW-2 and MW-7.
MW-15: production of downgradient groundwater to treatment facility installed near previous monitor well MW-8 location.

Figure 20
POST-EXCAVATION
CROSS-SECTION B-B'

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Milwaukie, OR

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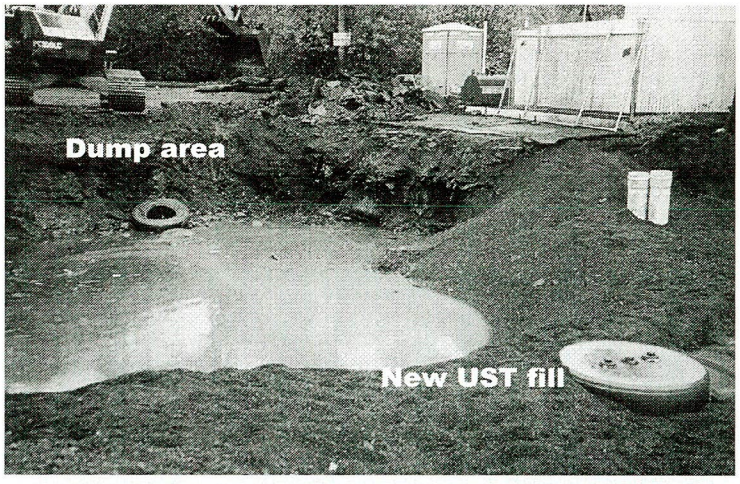
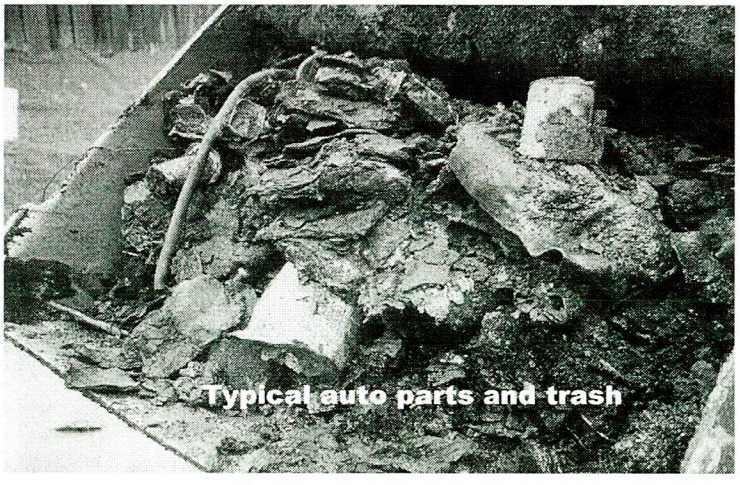
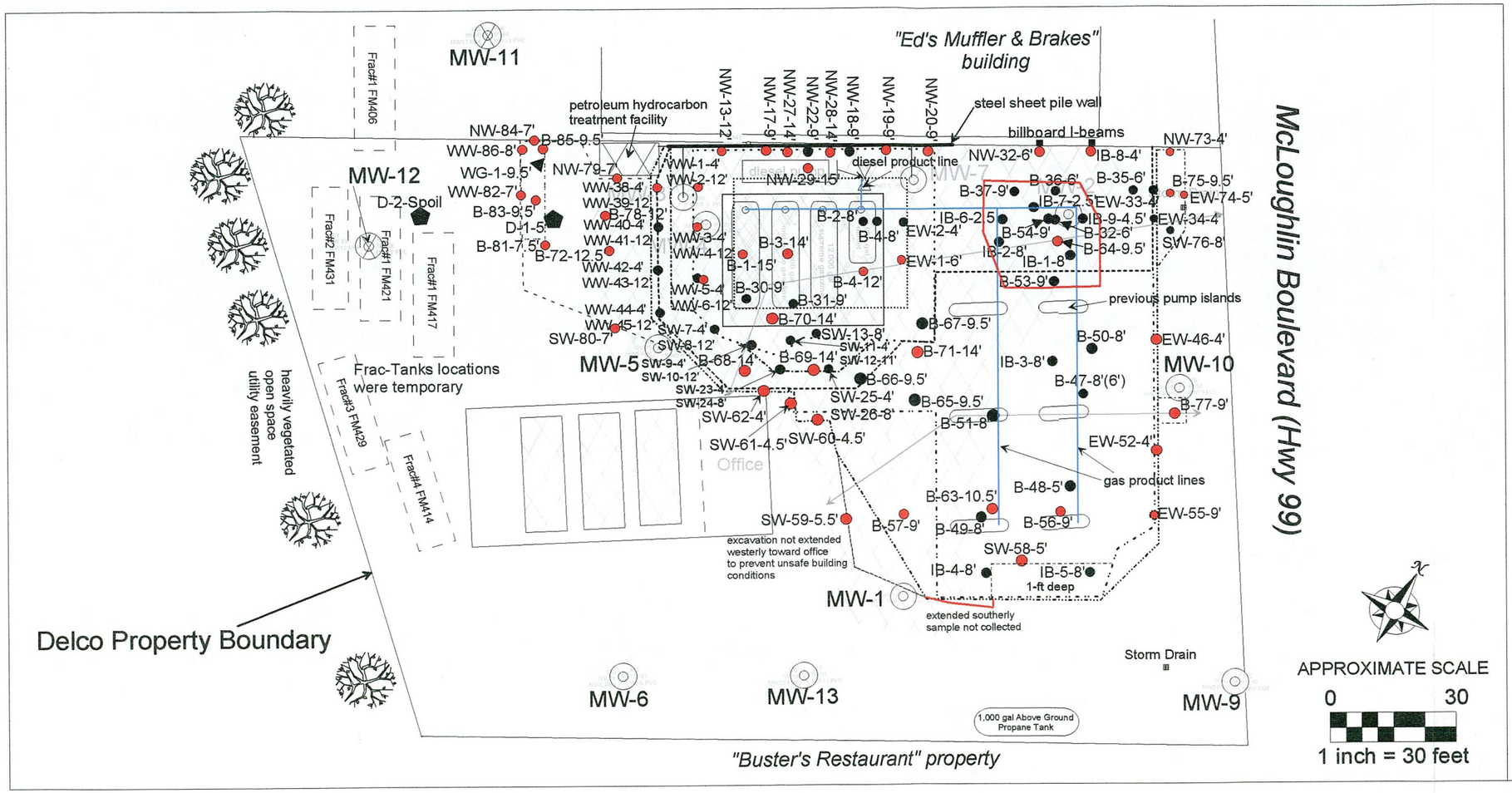
Battle Ground, WA

Project No. 990621

Figure 21 – AUTO PARTS AND BUILDING MATERIALS DUMP AREA







APPROXIMATE SCALE
0 30
1 inch = 30 feet

LEGEND

- Estimated area of groundwater contamination
- Monitor well location MW-13 (surveyed by Barbiari)
- pipeline ~3-ft wide sand-filled trench

Approximate excavation outline:

- 10/11/99
- 10/14/99
- 10/18/99
- 10/21/99
- 10/25/99
- 10/28/99
- 11/4/99

11/9/99 - began backfill

- 12/7/99
- 12/10/99 auto parts trench
- 12/21/99 final

- Confirmation soil sample representative of excavation extent or limit of contamination.
- Excavation deepened greater than approx. 9.5-ft. to depths where visual observation of soil indicated non-contamination. Additional confirmation sampling was not performed.

NOTES:
1) Excavated monitor wells, UST locations, groundwater contamination, dispenser islands, and pipelines shown for reference.
2) Samples IB-1-8', IB-2-8', IB-3-8', IB-4-8', and IB-5-8' collected from bottom of a trackhoe pit before excavation.
3) Samples collected during excavation labeled according to area: B-bottom; NW-north wall; EW-east wall; SW-south wall; WW-west wall; IB-pump islands; D-auto-dump; and WG-water grab.

Figure 22
EXCAVATION SAMPLE LOCATION MAP
DELCO PETROLEUM CO. LLC
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Milwaukie, OR

GeoPro Geologic Services
Battle Ground, WA
Project No. 990621

GeoPro	Project:	Delco	Sampled: 10/11/99 to 10/12/99
P.O. Box 26	Project Number:	990621	Received: 10/12/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 10/15/99 16:43

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-1-15'	P910226-01	Soil	10/11/99
SW-11-4'	P910226-02	Soil	10/12/99
SW-12-11'	P910226-03	Soil	10/12/99
SW-7-4'	P910226-04	Soil	10/12/99
SW-8-12'	P910226-05	Soil	10/12/99
WW-5-4'	P910226-06	Soil	10/12/99
WW-6-12'	P910226-07	Soil	10/12/99
WW-3-4'	P910226-08	Soil	10/12/99
WW-4-12'	P910226-09	Soil	10/12/99
WW-1-4'	P910226-10	Soil	10/12/99
WW-2-12'	P910226-11	Soil	10/12/99
NW-13-12'	P910226-12	Soil	10/12/99
B-2-8'	P910226-13	Soil	10/12/99
SW-9-4'	P910226-14	Soil	10/12/99
SW-10-12'	P910226-15	Soil	10/12/99
B-3-14'	P910226-16	Soil	10/12/99
SW-13-8'	P910226-17	Soil	10/12/99
B-4-12'	P910226-18	Soil	10/12/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	10/12/99
P.O. Box 26	Project Number:	990621	Received:	10/12/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/16/99 11:28

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
SW-7-4'	P910226-04	Soil	10/12/99
WW-5-4'	P910226-06	Soil	10/12/99
SW-9-4'	P910226-14	Soil	10/12/99
SW-13-8'	P910226-17	Soil	10/12/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/15/99
P.O. Box 26	Project Number:	990621	Received: 10/15/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 10/22/99 11:11

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
IB-1-8'	P910307-01	Soil	10/15/99
IB-2-8'	P910307-02	Soil	10/15/99
IB-3-8'	P910307-03	Soil	10/15/99
IB-4-8'	P910307-04	Soil	10/15/99
IB-5-8'	P910307-05	Soil	10/15/99

GeoPro	Project:	Delco	Sampled:	10/11/99 to 10/12/99
P.O. Box 26	Project Number:	990621	Received:	10/12/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/15/99 09:30

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-1-15'	P910226-01	Soil	10/11/99
SW-11-4'	P910226-02	Soil	10/12/99
SW-12-11'	P910226-03	Soil	10/12/99
SW-7-4'	P910226-04	Soil	10/12/99
SW-8-12'	P910226-05	Soil	10/12/99
WW-5-4'	P910226-06	Soil	10/12/99
WW-6-12'	P910226-07	Soil	10/12/99
WW-3-4'	P910226-08	Soil	10/12/99
WW-4-12'	P910226-09	Soil	10/12/99
WW-1-4'	P910226-10	Soil	10/12/99
WW-2-12'	P910226-11	Soil	10/12/99
NW-13-12'	P910226-12	Soil	10/12/99
B-2-8'	P910226-13	Soil	10/12/99
SW-9-4'	P910226-14	Soil	10/12/99
SW-10-12'	P910226-15	Soil	10/12/99
B-3-14'	P910226-16	Soil	10/12/99
SW-13-8'	P910226-17	Soil	10/12/99
B-4-12'	P910226-18	Soil	10/12/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/14/99
P.O. Box 26	Project Number:	990621 / COC 991014	Received: 10/14/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 10/18/99 13:39

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
NW-17-9'	P910271-01	Soil	10/14/99
NW-18-9'	P910271-02	Soil	10/14/99
NW-19-9'	P910271-03	Soil	10/14/99
NW-20-9'	P910271-04	Soil	10/14/99
NW-22-9'	P910271-05	Soil	10/14/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	10/14/99
P.O. Box 26	Project Number:	990621 / COC 991014	Received:	10/14/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/19/99 13:03

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
NW-18-9'	P910271-02	Soil	10/14/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/13/99
P.O. Box 26	Project Number:	990621	Received: 10/13/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 10/15/99 16:40

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-4-8'	P910252-01	Soil	10/13/99
EW-1-6'	P910252-02	Soil	10/13/99
EW-2-4'	P910252-03	Soil	10/13/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/13/99
P.O. Box 26	Project Number:	990621	Received: 10/13/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 10/18/99 13:43

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
EW-1-6'	P910252-02	Soil	10/13/99
EW-2-4'	P910252-03	Soil	10/13/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	10/21/99
P.O. Box 26	Project Number:	990621	Received:	10/21/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/25/99 16:24

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-32-6'	P910427-01	Soil	10/21/99
EW-33-4'	P910427-02	Soil	10/21/99
EW-34-4'	P910427-03	Soil	10/21/99
B-35-6'	P910427-04	Soil	10/21/99
B-36-6'	P910427-05	Soil	10/21/99
B-37-9'	P910427-06	Soil	10/21/99
WW-38-4'	P910427-07	Soil	10/21/99
WW-39-12'	P910427-08	Soil	10/21/99
WW-40-4'	P910427-09	Soil	10/21/99
WW-41-12'	P910427-10	Soil	10/21/99
WW-42-4'	P910427-11	Soil	10/21/99
WW-43-12'	P910427-12	Soil	10/21/99
WW-44-4'	P910427-13	Soil	10/21/99
WW-45-12'	P910427-14	Soil	10/21/99

GeoPro	Project:	Delco	Sampled:	10/11/99 to 10/12/99
P.O. Box 26	Project Number:	990621	Received:	10/12/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/19/99 15:49

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-1-15'	P910226-01	Soil	10/11/99
SW-11-4'	P910226-02	Soil	10/12/99
SW-12-11'	P910226-03	Soil	10/12/99
SW-7-4'	P910226-04	Soil	10/12/99
SW-8-12'	P910226-05	Soil	10/12/99
WW-5-4'	P910226-06	Soil	10/12/99
WW-6-12'	P910226-07	Soil	10/12/99
WW-3-4'	P910226-08	Soil	10/12/99
WW-4-12'	P910226-09	Soil	10/12/99
WW-1-4'	P910226-10	Soil	10/12/99
WW-2-12'	P910226-11	Soil	10/12/99
NW-13-12'	P910226-12	Soil	10/12/99
B-2-8'	P910226-13	Soil	10/12/99
SW-9-4'	P910226-14	Soil	10/12/99
SW-10-12'	P910226-15	Soil	10/12/99
B-3-14'	P910226-16	Soil	10/12/99
SW-13-8'	P910226-17	Soil	10/12/99
B-4-12'	P910226-18	Soil	10/12/99

Sara McClurg, Project Manager

GeoPro		Project:	Delco	Sampled:	10/19/99
P.O. Box 26		Project Number:	990621	Received:	10/19/99
Battle Ground, WA 98604		Project Manager:	Richard Kent	Reported:	10/21/99 09:52

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
IB-6-2.5'	P910359-01	Soil	10/19/99
IB-7-2.5'	P910359-02	Soil	10/19/99
IB-8-4'	P910359-03	Soil	10/19/99
NW-32-6'	P910359-04	Soil	10/19/99
IB-9-4.5'	P910359-05	Soil	10/19/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/19/99
P.O. Box 26	Project Number:	990621	Received: 10/19/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 10/27/99 11:25

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
IB-6-2.5'	P910359-01	Soil	10/19/99
IB-7-2.5'	P910359-02	Soil	10/19/99
IB-8-4'	P910359-03	Soil	10/19/99
NW-32-6'	P910359-04	Soil	10/19/99
IB-9-4.5'	P910359-05	Soil	10/19/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	10/18/99
P.O. Box 26	Project Number:	990621	Received:	10/18/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/27/99 10:44

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
SW-23-4'	P910331-01	Soil	10/18/99
SW-24-8'	P910331-02	Soil	10/18/99
SW-25-4'	P910331-03	Soil	10/18/99
SW-26-8'	P910331-04	Soil	10/18/99
NW-27-14'	P910331-05	Soil	10/18/99
NW-28-14'	P910331-06	Soil	10/18/99
NW-29-15'	P910331-07	Soil	10/18/99
B-30-9'	P910331-08	Soil	10/18/99
B-31-9'	P910331-09	Soil	10/18/99
PW-1	P910331-10	Water	10/18/99
PW-2	P910331-11	Water	10/18/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	10/19/99
P.O. Box 26	Project Number:	990621	Received:	10/19/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/20/99 11:45

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
IB-6-2.5'	P910359-01	Soil	10/19/99
IB-7-2.5'	P910359-02	Soil	10/19/99
IB-8-4'	P910359-03	Soil	10/19/99
NW-32-6'	P910359-04	Soil	10/19/99
IB-9-4.5'	P910359-05	Soil	10/19/99

GeoPro	Project:	Delco	Sampled: 10/26/99
P.O. Box 26	Project Number:	990621	Received: 10/26/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 11/8/99 08:47

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-49-8'	P910522-01	Soil	10/26/99
B-50-8'	P910522-02	Soil	10/26/99
B-51-8'	P910522-03	Soil	10/26/99
EW-52-4'	P910522-04	Soil	10/26/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	10/18/99
P.O. Box 26	Project Number:	990621	Received:	10/18/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	10/20/99 11:40

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
SW-23-4'	P910331-01	Soil	10/18/99
SW-24-8'	P910331-02	Soil	10/18/99
SW-25-4'	P910331-03	Soil	10/18/99
SW-26-8'	P910331-04	Soil	10/18/99
NW-27-14'	P910331-05	Soil	10/18/99
NW-28-14'	P910331-06	Soil	10/18/99
NW-29-15'	P910331-07	Soil	10/18/99
B-30-9'	P910331-08	Soil	10/18/99
B-31-9'	P910331-09	Soil	10/18/99
PW-1	P910331-10	Water	10/18/99
PW-2	P910331-11	Water	10/18/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Sara McClurg, Project Manager

GeoPro		Project:	Delco	Sampled:	10/26/99
P.O. Box 26		Project Number:	990621	Received:	10/26/99
Battle Ground, WA 98604		Project Manager:	Richard Kent	Reported:	10/28/99 11:04

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-49-8'	P910522-01	Soil	10/26/99
B-50-8'	P910522-02	Soil	10/26/99
B-51-8'	P910522-03	Soil	10/26/99
EW-52-4'	P910522-04	Soil	10/26/99

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Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/26/99
P.O. Box 26	Project Number:	990621	Received: 10/26/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 11/2/99 08:01

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-49-8'	P910522-01	Soil	10/26/99
B-50-8'	P910522-02	Soil	10/26/99
B-51-8'	P910522-03	Soil	10/26/99
EW-52-4'	P910522-04	Soil	10/26/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/25/99
P.O. Box 26	Project Number:	990621	Received: 10/25/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 10/29/99 08:32

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
FM414-10-25	P910490-01	Water	10/25/99
FM421-10-25	P910490-02	Water	10/25/99
FM431-10-25	P910490-03	Water	10/25/99
EW-46-4'	P910490-04	Soil	10/25/99
B-47-8'	P910490-05	Soil	10/25/99
B-48-5'	P910490-06	Soil	10/25/99

GeoPro	Project:	Delco	Sampled: 10/25/99
P.O. Box 26	Project Number:	990621	Received: 10/25/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 11/4/99 08:48

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
EW-46-4'	P910490-04	Soil	10/25/99
B-47-8'	P910490-05	Soil	10/25/99
B-48-5'	P910490-06	Soil	10/25/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	11/15/99 to 11/17/99
P.O. Box 26	Project Number:	990621	Received:	11/17/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	11/18/99 15:13

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-67-9.5'	P911357-01	Soil	11/15/99
B-68-14'	P911357-02	Soil	11/17/99
B-69-14'	P911357-03	Soil	11/17/99
B-70-14'	P911357-04	Soil	11/17/99
B-71-14'	P911357-05	Soil	11/17/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 10/21/99
P.O. Box 26	Project Number:	990621	Received: 10/21/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 11/4/99 16:59

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-32-6'	P910427-01	Soil	10/21/99
EW-33-4'	P910427-02	Soil	10/21/99
EW-34-4'	P910427-03	Soil	10/21/99
B-35-6'	P910427-04	Soil	10/21/99
B-36-6'	P910427-05	Soil	10/21/99
B-37-9'	P910427-06	Soil	10/21/99
WW-38-4'	P910427-07	Soil	10/21/99
WW-39-12'	P910427-08	Soil	10/21/99
WW-40-4'	P910427-09	Soil	10/21/99
WW-41-12'	P910427-10	Soil	10/21/99
WW-42-4'	P910427-11	Soil	10/21/99
WW-43-12'	P910427-12	Soil	10/21/99
WW-44-4'	P910427-13	Soil	10/21/99
WW-45-12'	P910427-14	Soil	10/21/99

Sara McClurg, Project Manager

GeoPro	Project: Delco	Sampled: 11/4/99 to 11/9/99
P.O. Box 26	Project Number: 990621	Received: 11/9/99
Battle Ground, WA 98604	Project Manager: Richard Kent	Reported: 11/18/99 16:17

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
SW-58-5'	P911191-01	Soil	11/4/99
SW-59-5.5'	P911191-02	Soil	11/4/99
SW-60-4.5'	P911191-03	Soil	11/4/99
SW-61-4.5'	P911191-04	Soil	11/4/99
SW-62-4'	P911191-05	Soil	11/4/99
B-63-9.5'	P911191-06	Soil	11/9/99

Sara McClurg, Project Manager

GeoPro	Project: Delco	Sampled: 11/10/99
P.O. Box 26	Project Number: 990621	Received: 11/10/99
Battle Ground, WA 98604	Project Manager: Richard Kent	Reported: 11/11/99 13:30

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-64-9.5	P911221-01	Soil	11/10/99
B-65-9.5	P911221-02	Soil	11/10/99
B-66-9.5	P911221-03	Soil	11/10/99

Sara McClurg, Project Manager

GeoPro		Project:	Delco	Sampled:	10/28/99
P.O. Box 26		Project Number:	990621	Received:	10/28/99
Battle Ground, WA 98604		Project Manager:	Richard Kent	Reported:	11/4/99 08:55

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-53-9'	P910593-01	Soil	10/28/99
B-54-9'	P910593-02	Soil	10/28/99
EW-55-9'	P910593-03	Soil	10/28/99
B-56-9'	P910593-04	Soil	10/28/99
B-57-9'	P910593-05	Soil	10/28/99

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Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled:	11/4/99 to 11/9/99
P.O. Box 26	Project Number:	990621	Received:	11/9/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	11/11/99 13:28

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
SW-58-5'	P911191-01	Soil	11/4/99
SW-59-5.5'	P911191-02	Soil	11/4/99
SW-60-4.5'	P911191-03	Soil	11/4/99
SW-61-4.5'	P911191-04	Soil	11/4/99
SW-62-4'	P911191-05	Soil	11/4/99
B-63-9.5'	P911191-06	Soil	11/9/99

Sara McClurg, Project Manager

GeoPro	Project: Delco	Sampled: 12/2/99
P.O. Box 26	Project Number: 990621	Received: 12/2/99
Battle Ground, WA 98604	Project Manager: Richard Kent	Reported: 12/13/99 14:23

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
D-2-SPOIL	P912053-06	Soil	12/2/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled: 10/28/99
P.O. Box 26	Project Number:	990621	Received: 10/28/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 11/2/99 07:58

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-53-9'	P910593-01	Soil	10/28/99
B-54-9'	P910593-02	Soil	10/28/99
EW-55-9'	P910593-03	Soil	10/28/99
B-56-9'	P910593-04	Soil	10/28/99
B-57-9'	P910593-05	Soil	10/28/99

The results in this report apply to the samples analyzed in accordance with the chain of custody documen
This analytical report must be reproduced in its entire

Sara McClurg, Project Manager

GeoPro	Project: Delco	Sampled: 12/2/99
P.O. Box 26	Project Number: 990621	Received: 12/2/99
Battle Ground, WA 98604	Project Manager: Richard Kent	Reported: 12/8/99 15:10

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
D-1-5C	P912053-05	Soil	12/2/99
D-2-SPOIL	P912053-06	Soil	12/2/99

Sara McClurg, Project Manager

GeoPro	Project:	Delco	Sampled: 12/2/99
P.O. Box 26	Project Number:	990621	Received: 12/2/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/13/99 10:43

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-78-12'	P912053-01	Soil	12/2/99
NW-79-7'	P912053-02	Soil	12/2/99
SW-80-7'	P912053-03	Soil	12/2/99
B-81-7.5'	P912053-04	Soil	12/2/99
D-1-5C	P912053-05	Soil	12/2/99
D-2-SPOIL	P912053-06	Soil	12/2/99

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled: 11/29/99 to 11/30/99
P.O. Box 26	Project Number:	990621	Received: 12/1/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/10/99 16:46

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
B-72-12.5'	P912030-01	Soil	11/29/99
NW-73-4'	P912030-02	Soil	11/30/99
EW-74-5'	P912030-03	Soil	11/30/99
B-75-9.5'	P912030-04	Soil	11/30/99
SW-76-8'	P912030-05	Soil	11/30/99
B-77-9'	P912030-06	Soil	11/30/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled: 12/2/99
P.O. Box 26	Project Number:	990621	Received: 12/2/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/13/99 12:31

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
D-2-SPOIL	P912053-06	Soil	12/2/99

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled: 12/10/99
P.O. Box 26	Project Number:	990621	Received: 12/10/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/16/99 16:38

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
WW-82-7'	P912217-01	Soil	12/10/99
B-83-9.5'	P912217-02	Soil	12/10/99
NW-84-7'	P912217-03	Soil	12/10/99
B-85-9.5	P912217-04	Soil	12/10/99
WW-86-8'	P912217-05	Soil	12/10/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Crystal Burkholder, Project Manager

GeoPro Geologic Services	Project:	Delco	Sampled: 12/10/99
P.O. Box 26	Project Number:	990621	Received: 12/10/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/29/99 09:34

ANALYTICAL REPORT FOR SAMPLES:

REVISED REPORT 12/29/99

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
WW-82-7'	P912217-01	Soil	12/10/99
B-83-9.5'	P912217-02	Soil	12/10/99
NW-84-7'	P912217-03	Soil	12/10/99
B-85-9.5	P912217-04	Soil	12/10/99
WW-86-8'	P912217-05	Soil	12/10/99
WG-1-9.5'	P912217-06	Water	12/10/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document
This analytical report must be reproduced in its entirety

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled: 12/10/99
P.O. Box 26	Project Number:	990621	Received: 12/10/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/16/99 08:29

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
WG-1-9.5'	P912217-06	Water	12/10/99

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled: 12/10/99
P.O. Box 26	Project Number:	990621	Received: 12/10/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/16/99 15:53

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
WW-82-7'	P912217-01	Soil	12/10/99
B-83-9.5'	P912217-02	Soil	12/10/99
NW-84-7'	P912217-03	Soil	12/10/99
B-85-9.5	P912217-04	Soil	12/10/99
WW-86-8'	P912217-05	Soil	12/10/99
WG-1-9.5'	P912217-06	Water	12/10/99

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled:	12/10/99
P.O. Box 26	Project Number:	990621	Received:	12/10/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported:	12/15/99 15:57

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
WW-82-7'	P912217-01	Soil	12/10/99
B-83-9.5'	P912217-02	Soil	12/10/99
NW-84-7'	P912217-03	Soil	12/10/99
B-85-9.5	P912217-04	Soil	12/10/99
WW-86-8'	P912217-05	Soil	12/10/99
WG-1-9.5'	P912217-06	Water	12/10/99

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Crystal Burkholder, Project Manager

GeoPro	Project:	Delco	Sampled: 12/10/99
P.O. Box 26	Project Number:	990621	Received: 12/10/99
Battle Ground, WA 98604	Project Manager:	Richard Kent	Reported: 12/15/99 18:12

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
WW-82-7'	P912217-01	Soil	12/10/99
B-83-9.5'	P912217-02	Soil	12/10/99
NW-84-7'	P912217-03	Soil	12/10/99
B-85-9.5	P912217-04	Soil	12/10/99
WW-86-8'	P912217-05	Soil	12/10/99
WG-1-9.5'	P912217-06	Water	12/10/99

Crystal Burkholder, Project Manager

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

COC 990621 COPY

CHAIN OF CUSTODY REPORT

Work Order #: P910266

CLIENT: GeoPro
REPORT TO: GeoPro
ADDRESS: P.O. Box 26, Battle Ground WA 98604
PHONE: 360-666-1465 FAX: email: geopro@pacifier.com

INVOICE TO: Delco Petroleum Co. LLC, 17873 SE McLoughlin Blvd, Milwaukie OR 97267

PO NUMBER:

PROJECT NAME: Delco
PROJECT NUMBER: 990621
SAMPLED BY: R Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | (2) | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	gasoline	diesel	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA ID
1.	B-1-15'	10/11/99 14:30	✓	✓	✓	✓	S	1		
2.	SW-11-4'	10/12/99 1215								
3.	SW-12-11'	10/12/99 1220								
4.	SW-7-4'	10/12/99 1230								
5.	SW-8-12'	10/12/99 1235								
6.	WW-5-4'	10/12/99 1240								
7.	WW-6-12'	10/12/99 1245								
8.	WW-3-4'	10/12/99 1247								
9.	WW-4-12'	10/12/99 1250								
10.	WW-1-4'	10/12/99 1300								
11.	WW-2-12'	10/12/99 1310								
12.	WW-13-13'	10/12/99 1312								
13.	B-2-8'	10/12/99 1510								
14.	SW-9-4'	10/12/99 1450								
15.	SW-10-12'	10/12/99 1455								

RELINQUISHED BY: PRINT NAME: Richard Kent FIRM: GeoPro DATE: 10/12/99 TIME: 1515
RECEIVED BY: PRINT NAME: David Lorenzen FIRM: NCA DATE: 10/12/99 TIME: 15:15

RELINQUISHED BY: PRINT NAME: FIRM: DATE: TIME:
RECEIVED BY: PRINT NAME: Bob Fahrholz FIRM: NCA DATE: 10/12/99 TIME: 1645

ADDITIONAL REMARKS:

TEMP:

COC REV 3/99

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

COC 991012 2of2

CHAIN OF CUSTODY REPORT

Work Order #: P910226

CLIENT: GeoPro
REPORT TO: GeoPro
ADDRESS: P.O. Box 26 Battle Ground WA
PHONE: FAX: email geopro@pacifier.com

INVOICE TO: Delco Petroleum Co. LLC
17873 SE McLoughlin Blvd
Milwaukie OR 97267
P.O. NUMBER:

PROJECT NAME: Delco
PROJECT NUMBER: 990621
SAMPLED BY: R Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses — STD. | 5 | 4 | 3 | 2 | 1 | <1 | STD.

OTHER — Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	gas X	diesel X	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NC. ID
1.	B-3 14'	10/12/99 1500	X	X	X	X	S	1		
2.	SW-13-8'	10/12/99 1440	X	X	X	X	S	1		
3.	B-4-12'	10/12/99 1445	X	X	X	X	S	1		
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										

RELINQUISHED BY: Richard Kent — FIRM: GeoPro — DATE: 10/12/99 — TIME: 1515
RECEIVED BY: [illegible] — PRINT NAME: [illegible] — FIRM: NCA — DATE: 10/12/99 — TIME: 15:15

RELINQUISHED BY: — PRINT NAME: — FIRM: — DATE: — TIME:
RECEIVED BY: [illegible] — PRINT NAME: Bob Faliskoln — FIRM: NCA — DATE: 10/12/99 — TIME: 16:45

ADDITIONAL REMARKS:

TEMP: 2 °C

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: P910271

CLIENT: Geo Pro

REPORT TO: Geo Pro
ADDRESS: P.O. Box 26
Battle Ground WA 98604
PHONE: 360 666 1465 email/FAX: geopro@pacifier.com

INVOICE TO: Delco Petroleum Co. LLC
17873 SE McLoughlin Blvd
Milwaukie OR

P.O. NUMBER: COC 991014

PROJECT NAME: DELCO
PROJECT NUMBER: 990621
SAMPLED BY: R Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | (2) | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES: BTEX	Gas x-fd	Diesel x-fd	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCP ID
1.	NW-17-9'	10/14/99 14:38	X	X	X	X	S	1		
2.	NW-18-9'	14:55								
3.	NW-19-9'	15:02								
4.	NW-20-9'	15:17								
5.	~~NW-21-9'~~	NW								
6.	~~NW-22-9'~~									
7.	NW-22-9'	10/14/99 15:30	X	X	X	X	S	1		
8.										
9.										
10.	5 Samples									
11.										
12.										
13.										
14.										
15.										

RELINQUISHED BY: PRINT NAME: Richard Kent FIRM: GeoPro DATE: 10/14/99 TIME: 535
RECEIVED BY: PRINT NAME: David Livingston FIRM: NEA DATE: 10/14/99 TIME: 15:35

RELINQUISHED BY: PRINT NAME: David Livingston FIRM: NEA DATE: 10/14/99 TIME: 16:10
RECEIVED BY: PRINT NAME: Bob Fulstone FIRM: NCA DATE: 10/14/99 TIME: 1610

ADDITIONAL REMARKS:

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COC 991013

CHAIN OF CUSTODY REPORT

Work Order #: 991052

CLIENT: GeoPro

REPORT TO: GeoPro

ADDRESS: P.O. Box 26
Battle Ground WA 98604

PHONE: 360-666-1465 FAX: and geopro@pacifier.com

INVOICE TO: Delco Petroleum Co. LLC
17873 SE McLoughlin Blvd
Milwaukie OR

P.O. NUMBER:

PROJECT NAME: DELCO

PROJECT NUMBER: 990621

SAMPLED BY: R Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | (2) | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Gas x-fld	Diesel x-fld	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA ID
1. B-4-8'	10/13/99 1515					S	1		
2. EW-1-6'	10/13/99 1517					S	1		
3. EW-2-4'	10/13/99 1519					S	1		
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									

REQUESTED ANALYSES

RELINQUISHED BY: PRINT NAME: Richard Kent FIRM: GeoPro DATE: 10/13/99 TIME: 15:55

RECEIVED BY: PRINT NAME: David Langeway FIRM: NCA DATE: 10/13/99 TIME: 15:55

RELINQUISHED BY: PRINT NAME: David Langeway FIRM: NCA DATE: 10/13/99 TIME: 16:30

RECEIVED BY: PRINT NAME: Evie Morgan FIRM: NCA DATE: 10/13 TIME: 16:45

ADDITIONAL REMARKS:

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CHAIN OF CUSTODY REPORT

Work Order #: P910331

CLIENT: GeoPro
REPORT TO: GeoPro
ADDRESS: PO Box 26
Battle Ground WA geopro@pacifier.com
PHONE: 3606661465 FAX: 3606668915

INVOICE TO: Delco Petroleum Co. LLC
17873 SE McLoughlin Blvd
Milwaukie OR

P.O. NUMBER:

PROJECT NAME: DELCO
PROJECT NUMBER: 990621
SAMPLED BY: R. Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Gas Xtd	Diesel Xtd	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCD ID
1.	SW-23-4'	10/18/99 1300	X	X	X	X	S	1		
2.	SW-24-8'	1305					S	1		
3.	SW-25-4'	1310					S	1		
4.	SW-26-8'	1315					S	1		
5.	NW-27-14'	10/18/99 1442					S	1		
6.	NW-28-14'	10/18/99 1500					S	1		
7.	NW-29-15	10/18/99 1450					S	1		
8.	B-30-9'	10/18/99 1515					S	1		
9.	B-31-9'	10/18/99 1516					S	1		
10.	PW-1	10/18/99 1525					W	3	OR Lic HR 22423	
11.	PW-2	10/18/99 1526					W	3	FM431	
12.										
13.										
14.										
15.										

RELINQUISHED BY: PRINT NAME: Richard Kent FIRM: GeoPro DATE: 10/18/99 TIME: 1600
RECEIVED BY: PRINT NAME: [illegible] FIRM: NCA DATE: 10-18-99 TIME: 1600

RELINQUISHED BY: PRINT NAME: FIRM: DATE: TIME:
RECEIVED BY: J. ROBERTS PRINT NAME: JROBERTC FIRM: NCA DATE: 10/18/99 TIME: 1800

ADDITIONAL REMARKS:

TEMP:

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CHAIN OF CUSTODY REPORT

Work Order #: 9910307

CLIENT: GeoPro Geologic Services	INVOICE TO: Delco Petroleum Co. LLC 17873 SE McLaughlin Blvd Milwaukie OR ATTN Mr. Sahi
REPORT TO: GeoPro ADDRESS: P.O. Box 26 Battle Ground WA 98604	
PHONE: 3606661465 FAX: geopro@pacifier.com	P.O. NUMBER:
PROJECT NAME: DELCO PROJECT NUMBER: 990621 SAMPLED BY: R Kent	

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses (STD.): 5 | 4 | 3 | (2) | 1 | <1

OTHER (STD.) Please Specify _____

*Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Gas X+d	Diesel X+d	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCTO ID
1. IB-1-8'	10/15/99 1515	↓	↓	↓	↓	S	1		
2. IB-2-8'	1508					↓	↓		
3. IB-3-8'	1500								
4. IB-4-8'	1415								
5. IB-5-8'	1435								
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									

RELINQUISHED BY:		DATE: 10/15/99	RECEIVED BY: David Langevin
PRINT NAME: Richard Kent	FIRM: GeoPro	TIME: 1520	PRINT NAME: DAVID LANGEVIN FIRM: NCA TIME: 1530
RELINQUISHED BY: David Langevin		DATE: 10/15/99	RECEIVED BY: Bob Fakkema DATE: 10/15
PRINT NAME: David Langevin	FIRM: NCC	TIME: 15:55	PRINT NAME: Bob Fakkema FIRM: NCA TIME: 1600

ADDITIONAL REMARKS:

TEMP:

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

COC 991019

CHAIN OF CUSTODY REPORT

Work Order #: P910359

CLIENT: GeoPro
REPORT TO: GeoPro
ADDRESS: PO Box 26, Battle Ground WA 98604, GeoPro@Pacifier.com
PHONE: 360 666 1465 FAX: 360 666 8915

INVOICE TO: Delco Petroleum Co. LLC, 17873 SE McLoughlin Blvd, Milwaukie OR

P.O. NUMBER:

PROJECT NAME: DELCO
PROJECT NUMBER: 990621
SAMPLED BY: R. Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Gas Xtd	Diesel Xtd	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	LAB ID
1.	FB-6-2.5'	10/19/99 0945	X	X	X	X	S	1	Free Product in soil (*)	
2.	FB-7-2.5'	10/19/99 0945	X	X	X	X	S	1	Free Product in soil (*)	
3.	FB-8-4'	10/19/99 1110	X	X	X	X	S	1		
4.	NW-32-6'	10/19/99 1155	X	X	X	X	S	1		
5.	FB-9-4.5'	10/19/99 1410	X	X	X	X	S	1	strong odor *	
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										

RELINQUISHED BY:		DATE: 10/19/99	RECEIVED BY:		DATE: 10/19/99
PRINT NAME: Richard Kent	FIRM: GeoPro	TIME: 1510	PRINT NAME: DAVID LANGWAY	FIRM: NCA	TIME: 15:10
RELINQUISHED BY:		DATE: 10/19/99	RECEIVED BY:		DATE: 10-19-99
PRINT NAME: DAVID LANGWAY	FIRM: NCA	TIME: 16:20	PRINT NAME: Sara McClurg	FIRM: NCA	TIME: 1620

ADDITIONAL REMARKS:

TEMP: 18.5

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

COC 991021

CHAIN OF CUSTODY REPORT

Work Order #: 9910427

CLIENT: GeoPro

REPORT TO: GeoPro

ADDRESS: P.O. Box 26
Battle Ground WA 98604

PHONE: 3606661465 FAX: geopro@pacifier.com

INVOICE TO: Delco Petroleum Co. LLC
17873 SE McLoughlin Blvd.
Milwaukie OR

P.O. NUMBER:

PROJECT NAME: DELCO

PROJECT NUMBER: 990621

SAMPLED BY: R. Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTXE	Gas xtd	Diesel xtd	MTBE	pH	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA LAB ID
1.	B-32-6'	10/21/99 1509	X	X	X	X		S	1		
2.	EW-33-4'	1501									
3.	EW-34-4'	1503									
4.	B-35-6'	1519									
5.	B-36-6'	1505									
6.	B-37-9'	1513									
7.	WW-38-4'	1535									
8.	WW-39-12'	1544									
9.	WW-40-4'	1534									
10.	WW-41-12'	1532									
11.	WW-42-4'	1538									
12.	~~WW-43-12'~~ Rec'd										
13.	~~WW-44-4'~~ Rec'd										
14.	~~WW-45-12'~~ Rec'd										
15.											

RELINQUISHED BY: PRINT NAME: Richard Kent FIRM: GeoPro DATE: 10/21/99 TIME: 1553

RECEIVED BY: PRINT NAME: Amy Mangler FIRM: NCA DATE: 10-21-99 TIME: 1805

RELINQUISHED BY: PRINT NAME: Amy Mangler FIRM: NCA DATE: 10-21-99 TIME:

RECEIVED BY: Jessica Roberts PRINT NAME: JROBERTS FIRM: NCA DATE: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 2

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9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 FAX 906-9210 ✓
20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

COC991021 COPY

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: GeoPro

REPORT TO:

ADDRESS:

PHONE: FAX:

INVOICE TO: Delco

P.O. NUMBER:

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 (circled) <1

OTHER — Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

PROJECT NAME: DELCO

PROJECT NUMBER: 990621

SAMPLED BY: R Kent

REQUESTED ANALYSES: BTEX; Gas Xtd; Diesel Xtd; MTBE

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Gas Xtd	Diesel Xtd	MTBE									MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1. WW-43-12'	10/21/99 1606	X	X	X	X									S	1		
2. WW-44-4'	10/21/99 1605	↓	↓	↓	↓									↓	↓		
3. WW-45 12'	10/21/99 1607	↓	↓	↓	↓									↓	↓		
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	
11.																	
12.																	
13.																	
14.																	
15.																	

RELINQUISHED BY: [signature]	DATE: 10/21/99	RECEIVED BY: [signature]	DATE: 102199
PRINT NAME: Richard Kent FIRM: GeoPro	TIME: 1555	PRINT NAME: Larry Spangler FIRM: NCA	TIME: 1555
RELINQUISHED BY: [signature]	DATE: 10-21-99	RECEIVED BY:	DATE:
PRINT NAME: Larry Spangler FIRM: NCA	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP: 2

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

COC991025 COPY

CHAIN OF CUSTODY REPORT

Work Order #: P910990

CLIENT: GeoPro	INVOICE TO: Delco Petroleum Co LLC 17873 SE McLoughlin Blvd Milwaukee on
REPORT TO: GeoPro	
ADDRESS: PO Box 26 Battle Ground WA	
PHONE: 3606661465 FAX:	P.O. NUMBER:
PROJECT NAME: Delco	
PROJECT NUMBER: 990621	
SAMPLED BY: R. Kent	

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	TPH	BTEX	pH	Gas x-d	Diesel x-d	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA LAB ID
1.	FM414-10-25	10/25/99 1505	X	X	X				W	4		
2.	FM421-10-25	10/25/99 1520	X	X	X				W	4		
3.	FM431-10-25	10/25/99 1530	X	X	X				W	4		
4.	EW-46-4'	10/25/99 1540		X		X	X	X	S	1		
5.	B-47-8'	10/25/99 1545		X		X	X	X	S	1		
6.	BB-48-5'	10/25/99 1546		X		X	X	X	S	1		
7.	~~B~~											
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												

REQUESTED ANALYSES

RELINQUISHED BY:		DATE: 10/25/99	RECEIVED BY:		DATE: 10-26-99
PRINT NAME: Richard Kent	FIRM: GeoPro	TIME: 1600	PRINT NAME:	FIRM: Express Morgan	TIME: 0900
RELINQUISHED BY:		DATE:	RECEIVED BY:		DATE: 10/25
PRINT NAME:	FIRM:	TIME:	PRINT NAME: Eric Morgan	FIRM: NCA	TIME: 18:30

ADDITIONAL REMARKS:

TEMP:

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CHAIN OF CUSTODY REPORT

Work Order #: P910522

CLIENT: GeoPro
REPORT TO: GeoPro
ADDRESS: PO Box 26, Battle Ground WA 98604
PHONE: 360 666 1465 FAX: geopro@pacifier.com

INVOICE TO: Delco Petroleum Co LLC, 17873 SE McLoughlin Blvd, Milwaukie OR
P.O. NUMBER:

TURNAROUND REQUEST in Business Days*
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 (1 circled) <1
OTHER Please Specify
*Turnaround Requests less than standard may incur Rush Charges.

PROJECT NAME: DELCO
PROJECT NUMBER: 990621
SAMPLED BY: R. Kent

REQUESTED ANALYSES: BETX, Gas XH, Diesel XH, MTBE, TPH, pH

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BETX	Gas XH	Diesel XH	MTBE	TPH	pH								MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1.	B-49-8'	10/26/99 1535	X	X	X	X										S	1		
2.	B-50-8'	10/26/99 1537	X	X	X	X										↓	↓		
3.	B-51-8'	10/26/99 1540	X	X	X	X										↓	↓		
4.	EW-52-4'	10/26/99 1545	X	X	X	X										↓	↓		
5.																			
6.																			
7.																			
8.																			
9.																			
10.																			
11.																			
12.																			
13.																			
14.																			
15.																			

RELINQUISHED BY: [signature] DATE: 10/26/99
PRINT NAME: Richard Kent FIRM: GeoPro TIME: 1550
RECEIVED BY: [signature] DATE: 10-26-99
PRINT NAME: Larry Spangler FIRM: NCA TIME: 1550

RELINQUISHED BY: [signature] DATE: 10-26-99
PRINT NAME: Larry Spangler FIRM: NCA TIME:
RECEIVED BY: Jessica Roberts DATE: 10/26/99
PRINT NAME: [illegible] FIRM: NCA TIME: 1730

ADDITIONAL REMARKS:

TEMP:

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COC 991104

CHAIN OF CUSTODY REPORT

COPY

Work Order #: P911191

CLIENT:	GeoPro
REPORT TO:	GeoPro
ADDRESS:	PO Box 26 Battle Ground WA 98604
PHONE:	3606661465 FAX:
PROJECT NAME:	Delco
PROJECT NUMBER:	990621
SAMPLED BY:	R. Hoat

INVOICE TO: Delco Petroleum
17873 SE McLoughlin Blvd
Milwaukie OR

P.O. NUMBER:

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1 (STD.)

OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Geo Ltd	Diesel Ltd	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA ID
1. SW-58-5'	11/4/99 1330	X	X	X	X	S	1		
2. SW-59-5.5'	11/4/99 1337	X	X	X	X	S	1		
3. SW-60-4.5'	11/4/99 1342	X	X	X	X	S	1		
4. SW-61-4.5'	11/4/99 1347	X	X	X	X	S	1		
5. SW-62-4'	11/4/99 1350	X	X	X	X	S	1		
6. B-63-9.5	11/9/99 1445	X	X	X	X	S	1		
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									

RELINQUISHED BY:		DATE: 11/9/99	RECEIVED BY:		DATE: 11/9/99
PRINT NAME: Richard Hoat	FIRM: GeoPro	TIME:	PRINT NAME: David Langevin	FIRM: NCA	TIME: 15:10
RELINQUISHED BY:		DATE: 11/9/99	RECEIVED BY:		DATE: 11/9/99
PRINT NAME: David Langevin	FIRM: NCA	TIME: 16:20	PRINT NAME: Bob Fahsholtz	FIRM: NCA	TIME: 16:50

ADDITIONAL REMARKS:

TEMP: 14/1

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NC 102899 1.0 dup

CHAIN OF CUSTODY REPORT

Work Order #: P910593

CLIENT: GeoPro	INVOICE TO: Delco Petroleum C LLC 17873 SE Mcloughlin Blvd Milwaukie OR
REPORT TO: GeoPro	
ADDRESS: PO Box 2b Battle Ground WA 98604	
PHONE: 3606664465 FAX:	P.O. NUMBER:
PROJECT NAME: DELCO	
PROJECT NUMBER: 990621	
SAMPLED BY: Rikert	

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1 (STD.)

Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1 (STD.)

OTHER — Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES: BTEX	Gas Xtd	Diesel Xtd	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCL ID
1. B-53-91	10/28/99 1445	X	X	X	X	S	1		
2. B-54-91	1510	X	X	X	X				
3. EW-55-91	1519	X	X	X	X				
4. B-56-91	1524	X	X	X	X				
5. B-57-91	1532	X	X	X	X				
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									

RELINQUISHED BY:		DATE: 10/28/99	RECEIVED BY:		DATE: 10-29-99
PRINT NAME:	FIRM: GeoPro	TIME: 1540	PRINT NAME: Kerry Sprague	FIRM: NCA	TIME: 0840
RELINQUISHED BY:		DATE: 10-28-99	RECEIVED BY:		DATE: 10/29/99
PRINT NAME: Grant Spangler	FIRM: NCA	TIME:	PRINT NAME: Eric Morgan	FIRM: NCA	TIME: 0900

ADDITIONAL REMARKS:

TEMP:

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COC 991109

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CHAIN OF CUSTODY REPORT

Work Order #: P911721

CLIENT: GeoPro	INVOICE TO: Delco Petroleum Co LLC 17875 SE McLoughlin Blvd Milwaukie OR
REPORT TO: GeoPro	
ADDRESS: PO Box 26 Battle Ground WA 98604	
PHONE: 3606661405 FAX: [redacted]	P.O. NUMBER:
PROJECT NAME: DELCO	
PROJECT NUMBER: 990621	
SAMPLED BY: R Kent	

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	TPH as Gas	TPH as Diesel	NWTPH-Dx	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA LAB ID
1. B-64-9.5'	11/10/99 1200	X	X	X	X	S	1		
2. B-65-9.5'	11/10/99 1240	X	X	X	X	S	1		
3. B-66-9.5'	11/10/99 1240	X	X	X	X	S	1		
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									

RELINQUISHED BY: Richard Kent	FIRM: GeoPro	DATE: 11/10/99	RECEIVED BY: David Lindberg	FIRM: NCA	DATE: 11/10/99
PRINT NAME: Richard Kent		TIME: 1355	PRINT NAME: David Lindberg		TIME: 9:55
RELINQUISHED BY: David Lindberg	FIRM: NCA	DATE: 11/10/99	RECEIVED BY: Bob Fahslolz	FIRM: NCA	DATE: 11/10
PRINT NAME: David Lindberg		TIME: 17:35	PRINT NAME: Bob Fahslolz		TIME: 14:35

ADDITIONAL REMARKS:

TEMP: 6.8

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COC 991115

10.5°

CHAIN OF CUSTODY REPORT

Work Order #: P911357

COPY

CLIENT: GeoPro
REPORT TO: GeoPro
ADDRESS: PO Box 26, Battle Ground WA 98604
PHONE: 3606661465 FAX: geopro@pacifier.com

INVOICE TO: Delco Petroleum Co. Inc. 7823 SE McLoughlin Blvd Milwaukie OR

P.O. NUMBER:

PROJECT NAME: DELCO
PROJECT NUMBER: 990621
SAMPLED BY: R. Kent

TURNAROUND REQUEST in Business Days*
Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1
STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1
STD. OTHER Please Specify
*Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES: BTEX	Gas Xtd	Diesel Xtd	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA LAB ID
1. B-67-9.5'	11-15-99 1400	X	X	X	X	S	1		
2. B-68-14'	11/17/99 1300	X	X	X	X	S	1		
3. B-69-14'	11/17/99 1320	X	X	X	X	S	1		
4. B-70-14'	11/17/99 1330	X	X	X	X	S	1		
5. B-71-14'	11/17/99 1335	X	X	X	X	S	1		
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									

RELINQUISHED BY: [signature] DATE: 11/17/99
PRINT NAME: Richard Kent FIRM: GeoPro TIME: 1500
RECEIVED BY: [signature] DATE:
PRINT NAME: David Langhorne FIRM: TIME:

RELINQUISHED BY: [signature] DATE: 11/17/99
PRINT NAME: David Langhorne FIRM: NCH TIME: 16:00
RECEIVED BY: David Langhorne DATE: 11/17/99
PRINT NAME: Eric Morgan FIRM: NCA TIME: 15:00

ADDITIONAL REMARKS:
TEMP:

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10.9R

CHAIN OF CUSTODY REPORT

Work Order #: P912030

CLIENT: GeoPro

REPORT TO: GeoPro Geologic Services

ADDRESS: PO Box 26
Battle Ground WA 98604

PHONE: 360.666.1465 FAX: geopro@pacifier

INVOICE TO: Delco Petroleum Co LLC
17873 SE McLoughlin Blvd
Milwaukie OR

P.O. NUMBER:

PROJECT NAME: Delco

PROJECT NUMBER: 990621

SAMPLED BY: R Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: STD. | 5 | 4 | 3 | 2 | 1 | <1

OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES: BTEX	Gas x-tnd	Diesel x-tnd	MTBE	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA ID
1.	B-72-12.5'	11/29/99 1000	X	X	X	X	S	1		
2.	NW-73-4'	11/30/99 1150	X	X	X	X	S	1		
3.	EW-74-5'	11/30/99 1155	X	X	X	X	S	1		
4.	B-75-9.5'	11/30/99 1157	X	X	X	X	S	1		
5.	SW-76-8'	11/30/99 1200	X	X	X	X	S	1		
6.	B-77-9'	11/30/99 1430	X	X	X	X	S	1		
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										

RELINQUISHED BY: Richard Kent
PRINT NAME: Richard Kent FIRM: GeoPro DATE: 12/1/99 TIME: 1430

RECEIVED BY: David Langeway
PRINT NAME: David Langeway FIRM: NCA DATE: 12/1/99 TIME: 14:60

RELINQUISHED BY: David Langeway
PRINT NAME: David Langeway FIRM: NCA DATE: 12/1/99 TIME: 15:07

RECEIVED BY: Jim Roberts
PRINT NAME: JROBERTS FIRM: NCA DATE: 12/1/99 TIME: 1507

ADDITIONAL REMARKS:

TEMP:

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

14.1R

CHAIN OF CUSTODY REPORT

Work Order #: 9917053

CLIENT: GeoPro Geologic Services
REPORT TO: GeoPro
ADDRESS: PO Box 26
Battle Ground WA 98604
PHONE: 3606661465 FAX:

INVOICE TO: Delco Petroleum Co LLC
17873 SE McLoughlin Blvd
Milwaukie OR

P.O. NUMBER:

PROJECT NAME: Delco
PROJECT NUMBER: 990621
SAMPLED BY: R. Kent

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | **3** | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: **5** | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Gas x-fd	Diesel x-fd	MTBE		PCB	VOC	Metals					MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCR ID
1.	B-78-12'	12/2/99 1315	X	X	X	X									S	1		
2.	NW-79-7'	12/2/99 1318	X	X	X	X									S	1		
3.	SW-80-7'	12/2/99 1325	X	X	X	X									S	1		
4.	B-81-7.5'	12/2/99 1340	X	X	X	X									S	1		
5.																		
6.	D-1-5C	12/2/99 1350			X			X	X	X					S	1		
7.	D-2-SPOIL	12/2/99 1355			X			X	X	X					S	1		
8.																		
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
15.																		

REQUESTED ANALYSES

RELINQUISHED BY: Richard Kent DATE: 12/2/99
PRINT NAME: Richard Kent FIRM: GeoPro TIME: 1530

RECEIVED BY: Jim Roberts DATE: 12/2/99
PRINT NAME: J ROBERTS FIRM: NCA TIME: 1530

RELINQUISHED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: P912217

CLIENT: GeoPro Geologic Services	INVOICE TO: Delco Petroleum Co. LLC 17873 SE McLoughlin Blvd Milwaukie OR
REPORT TO: GeoPro	
ADDRESS: PO Box 26 Battle Ground WA 98604	
PHONE: 3606661465 FAX: geopro@pacifier	P.O. NUMBER:
PROJECT NAME: Delco	
PROJECT NUMBER: 990621	
SAMPLED BY: R Kent	

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	Gas Xtd	Diesel Xtd	MTBE	EPA Metals	VOC	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1.	MW-82-7'	12/10/99 1220	X	X	X	X	X	X	S	1		
2.	B-83-9.5'	12/10/99 1230					X	X	S	1		
3.	MW-84-7'	12/10/99 1250					X	X	S	1		
4.	B-85-9.5'	12/10/99 1245					X	X	S	1		
5.	MW-86-8'	12/10/99 1255					X	X	S	1		
6.	WG-1-9.5'	12/10/99 1340	↓	↓	↓	↓	X	X	W	4	1L, 3 VOA	
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												

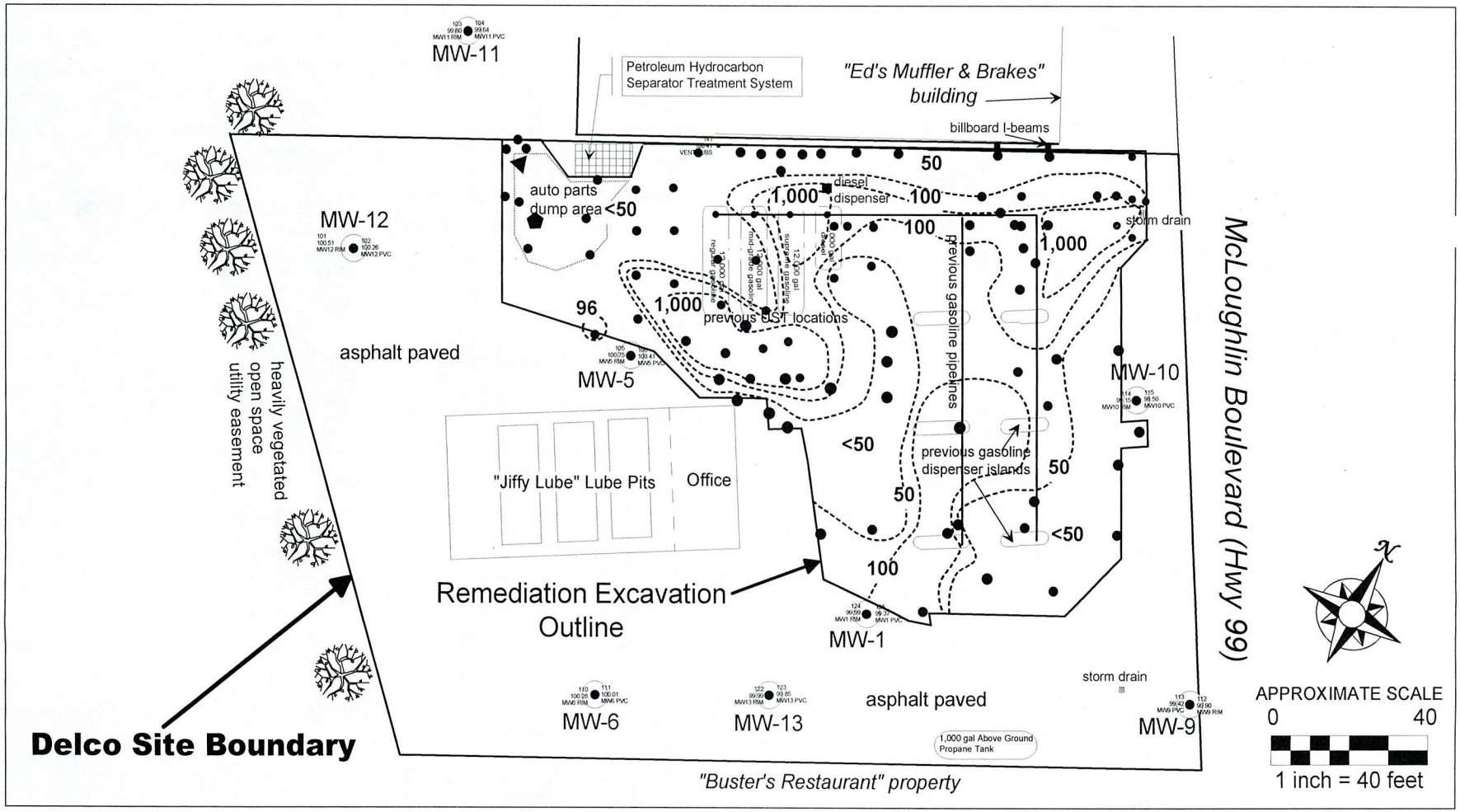
RELINQUISHED BY: Richard Kent		DATE: 12/10/99	RECEIVED BY: David Lowenberg		DATE: 12/10/99
PRINT NAME: Richard Kent	FIRM: GeoPro	TIME: 14:47	PRINT NAME: David Lowenberg	FIRM: NCA	TIME: 14:47
RELINQUISHED BY: David Lowenberg		DATE: 12/10/99	RECEIVED BY: Bob Fabiszak		DATE: 12/10/99
PRINT NAME: David Lowenberg	FIRM: NCA	TIME: 14:55	PRINT NAME: Bob Fabiszak	FIRM: NCA	TIME: 14:55

ADDITIONAL REMARKS:

TEMP: 13.2

COC REV 3/99

Figure 23A – TPH GASOLINE CONTOUR MAP



100 TPH-gasoline contours in mg/kg based on soil sample concentrations. Areas shown as "<50" were excavated because sample analysis, PID field measurements or visual observations of strong petroleum odors, colors, and sheen indicated high concentrations of TPH.

● Soil sample location

MW-13 Monitor Well Location

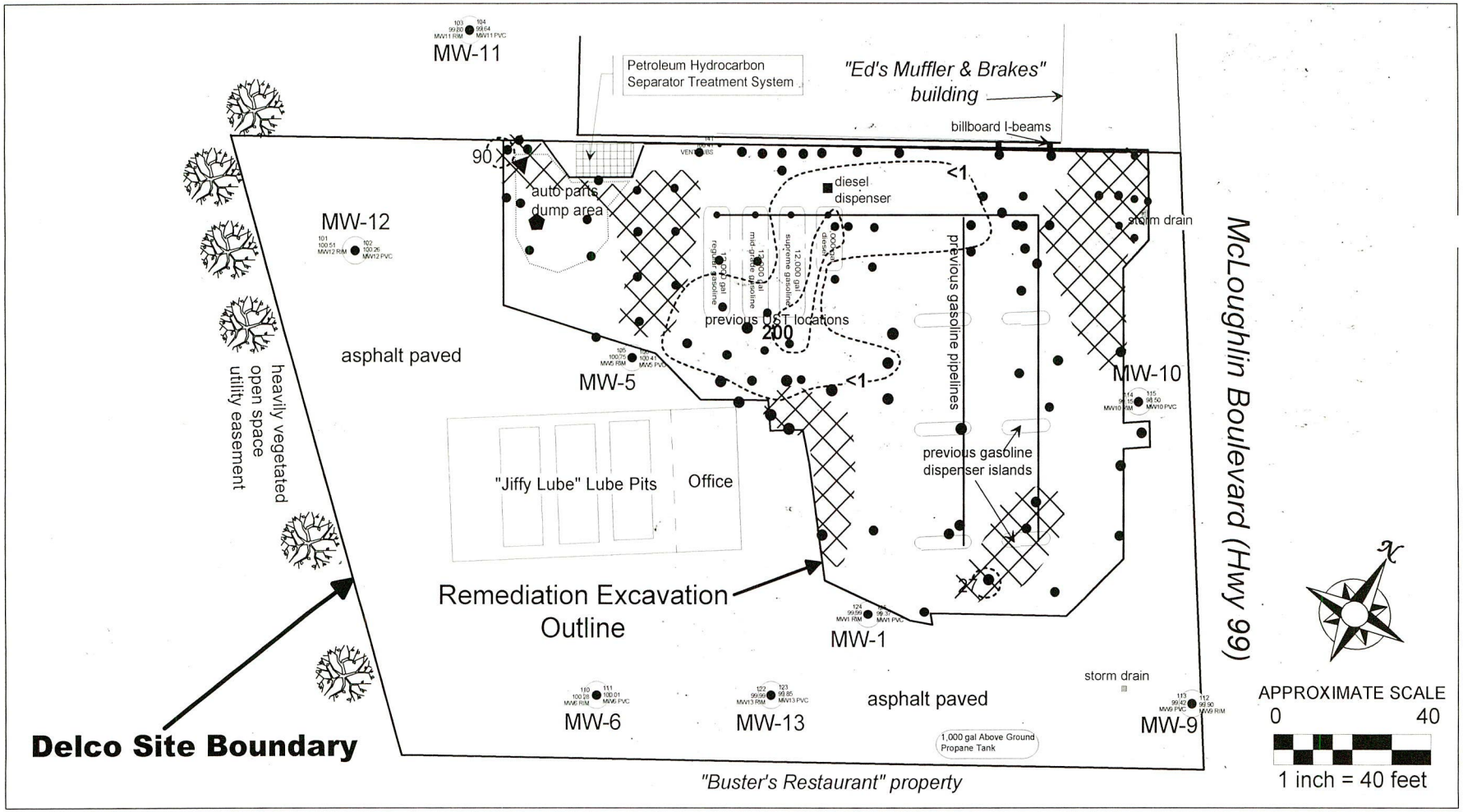
GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

Figure 23A
TPH GASOLINE CONTOUR MAP

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

Figure 23B – TPH DIESEL CONTOUR MAP



● Soil sample location

MW-13 Monitor Well Location

100 TPH-diesel contours in mg/kg based on soil sample concentrations. Areas shown as "ND" were excavated because sample analysis, PID field measurements or visual observations of strong petroleum odors, colors, and sheen indicated high concentrations of TPH.

Areas where detected hydrocarbons (TPH) appear to be primarily due to overlap of gasoline and heavy oil, but weathered diesel is present. Contours in mg/kg based on soil sample concentrations.

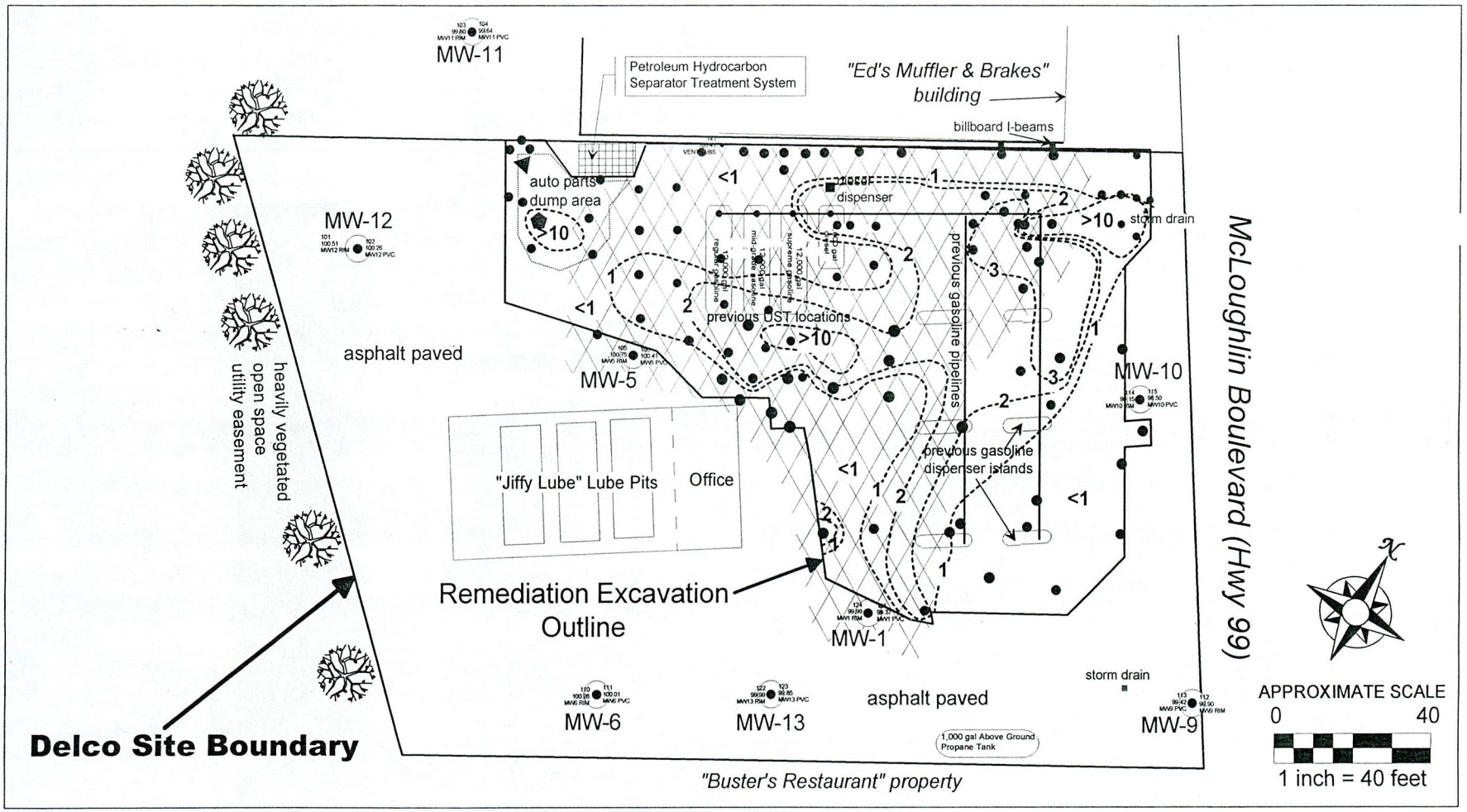
GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

Figure 23B
TPH DIESEL CONTOUR MAP

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

Figure 23C – BENZENE CONTOUR MAP



2 Benzene contours in mg/kg based on soil sample concentrations. Areas shown as "<1" were excavated because sample analysis, PID field measurements or visual observations of strong petroleum odors, colors, and sheen indicated high concentrations of TPH.

GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

Soil sample location

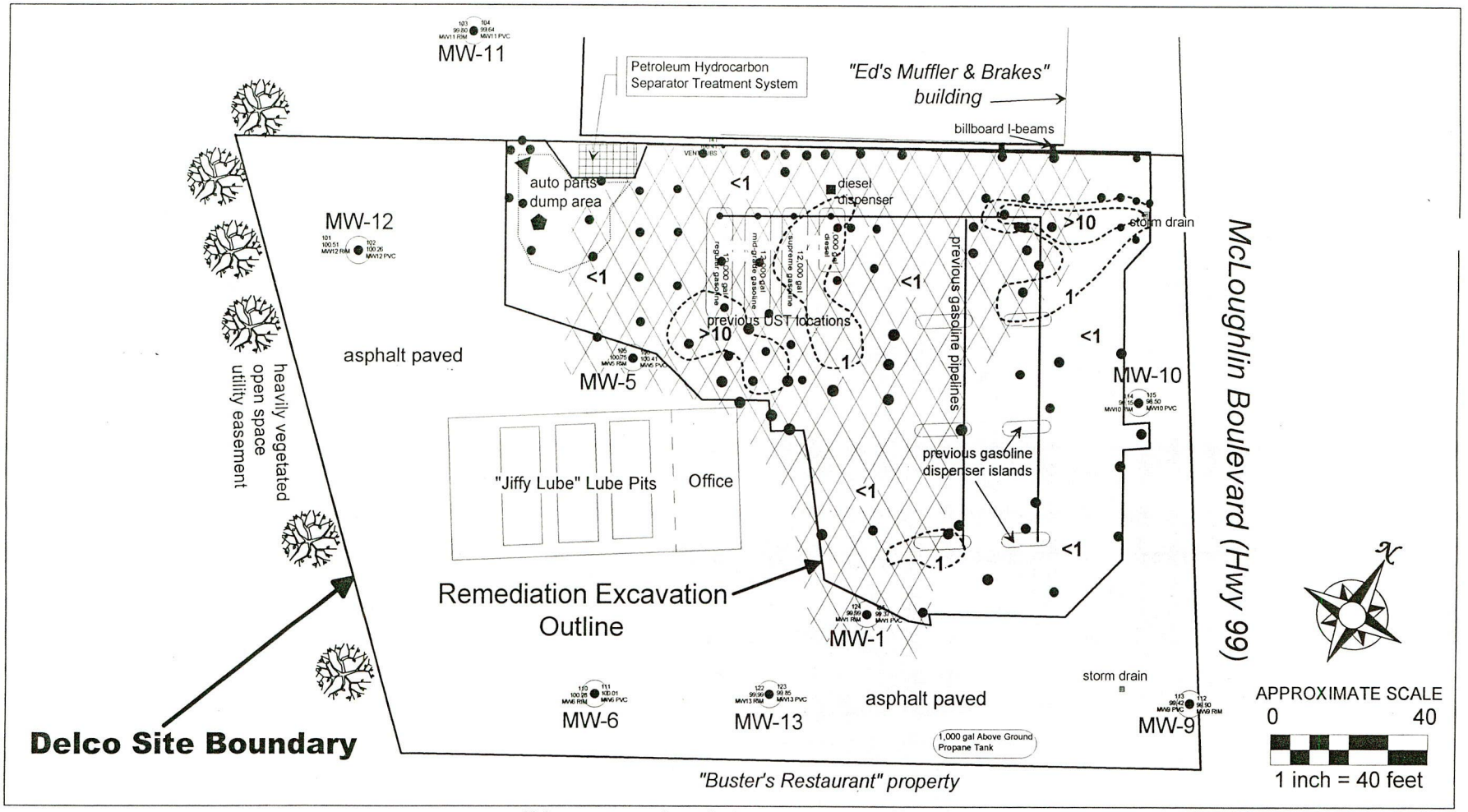
MW-13 Monitor Well Location

Pre-excavation estimated area of groundwater contamination

Figure 23C
BENZENE CONTOUR MAP

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

Figure 23D – TOLUENE CONTOUR MAP



1 — Toluene contours in mg/kg based on soil sample concentrations. Areas shown as "<1" were excavated because sample analysis, PID field measurements or visual observations of strong petroleum odors, colors, and sheen indicated high concentrations of TPH.

GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

● Soil sample location

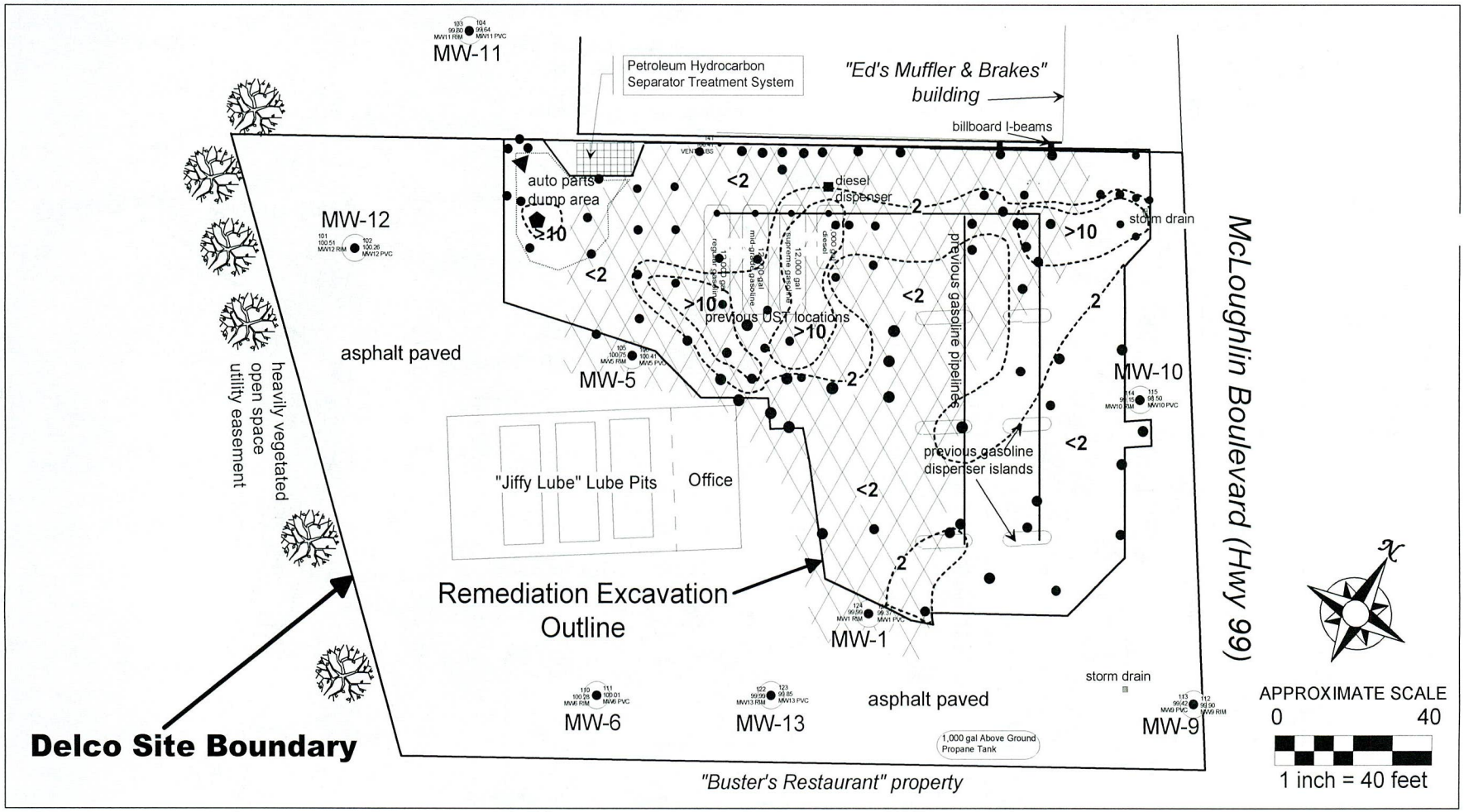
MW-13 Monitor Well Location

Pre-excavation estimated area of groundwater contamination

Figure 23D
TOLUENE CONTOUR MAP

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

Figure 23E – ETHYLBENZENE CONTOUR MAP



2 Ethylbenzene contours in mg/kg based on soil sample concentrations. Areas shown as "<2" were excavated because sample analysis, PID field measurements or visual observations of strong petroleum odors, colors, and sheen indicated high concentrations of TPH.

GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

● Soil sample location

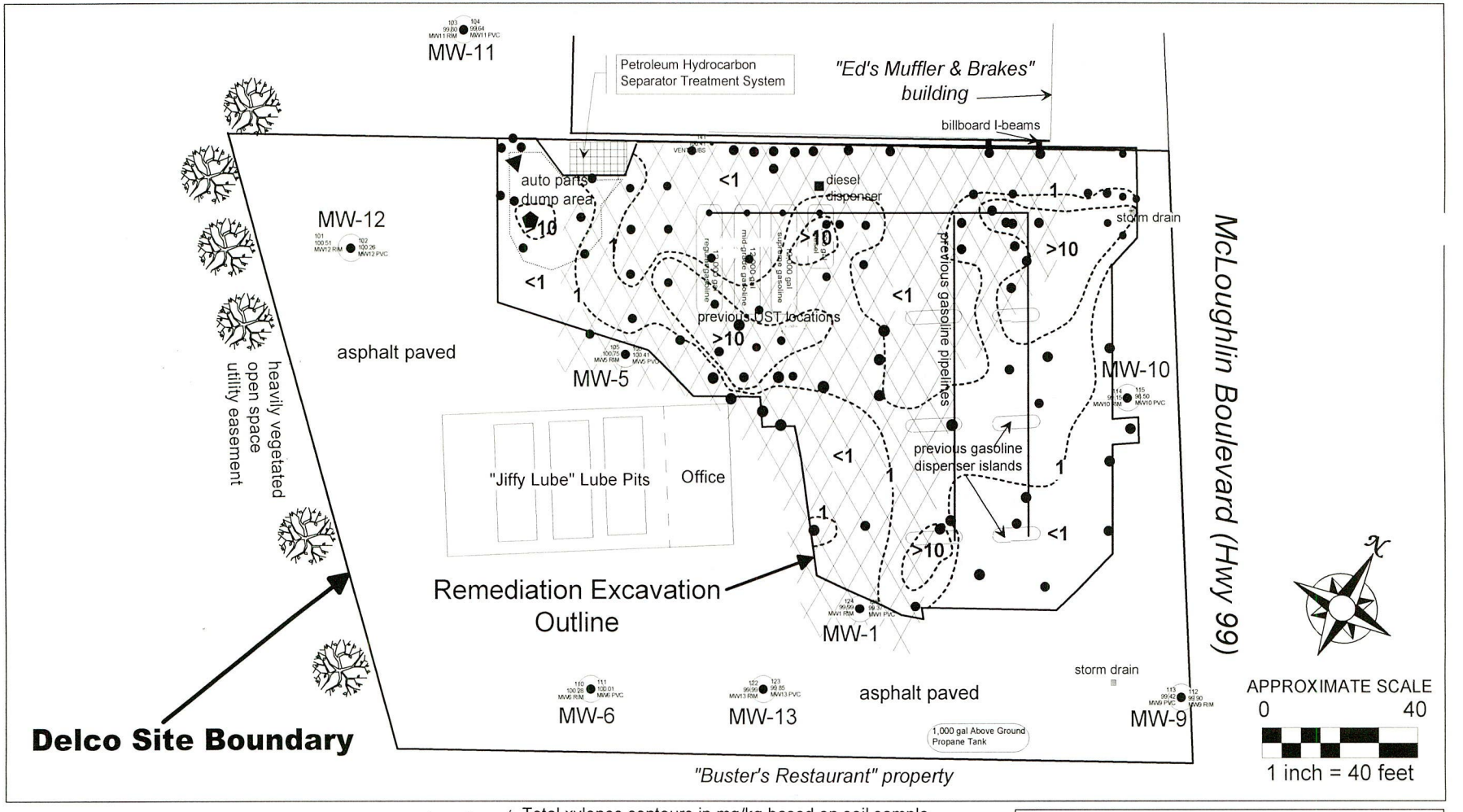
MW-13 Monitor Well Location

Pre-excavation estimated area of groundwater contamination

Figure 23E
ETHYLBENZENE CONTOUR MAP

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

Figure 23F – TOTAL XYLENES CONTOUR MAP



1 Total xylenes contours in mg/kg based on soil sample concentrations. Areas shown as "<1" were excavated because sample analysis, PID field measurements or visual observations of strong petroleum odors, colors, and sheen indicated high concentrations of TPH.

GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

● Soil sample location

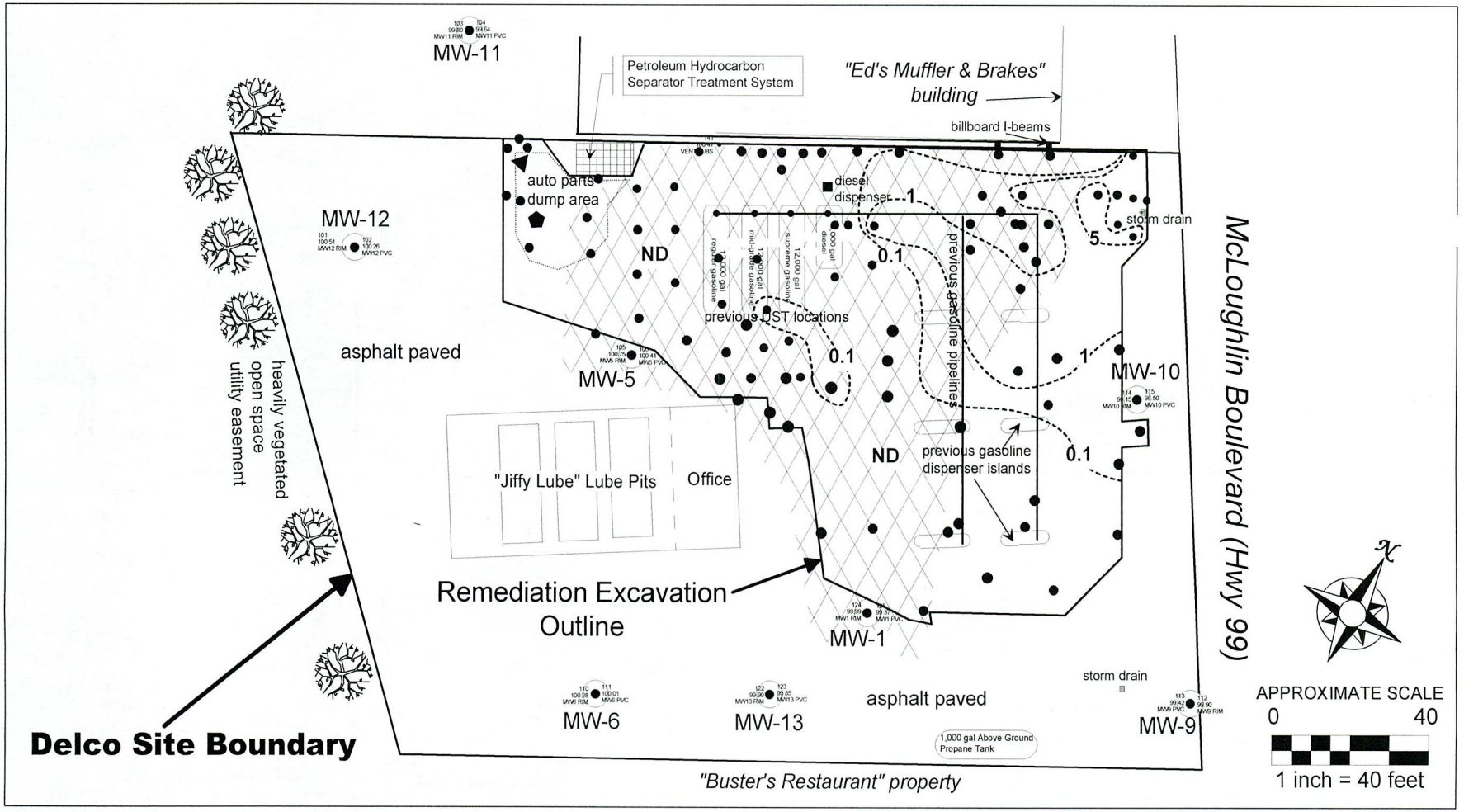
MW-13 Monitor Well Location

Pre-excavation estimated area of groundwater contamination

Figure 23F
TOTAL XYLENES CONTOUR MAP

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

Figure 23G – MTBE CONTOUR MAP



1 MTBE contours in mg/kg based on soil sample concentrations. Areas shown as "ND" were excavated because sample analysis, PID field measurements or visual observations of strong petroleum odors, colors, and sheen indicated high concentrations of TPH.

GeoPro Geologic Services
Battle Ground, WA

Project No. 990621

● Soil sample location

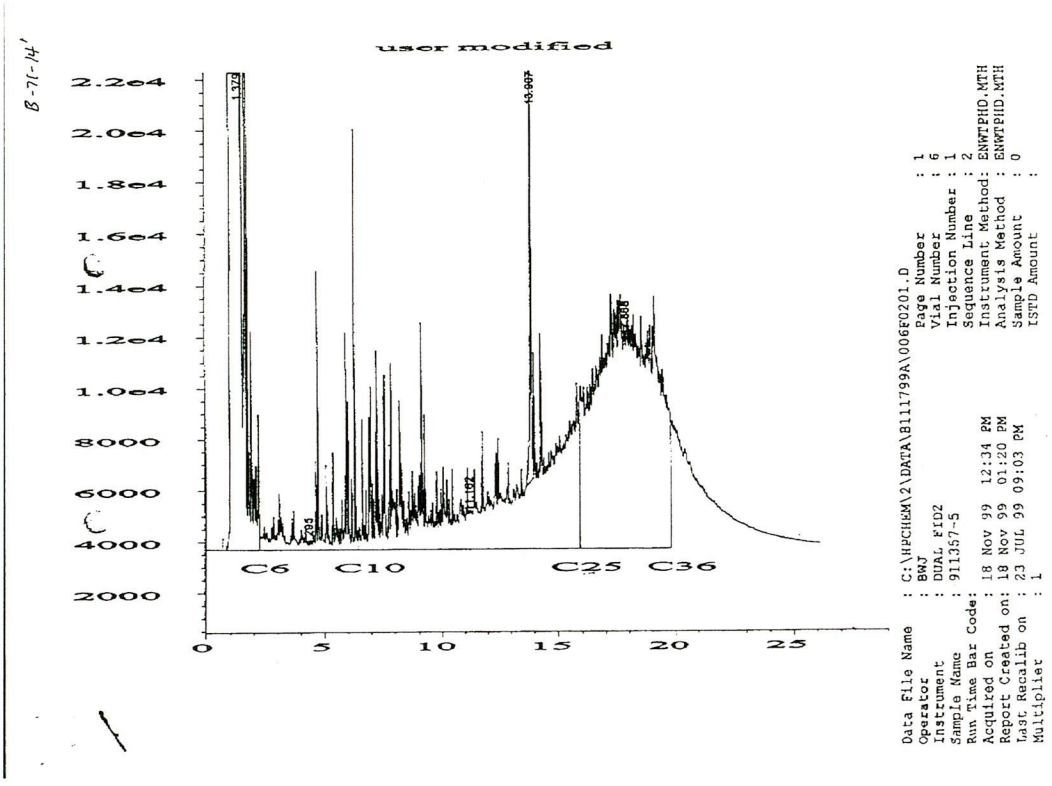
MW-13 Monitor Well Location

Pre-excavation estimated area of groundwater contamination

Figure 23G
MTBE
CONTOUR MAP

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

Figure 24 – CHROMATOGRAM SOIL SAMPLE B-71-4'



Below: GC "Fingerprint" Chromatograms of Soil Contamination from Total Petroleum Hydrocarbon Criteria Working Group Series, Volume 1, March 1998, "Analysis of Petroleum Hydrocarbons in Environmental Media, p.26.

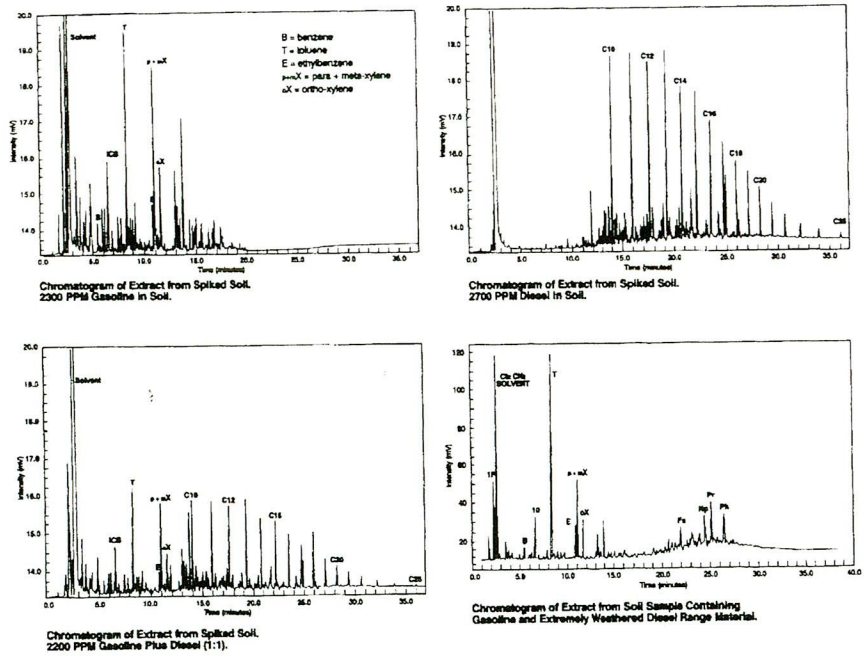
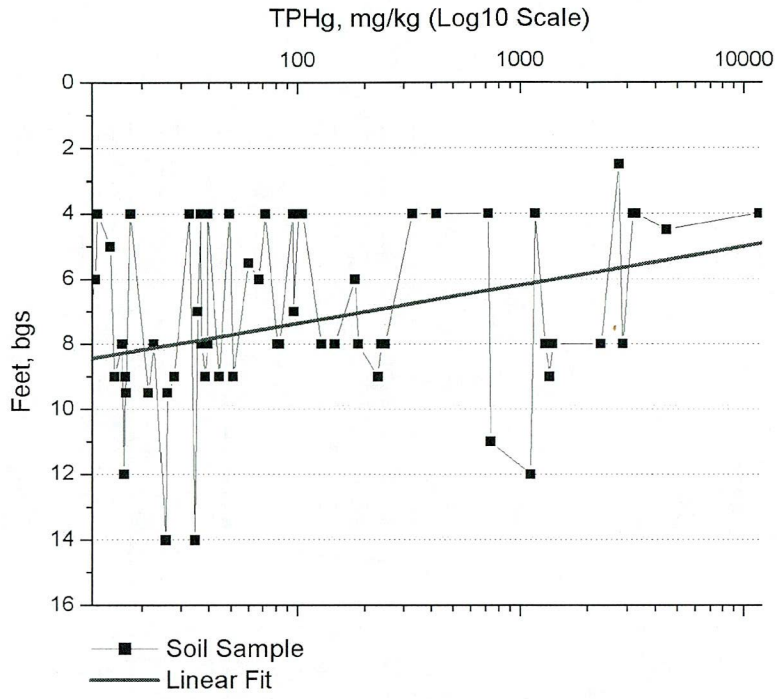


Figure 25 – TPH LINEAR REGRESSION AND SAMPLE DEPTH PLOTS



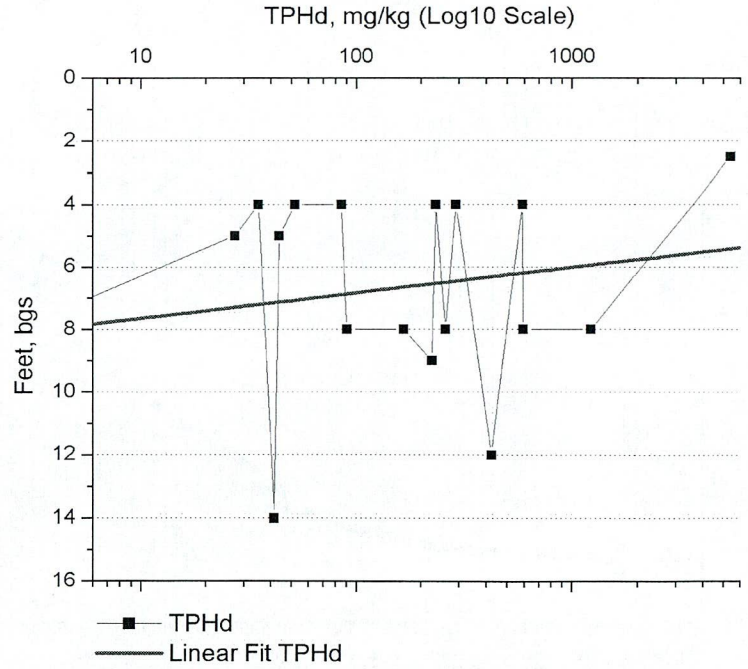


Figure 26 – CONCENTRATION RATIOS (SOIL)

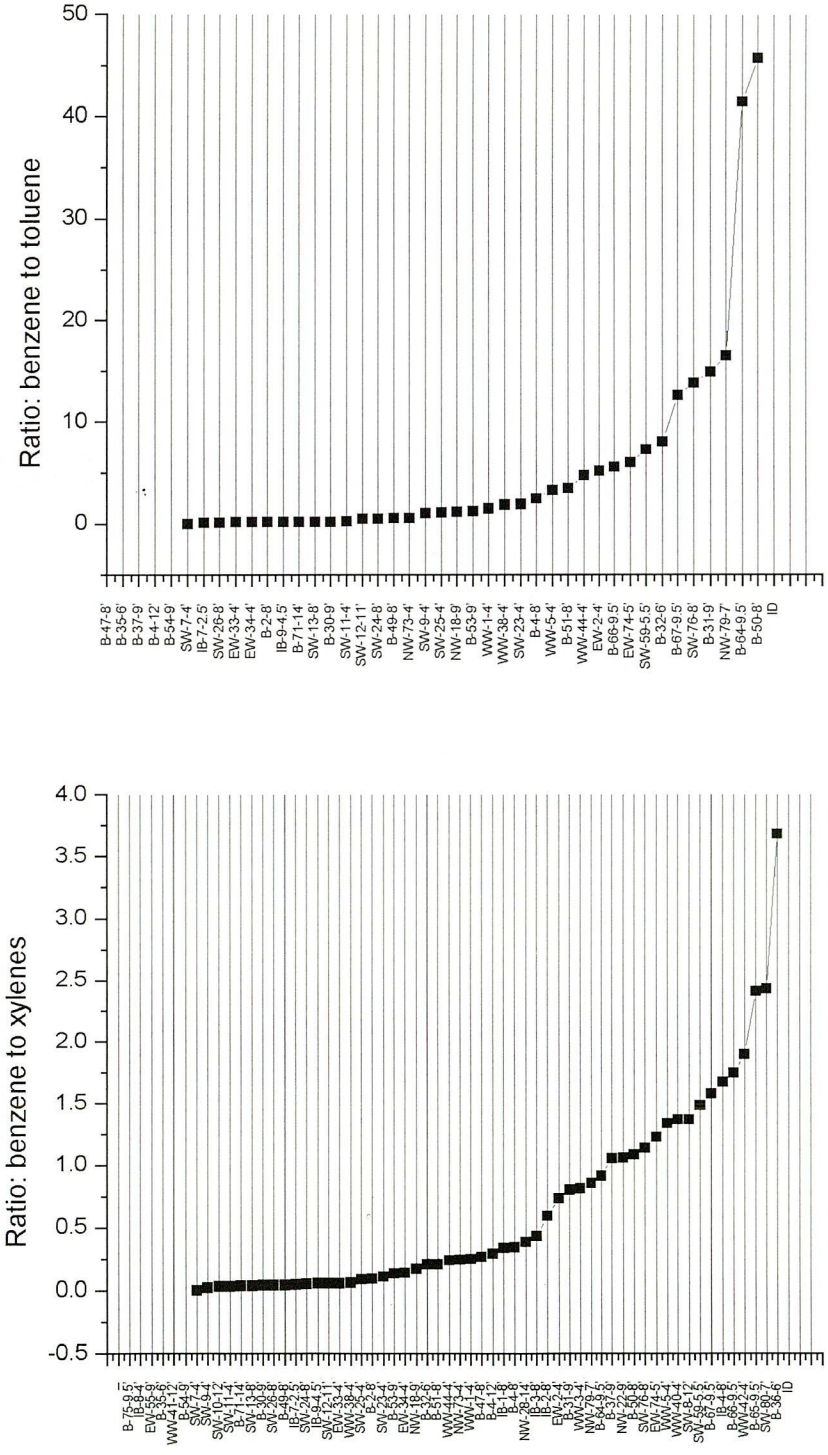
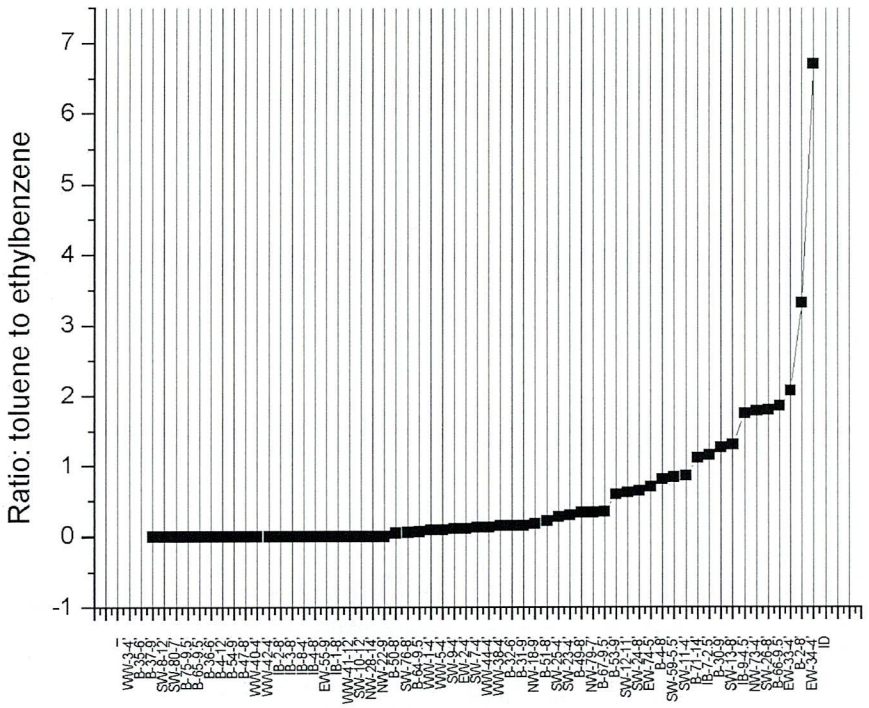


Figure 27 – TOLUENE TO ETHYLBENZENE CONCENTRATION RATIO (SOIL)



APPENDIX A

1993 PIPELINE LEAK AND CLEANUP

INITIAL REPORT FORM FOR UST CLEANUP PROJECT

This report is due within twenty (20) days from the date of the release.

DEPT. OF ENVIRONMENTAL QUALITY
RECEIVED
FEB 19 1993
NORTHWEST REGION

SITE INFORMATION

*DEQ File No.: 03-93-008 *Date of Release: 1/1

Site Name: Flying J

Site Address: 17873 S.E. McLoughlin Blvd.

Milwaukie , Or. 97222

Responsible Party: Donald W. Rognon Phone: (801) 734-6400

RP Mail Address: P.O. Box 678

Brigham City, Utah 84302

Service Provider: E.S.U Phone: (503) 666-2505

SP Mail Address: 2052 S.E. First St.

Gresham, Oregon 97030

* Note: This information is listed on the cover letter received by the Responsible Party.

INITIAL CLEANUP INFORMATION

(Y) N Do you believe that this cleanup project can be conducted under the requirements for an UST Cleanup Matrix site?

► Groundwater use in the immediate area of the project (check all that apply) - complete whether or not the release is believed to have impacted groundwater.

___ Drinking water supply
___ Agricultural
___ Industrial
_X_ Groundwater not used

► Facility location (check all that apply)

___ <100 ft. from a wetland or surface stream (circle one or both)
_X_ within a residential area
___ within an industrial/commercial area
___ Other (describe): _____

► 25 Current approximate depth to groundwater (in feet).

► 20 Seasonal high groundwater level (in feet) if different.

► Describe how depths were determined: U.S.G.S. - U.S. Geological Survey Groundwater well charts - Portland , Or.

INITIAL REPORT FORM FOR UST CLEANUP PROJECTS - PAGE 2

(Y) N NA Did you take immediate action to prevent any further release of the regulated substance into the environment? EXPLAIN: Release retro fitting of piping system

(Y) N NA Were steps taken to identify and mitigate fire, explosion, and vapor hazards? EXPLAIN: See Above

(Y) N NA Did you remove as much of the regulated substance from the UST system as necessary to prevent further release to the environment? EXPLAIN:

Y (N) NA Did you visually inspect any aboveground releases or exposed below ground releases and prevent further migration of the released substance in surrounding soils and groundwater? EXPLAIN: Delineation and mitigation at future plans

Y (N) NA Are/were there any vapors present in buildings or utility corridors? If yes, are you continuing to monitor and mitigate any additional fire and safety hazards posed by vapors and free product? EXPLAIN:

Y (N) NA Have you remedied any hazards posed by contaminated soils that were excavated or exposed as a result of release confirmation, site investigation, abatement, or cleanup activities? EXPLAIN: Soil removed to install piping system. Soil put on Vis-Queen and covered by VisQueen. To be removed as soon as possible.

Y (N) NA Have you measured for the presence of a release where contamination is most likely to be present at the UST site? EXPLAIN: Future C.A.P

Y N (NA) Did you investigate to determine the possible presence of free product and begin free product removal as soon as practicable? If yes, was the region notified? EXPLAIN: N/A

Y (N) Was groundwater initially encountered in the excavation? If yes, how was this water handled/disposed? How many gallons involved? EXPLAIN:

(Y) N Was a sheen or odor observed on any water in the excavation? If yes, DESCRIBE OBSERVATIONS: Ran water collecting in trenches. Exposed sheen and odor from soil.

Y (N) Did groundwater recharge 24 hours after pumping the accumulated water in the excavation? If yes, what actions have you taken as a result? Did you resample the recharge water? EXPLAIN: No Ground Water

(Y) N Are any SOIL OR WATER SAMPLE RESULTS available at the time of this report? If yes, attach all laboratory analysis reports and chain of custody forms.

GENERAL INFORMATION FOR ALL CONTAMINATED SOILS MANAGEMENT

Note: All soils temporarily stockpiled onsite prior to treatment or disposal must be contained within a bermed area, kept covered (and the cover anchored), and the entire area secured to prevent unauthorized access by the public. Non-contaminated soils should be protected and kept separated from contaminated soil.

(Y) N The level of contamination noted is expected to require removal of contaminated soil for treatment or disposal. If yes, complete the following. If no, go to Page 4, "Report Prepared By".

- Type of petroleum contamination (check all that apply):

  _x_ Gasoline ___ Diesel ___ Waste Oil ___ Heating Oil

  ___ Other contamination (specify): _____

- Estimated volume of soil if known (tons or cubic yards): Unknown

- Intended Disposition of Soils (check appropriate method):

  _x_ Treatment ? Not sure at this time.

  ___ Thermal treatment offsite at an authorized facility

  Facility Name: _____ Phone No.: _____

  Facility Address: _____

  ___ Thermal treatment onsite with a mobil treatment unit **

  Company Name: _____ Phone No.: _____

  ___ Offsite soil aeration[1] or bioremediation **

  Treatment Site Address: _____

  ___ Onsite soil aeration or bioremediation **

  ___ Disposal

  Landfill Name: _____ Phone No.: _____

  Landfill Address: _____

1 Offsite soil aeration is banned within the Portland METRO area - see enclosed fact sheet.

** Permit from DEQ required, see page 5 if you would like forms mailed.

► Who will be conducting the soil treatment or disposal work?

Company Name: ? Phone: _____

Contact Name: _____

► What date(s) is the treatment or disposal intended to be started?

_____

Note: You have approximately 30 days to stockpile contaminated soils onsite while making arrangements for proper disposal or treatment. After that time, you may be required to obtain a permit from DEQ for onsite management of the contaminated soil if you fail to take active measures to manage the soil in an appropriate manner.

THIS REPORT WAS PREPARED BY: Date: 2/18/93

Individual: Debbie Iverson Phone: (801) 734-6400

Company: Flying J Inc.

Address: P.O. Box 678,Brigham City, Utah 84302

If this report was NOT prepared by the Responsible Party:

Y N NA Are you the licensed Matrix Service Provider for the project and authorized by the Responsible Party to submit reports on their behalf?

See Page 3

Matrix Service Provider License No.: _____

NOTE: This initial report is intended to provide the Department with the basic initial information about activities associated with the release. It is anticipated that future reports will be much more detailed and will provide a more complete picture of the entire cleanup project. If appropriate, you may reference this initial report in subsequent reports if the information does not need to be repeated for clarity.

► Please attach additional information as necessary to explain any unusual circumstances associated with the project or if you need more space to respond to any of the questions in this report form.

Return this form to: DEQ-Northwest Region
UST Section
1500 SW First, Suite 750
Portland, OR 97201

If you have questions, call 503-229-5263 and ask for the underground storage tank (UST) Duty Officer.

►►►►►►► KEEP A COPY OF THIS REPORT FOR YOUR FACILITY RECORDS ◄◄◄◄◄◄◄

General Information:

►►►►►►► A permit from DEQ is required for the following activities ◄◄◄◄◄◄◄

___ Soil aeration, bioremediation (onsite or offsite) or onsite thermal treatment.

___ Water discharges to a stream/storm drain from excavations or treated groundwater.

Note: If there will be air emissions from pollution control equipment (e.g. air strippers, vapor extraction systems, etc.), notify the regional office by phone before installation. Have actual or estimated emissions calculated before calling.

Check any activities listed above that are anticipated for your cleanup project and the Department will send you the appropriate application forms to complete, information on permit fees and guidance documents as appropriate.

REMINDER: Submit UST Decommissioning/Change-in-Service Report forms and UST Decommissioning Checklists and Reports DIRECTLY to:

DEQ-UST Compliance Program Phone: 503-229-5759
811 SW 6th
Portland, OR 97204

Failure to do so can result in delays to your project; these reports must be received by the UST Compliance Program or the tank owner will continue to be billed for tank permit fees.

FEB-18-993 15:12 1 503 665 5815 P.02

COFFEY LABORATORIES INC.
12423 N.E. WHITAKER WAY, PORTLAND, OR 97230
(503) 254-1794 • FAX (503) 254-1452

CHAIN OF CUSTODY

COFFEY LABORATORIES - PENDLETON BRANCH
287 S.E. FIRST, PENDLETON, OR 97801
(503) 276-0385

PROJECT #:	PROJECT NAME:	P.O. #:	PAGE 1 of 1 PAGES PLEASE PRINT OR TYPE	FOR LABORATORY USE ONLY
300	17873 SE. [illegible] Port of.			

COMPANY NAME: ESCI. INC.
REPORT ATTENTION: Ed Stolz
SAMPLES COLLECTED BY: ESCI. INC.

JOB #: TP93D113-A
CUSTABBR: ESL

FIELD IDENTIFICATION: ONE LINE PER SAMPLE CONTAINER	LAB LOC	LAB ID	COLLECTION DATE	COLLECTION TIME	MEDIA	ANALYSIS REQUESTED	ANALYSIS REMARKS
#1 Composit trench		LA	1-12-93	1600	Soil	TPH/HCID — Rush BETX LEAD TPH-G/D	PLEASE FAX Results ASAP 668-5815

RELINQUISHED BY: Ed Stolz DATE/TIME 1-13-93 1800hrs
RECEIVED BY: Debby [illegible] DATE/TIME 1-13-93 1750
LAB USE:

RELINQUISHED BY: Debbie [illegible] DATE/TIME 1-13-93 1747
RECEIVED BY LAB: [illegible] DATE/TIME 1/13/93 0745

SAMPLE REMARKS:
LEVEL 1 2 3 4
EXPRESS UPS MAIL CXX GREY TAXI LAB

WHITE COPY - COFFEY LABORATORIES
PINK COPY - CLIENTS COPY

SHADED AREA FOR LABORATORY USE ONLY
CHAIN OF CUSTODY INSTRUCTIONS ON BACK OF PINK COPY

(7/90)

Report Date: January 14, 1993
Job#: TP-930113A-1
PO#: None
Project#: 300
Project: Flying J Oil-17873 SE McLoughlin, Portland, OR

Attention: Ed Stolz
E.S.U.
2053 S.E. First St
Gresham, OR 97030

SAMPLE INFORMATION:
Date Samples Were Received By Laboratory: 01/13/93

Lab No.	Field Identification	Sample Matrix	Date	Time
1	#1 Composite Trench	Soil	01-12-93	1600

ANALYTICAL RESULTS ARE ON THE FOLLOWING PAGE(S)

Sincerely,

Susan M. Coffey

Susan Coffey
President

SMC/mlh

This report is for the sole and exclusive use of the above-named client. Samples are retained 15 days from the report date, or until holding time expires. Results pertain only to samples submitted.

Job#: TP-930113A-1

E.S.U.
Page 3

Analysis Performed: TPH-G, by the Oregon DEQ method, purge-&-trap, GC/PID.

Sample ID: #1 Composite Trench

PARAMETER	DETECTION LIMIT	SAMPLE #1 RESULTS
Gasoline	50	1,000
Surrogate Recovery (%)		N/A*

Results expressed as mg/kg unless otherwise noted.

*Surrogate spike recovery could not be calculated because of the concentration of hydrocarbons present.

Analysis Performed: BTXE in soil by EPA Method 8020, GC/PID

ANALYTE	DETECTION LIMIT	LABORATORY BLANK	SAMPLE #1 RESULTS
Benzene	2.0	ND	ND
Ethylbenzene	2.0	ND	13
Toluene	2.0	ND	ND
Total Xylenes	2.0	ND	21

Results expressed as mg/kg unless otherwise noted.

ND means none detected at or above the detection limit listed.

COFFEY LABORATORIES, INC.
12423 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

PACIFIC ENVIRONMENTAL LABORATORY INC

METHOD: Total Metals per EPA 3050, 6010
Results in mg/kg (ppm)

Compound	#1 COMPOSIT TRENCH	Method Blank	Detection Limit
Lead	9.0	ND	5.0

9405 S.W. Nimbus Ave. ■ Beaverton, OR 97005 ■ (503) 644-0660 ■ FAX # (503) 644 2202

LABORATORY REPORT

Northwest Envirocon
7410 Deleware Lane
Vancouver WA 98664

PROJECT NAME/SITE: Delco Milwaukee
PROJECT NUMBER: 16122
EXTRACTION DATE: 7-18-94
REPORT NUMBER: 13361-B
REPORT DATE: 7-21-94

OREGON DEQ TPH-HCID

Analyte: Petroleum Hydrocarbon Identification (Gasoline, Diesel, Heavy Oil)

Field ID	Lab ID	Identification			Surrogate Recovery (%)
		Gasoline	Diesel	Heavy Oil	
DS # 1	15864	**ND**	**ND**	**Detected**	134
DS # 2	15865	**ND**	**ND**	**ND**	139
DS # 3	15866	**ND**	**Detected**	**Detected**	126
BLANK	-	ND	ND	ND	-
Reporting Limits (mg/Kg)	-	20	50	50	-

Surrogate is Cholorooctane
ND = Not Detected (below reporting limit or detection limit)

OREGON DEQ TPH-D

Analyte: Total Petroleum Hydrocarbon Quantification for soil

Field ID	Lab ID	mg/Kg (ppm)	Surrogate Recovery (%)
DS # 3	15866	**164**	105
BLANK	-	ND	-
Reporting Limit	-	20	-

Surrogate is o-Terphenyl
ND = Not Detected (below reporting limit or detection limit)

Soil pile on site

OREGON DEQ TPH-418.1 MODIFIED

Analyte: Total Heavy Oils / Diesel Quantification

Field ID	Lab ID	mg/Kg (ppm)
DS # 1	15864	**330**
DS # 3	15866	**206**
BLANK	-	ND
Detection Limit	-	10

ND = Not Detected (below reporting limit or detection limit)

Wy'East
Environmental Sciences, Inc.

013361B

Research and Laboratory Services

CHAIN OF CUSTODY

2415 SE 11th Ave. • Portland, Oregon 97214 • (503) 231-9320 • FAX (503) 231-9344

PROJECT # 6122	PROJECT NAME / SITE DeCo Milwaukie	STATE OR.	PURCHASE ORDER #
COMPANY NW Environcon	REPORT ATTENTION Scott Borders	PHONE NUMBER 230-0702	FAX NUMBER
SAMPLES COLLECTED BY S. Borders / L. Brown	DATE COLLECTED 7-18-94	TIME COLLECTED 3:15 pm	SAMPLES CHILLED TO 4° C? no
PRESERVATIVE USED? (HCl, etc.)			

FIELD ID	MEDIA	CONTAINER	ANALYSIS REQUIRED	LAB ID
DS #1	Soil	9oz glass	TPH, HCID+	15864
DS #2	"	"	" "	15865
DS #3	"	"	" "	15866

RELINQUISHED BY Laura Brown	DATE / TIME 7-18-94 3:30	RELINQUISHED BY	DATE / TIME
RELINQUISHED BY	DATE / TIME	RECEIVED BY LAB Chris Baugh	DATE / TIME 7/18/94 5:30 pm
REMARKS		SHIPPED BY	

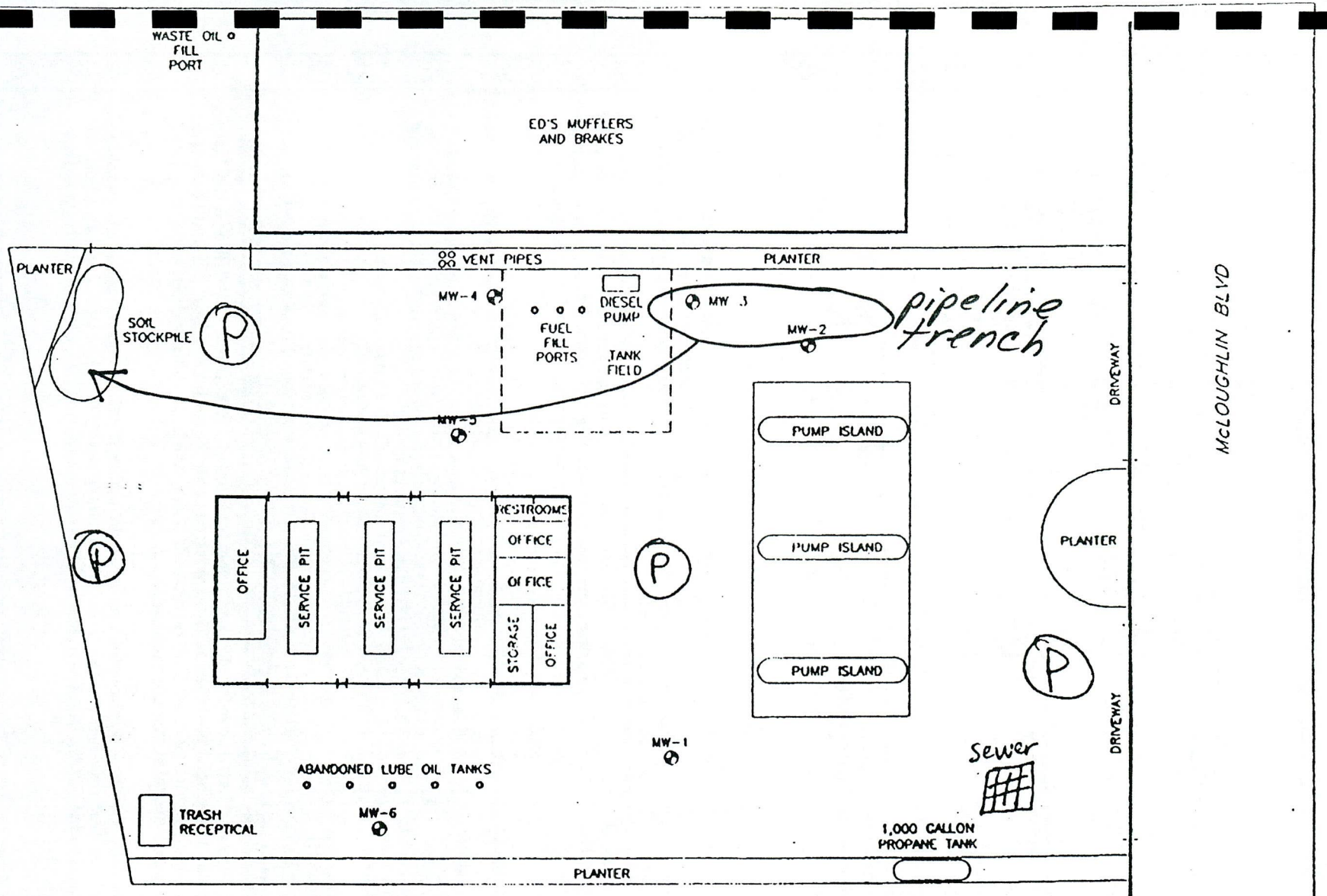
Wy'East will return white copy to client with laboratory report and keep yellow copy for files. Client keeps pink copy.

03/29/95 10:08:01
413SC

REGIONAL DISPOSAL COMPANY
RECAP OF WEIGHT TICKETS

ACCOUNT: Delco Petroleum

TICKET #	TIME	TRUCK#	GROSS	TARE	NET POUNDS	NET TONS	TYPE	JOB CODE	CONTAINER
DATE: 03/22/95									
168620	15:19	171	90560	34700	55860	27.930	PCS	95-1132	
168621	15:20	169	96360	35000	61360	30.680	PCS	95-1132	
168625	15:21	159	89620	34480	55140	27.570	PCS	95-1132	
168626	15:22	00115	96780	36340	60440	30.220	PCS	95-1132	
168627	15:23	199	100340	37560	62780	31.390	PCS	95-1132	
					295580	147.790			
TOTAL FOR: 03/22/95					295580	147.790			
TOTALS FOR: Delco Petroleum					295580	147.790			
REPORT TOTALS:					295580	147.790			



P proposed monitoring well locations

LEGEND.

MW-1 MONITORING WELL LOCATION

North

0 30 FT

APPROX. SCALE

FIGURE 2

MONITORING WELL LOCATION MAP

JIFFY LUBE INTERNATIONAL STORE #1012

17869 S.E. McLOUGHLIN BOULEVARD

MILWAUKIE, OR.

PROJECT NO 43-93-011	DRAWN BY I.H. 7/13/93
FILE NO. 4393011A	PREPARED BY PAC
REVISION NO.	REVIEWED BY

Delta Environmental Consultants, Inc.

Portland, Oregon
Soil Recycling Facility

OREGON HYDROCARBON INC.
(a TPS Technologies Inc. company)
SOIL DATA AND CERTIFICATION SHEET

Date: 8-29-94

Generator and/or Client:
Delco
17869 SE McLoughlin Blvd.
Milwaukie, OR

Consultant/Engineering Firm:
Northwest Envirocon Inc.
7410 Delaware Lane.
Vancouver, WA 98684

Testing Laboratory (Include contact person and phone #):
Wy'East Portland OR
Chris Baugh
(503) 231-9320

Sampling procedures and location (attach add'l sheets and map)
Random sampling of soil pile on site. Three samples were taken

Site History (list address, describe contamination type, contamination source, how contamination was stored, past activities at site - Attach additional sheet if necessary)
Site is gas station with Jiffy Lube at 17869 SE McLoughlin Blvd. Milwaukie OR. Contamination is from UST pipe leak. Soil is stockpiled on site with visqueen. Analyticals Attached.

Estimated Qty (Tons):
30 yd 3

State Classification:

Please check appropriate box below and attach all required analytical reports, including test methodologies used. Unless otherwise noted, composite samples should be collected with the following frequency: One (1) sample for 250 tons or less; two (2) samples for 500 tons or less and one (1) additional sample for each 500 additional tons.

☒ I/We certify that the soil referenced herein is contaminated solely by virgin petroleum products from leaking underground storage tank(s).

Attach analysis for the following:
1. Total Petroleum Hydrocarbons ID test (Method TPH-HCID)
2. If Method TPH-HCID shows gasoline is present, perform a Total Petroleum Hydrocarbons test for gasoline (Method TPH-G or EPA Method 8020)
3. If Method TPH-HCID shows that diesel, heating oil, and/or Bunker C are present, perform a Total Petroleum Hydrocarbons test for fuel oils (EPA Method 418.1 Modified)
4. If Method TPH-HCID shows that both gasoline and diesel or heating oils are present, then both types of TPH tests must be performed.

☐ I/We certify that some or all of the contaminants in the soil referenced herein is waste oil, or some other non-virgin petroleum product or virgin petroleum from something other than a leaking underground storage tank.

Attach analysis for the following:
1. Total Petroleum Hydrocarbons ID test (Method TPH-HCID)
2. If Method TPH-HCID shows gasoline is present, perform a Total Petroleum Hydrocarbons test for gasoline (Method TPH-G or EPA Method 8020)**
3. If Method TPH-HCID shows that diesel, heating oil, and/or Bunker C are present, perform a Total Petroleum Hydrocarbons test for fuel oils (EPA Method 418.1 Modified)
4. If Method TPH-HCID shows that both gasoline and diesel or heating oils are present, then both types of TPH tests must be performed.
5. Halogenated Volatile Organic compounds (EPA Method 8240)
6. PCB's and Halogenated Pesticides (EPA Method 8080)
7. TCLP (EPA Method 1311) metals concentration for a) through h):
   a) arsenic c) cadmium e) lead g) selenium
   b) barium d) chromium f) mercury h) silver

** If elevated benzene levels are detected, an additional TCLP benzene test may be required in an above-ground spill or leak situation.

No soils referenced herein may be delivered until the foregoing certificate is received and approved by OHI, and OHI issues manifests and assigns a delivery date. If any soils delivered to OHI are found to be "hazardous waste" pursuant to federal or state regulations, Client shall be solely responsible for their removal. If Client fails to so remove such soils, OHI, acting as Client's agent, may arrange for such removal at Client's expense.

"This is a complete and accurate description of the soil referenced herein; no deliberate or willful omissions have been made and all known or suspected hazards have been disclosed herein. I/We further hereby certify that the soil is not "hazardous" as defined by U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), State or local regulations. All required analysis reports are attached."

Generator's Authorized Signatory: _____ Date: _____

Print Name: _____ Title: _____

Engineer/Environmental Firm Authorized Signatory: Laura Brown NW Envirocon Date: 8-31-94

pipeline trench soil

APPENDIX B

1994 JIFFY LUBE UST DECOMMISSIONING REPORT

Oregon Department of Environmental Quality

UNDERGROUND STORAGE TANK DECOMMISSIONING/SERVICE CHANGE REPORT

DEQ FACILITY NUMBER: 1747

DATE: 3-29-95

FACILITY NAME: Milwaukie Fuel Stop

FACILITY ADDRESS: 11873 S.E. McLoughlin Blvd.
Milwaukie, Oregon 97222

PHONE: _____

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
APR 3 1995
NORTHWEST REGION

The following information MUST be submitted by the underground storage tank owner, operator or licensed DEQ Supervisor within 30 days following completion of the tank decommissioning or changing tank contents to a non-regulated substance. (OAR 340-150-001 though -150)

The attached supplemental checklist should be prepared by the person performing the decommissioning or service change. The checklist should be provided to DEQ and the tank owner to demonstrate that all required practices were followed.

Ordinarily the checklist is filled out by the DEQ licensed Service Provider or Supervisor. Owners who wish to personally decommission a tank or change service must follow all DEQ and other applicable standards. The owner should contact the DEQ Regional Office prior to starting the work to receive current copies of underground storage tank regulations.

A. DATES:

Decommissioning/Service Change Notice - Date Submitted: Sept. 14, 94 (30 days before work starts)

Work Start Telephone Notice - Date Submitted: Nov 15 94 (3 working days before work starts)

DEQ Person Notified: Jim MARSH

Date Work Started: Nov 28, 94

Date Work Completed: Dec 20, 94

Note: Provide the following information if any soil or water contamination is found during the decommissioning or service change. Contamination must be reported by the UST owner or operator within 24 hours. The licensed service provider must report contamination within 72 hours after discovery unless previously reported.

Date Contamination Reported: Nov 28, 94 By: Scott Borders

DEQ Person Notified: Jim MARSH

Backfill Telephone Notice - Date Called: Dec 1, 94 (before backfilling)

DEQ Person Notified: ~~Jim MARSH~~ Rick Silverman

B. PERMITS:

Note: DEQ permits or an addendum to the UST permit(s) may be needed where soil or water cleanup is required.

DEQ Water Discharge Permit #: _____ Date: _____

Disposed to (Location): _____

DEQ Solid Waste Disposal Permit #: _____ Date: _____

B. PERMITS (Continued)

UST-Soil Treatment Permit Addendum—Type: ______________ Date: ______________

Soil Disposal or Treatment Location: SOIL DISPOSAL / NORTHWEST ENVIROCON, INC.

C. TANK INFORMATION:

Tank #	DEQ UST Permit	Tank Size in (Gallons)	Product: Gasoline, Diesel, Used Oil, Other?		Closure or Service Change?			Tank to be Replaced?	
			Present	New	Tank Removal	Closure∞ Inplace	Other∞ Use	Yes*	No
1	ECCB	1500	6000 gallon		X				X
2	ECCC	1500	6000 gallon		X				X
3	ECCD	1500	3000 gallon		X				X
4	ECCE	1500	3000 gallon		X				X
5	ECCF	1500	6000 gallon		X				X

* Where decommissioned tank(s) are replaced by new underground storage tanks the UST owner or operator must submit a new permit application containing information on the new tanks 30 days before placing them in service.

∞ Submit a soil sampling plan to the DEQ regional office and receive plan approval prior to starting work if 1) tank is to be decommissioned in-place, 2) tank contents are changed to a non-regulated substance, 3) tank contains a regulated substance other than petroleum, or 4) tank changed to non-regulated use.

D. DISPOSAL INFORMATION:

Tank #	Tank & Piping Disposal Method				Disposal Location of Tank Contents *	
	Scrap	Land-fill	Other	Identify Location & Property Owner	Liquids	Sludges
1	X			SCHNITZER STEEL PRODUCTS	SPENCER ENVIRONMENTAL	Oil Re-Refiners, Inc.
2	X			OREGON PACIFIC STEEL + METAL		
3	X					
4	X					
5	X					

* Note: The tank contents, the tank and the piping may be subject to the requirements of Hazardous Waste regulations. If you have questions, contact the DEQ Hazardous Waste Section at (503) 229-5913 or DEQ regional office hazardous waste staff.

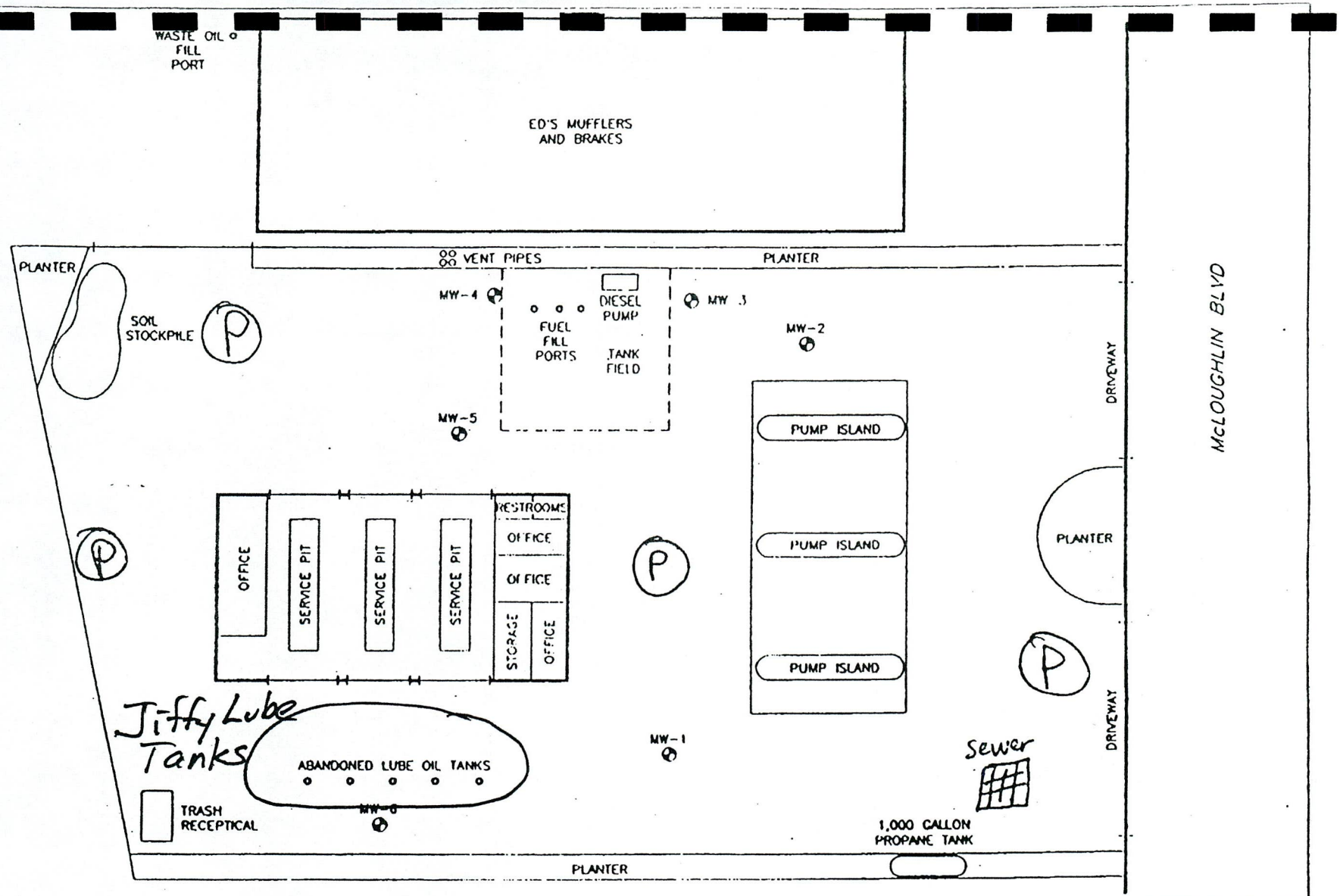


FIGURE 2

MONITORING WELL LOCATION MAP

JIFFY LUBE INTERNATIONAL STORE #1012

17869 S.E. McLOUGHLIN BOULEVARD

MILWAUKIE, OR.

PROJECT NO. 43-93-011	DRAWN BY I.H. 7/13/93
FILE NO. 4393011A	PREPARED BY PAC
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.

APPENDIX C

UST LEAK DETECTION TESTING REPORTS

INVOICE #BL000167

TEST DATE: 12/10/93

HYDROCARBON SPECIALTY CONTRACTOR INC
S.124 HOWE P.O.BOX 13040
SPOKANE WA 99213 509 534 5604

TANK STATUS EVALUATION REPORT

***** CUSTOMER DATA *****	***** SITE DATA *****
FLYING J 17873 MCLOUGHLIN	FLYING J 17873 MCLOUGHLIN
MILWAUKIE OR 97267	MILWAUKIE OR 97267
CONTACT: DAN MORGAN PHONE #:	CONTACT: DAN MORGAN PHONE #:

***** COMMENT LINES *****

SITE# 9929
STORE# 1148

CURRENT EPA STANDARDS DICTATE
THAT FOR UNDERGROUND FUEL TANKS, THE MAXIMUM ALLOWABLE LEAK/GAIN RATE
OVER THE PERIOD OF ONE HOUR IS .05 GALLONS.

0

TANK #1: REG UNLEADED	TYPE: STEEL	RATE: .044325 G.P.H. LOSS
	TANK IS TIGHT.	
TANK #2: SUPER UNLEADED	TYPE: STEEL	RATE: .038921 G.P.H. LOSS
	TANK IS TIGHT.	
TANK #3: REGULAR	TYPE: STEEL	RATE: .048892 G.P.H. LOSS
	TANK IS TIGHT.	
TANK #4: DIESEL FUEL 2	TYPE: STEEL	RATE: .009945 G.P.H. GAIN
	TANK IS TIGHT.	

OPERATOR: Dan Buster SIGNATURE: [signature] DATE: 12/10/93

FROM : PHONE NO. : P04

******* T A N K D A T A ********

	TANK NO. 1	TANK NO. 2	TANK NO. 3	TANK NO. 4
TANK DIAMETER (IN)	95	95	95	
VOLUME (GAL)	10000	10000	10000	8000
TYPE	ST	ST	ST	ST
FUEL LEVEL (IN)	27	35	59	54
FUEL TYPE	REG UNLD	SUP UNLD	REGULAR	DIESEL 2
[illegible] (GAL/IN)	120.90	129.30	130.03	106.21

CALIBRATION ROD	DISTANCE
1	10.65625
2	26.95313
3	41.93750
4	56.93750
5	74.93750

CERTIFICATE OF UNDERGROUND STORAGE TANK SYSTEM TESTING

NDE ENVIRONMENTAL CORPORATION
8906 WALL STREET, SUITE 306
AUSTIN, TEXAS 78754
(512) 719-4633
FAX (512) 719-4986

TEST RESULT SITE SUMMARY REPORT

TEST TYPE: VPLT

TEST DATE: December 17, 1994

WORK ORDER NUMBER: 943068

CLIENT: NORTHWEST ENVIROCON
7410 DELAWARE LN.
VANCOUVER, WA 98664

SITE: DELCO
17869 MCLOUGHLIN BLVD
MILWAUKIE, OR 97

ATTN: Laure Brown

The following tests were conducted at the site above in accordance with all applicable portions of Federal, NFP A and local regulations.

Tank Tests

TANK NUMBER	PRODUCT	TANK CAPACITY (Gallons)	TANK DIAMETER (Inches)	TANK RESULT	VOLUME CHANGE (gph)	ULLAGE RESULT
1	DIESEL	8,101	95.00	PASS	0.005	PASS
2	REGULAR	11,798	93.00	PASS	-0.002	PASS
3	PREMIUM	11,798	93.00	PASS	-0.038	PASS
4	UNLEADED	11,798	93.00	PASS	0.024	PASS

Line and Leak Detector Tests

TANK NUMBER	PRODUCT	VOLUME CHANGE (gph) A B C D	LINE RESULT (P=pass, F=fail I=inconclusive) A B C D	LEAK DETECTOR PRESENT	LEAK DETECTOR RESULT
1	DIESEL				
2	REGULAR				
3	PREMIUM				
4	UNLEADED				

NDE appreciates the opportunity to serve you, and looks forward to working with you in the future. Please call any time, day or night, when you need us.

NDE Customer Service Representative:
THOMAS MICHAEL CORNO

Test conducted by:
JOE FEUKER

Reviewed: Thomas M. Corno

Technician Certification Number: 11809

CERTIFICATE OF UNDERGROUND STORAGE TANK SYSTEM TESTING

NDE ENVIRONMENTAL CORPORATION
8906 WALL STREET, SUITE 306
AUSTIN, TEXAS 78754
(512) 719-4633
FAX (512) 719-4986

TEST RESULT SITE SUMMARY REPORT

TEST TYPE: VPLT

TEST DATE: **September 3, 1994**

WORK ORDER NUMBER: **942821**

INVOICE DATE:

INVOICE NUMBER:

CLIENT: **NORTHWEST ENVIROCON**
7410 DELAWARE LN.
VANCOUVER, WA 98664

SITE: **DELCO**
17869 MCLOUGHLIN BLVD
MILWAUKIE, OR 97

ATTN: **Laure Brown**

The following tests were conducted at the site above in accordance with all applicable portions of Federal, NFP A and local regulations.

Line and Leak Detector Tests

TANK NUMBER	PRODUCT	VOLUME CHANGE (gph) A B C D	LINE RESULT (P=pass, F=fail I=inconclusive) A B C D	LEAK DETECTOR PRESENT	LEAK DETECTOR RESULT
1	DIESEL				
2	REGULAR	0.008	P	YES	PASS
3	PREMIUM	0.011	P	YES	FAIL
4	UNLEADED	0.000	P	YES	PASS

NDE appreciates the opportunity to serve you, and looks forward to working with you in the future. Please call any time, day or night, when you need us.

NDE Customer Service Representative:
THOMAS MICHAEL CORNO

Reviewed: Thomas M. Corno

Test conducted by:
JOE FEUKER

Technician Certification Number: 11809

FROM : Panasonic FAX SYSTEM PHONE NO. : Jun. 15 1999 01:03PM P1

CERTIFICATE OF UNDERGROUND STORAGE TANK SYSTEM TESTING

Tanknology
8900 SHOAL CREEK, BUILDING 200
AUSTIN, TEXAS 78757
(512) 451-6334
FAX (512) 459-1459

TEST RESULT SITE SUMMARY REPORT

TEST TYPE: VacuTect PURPOSE: COMPLIANCE

TEST DATE: 01/23/98 CUSTOMER PO: WORK ORDER NUMBER: 2203251

CLIENT: DELCO
17873 MCLOUGHLIN BLVD
MILWAUKIE, OR 97267

GURDEY SOHI
(503) 654-9812

SITE: DELCO
17873MCLOUGHLIN BLVD
MILWAUKIE, OR 97267

Gurdev Sohi
(503) 654-9812

The following test(s) were conducted at the site above in accordance with all applicable portions of Federal, NFPA and local regulations

Tank Tests

TANK NUMBER	PRODUCT	TANK CAPACITY [illegible]	TANK DIAMETER [illegible]	TANK RESULTS	VOLUME CHANGE [illegible]	ULLAGE RESULT
1	UNLEADED	11,798	93.00	PASS	0.000	PASS
2	PREMIUM	11,798	93.00	PASS	0.000	PASS
3	PLUS	11,798	93.00	PASS	0.000	PASS
4	DIESEL	8,101	95.00	FAIL	0.000	FAIL

Line and Leak Detector Tests

TANK NUMBER	PRODUCT	VOLUME CHANGE [illegible]	LINE RESULT [illegible]	LEAK DETECTOR PRESENT	LEAK DETECTOR RESULT	[illegible] OPERATION
1	UNLEADED	0.002	P	Y	P	Y
2	PREMIUM	0.002	P	Y	P	Y
3	PLUS	0.001	P	Y	P	Y
4	DIESEL	0.002	P	N		Y

Tanknology appreciates the opportunity to serve you, and looks forward to working with you in the future. Please call any time, day or night, when you need us.

Tanknology representative: MARK SHAW

Test conducted by: ERIC WILEY

Reviewed:

Technician Certification Number: 14914

Printed 03/02/2000 00:11 MSHAW

APPENDIX D

UST RECYCLER RECEIPT

RECEIVED NOV - 9 1999

NORTHWEST TRUCK PARTS & RECYCLING INC.
P.O. BOX 400
[illegible], OR 97048

7739

CUSTOMER'S ORDER NO.

NAME: Pacific Northern Environmental

DATE: 10-13-99

ADDRESS:

CITY, STATE, ZIP Longview Wa.

SOLD BY:	CASH	C.O.D.	CHARGE	ON ACCT.	MDSE RTD.	PAID OUT

QUANTITY	DESCRIPTION	PRICE	AMOUNT
3	12K Tanks To Be disposed		
1	8K Tank of as Scrap		
	Jus 20		
	Job # 49049		
	Delco		
	17873 SE McLoughlin		
	milwalkie Or		
	PO # 47304		
4 hrs	Truck Time @ 45.00		180 —

JOB # 49049
DEPT.
G.L. CODE

RECEIVED BY: Attn Kelley 11-13

PAY DATE

KEEP THIS COPY FOR YOUR RECORDS
©1998 REDIFORM® 5L320

POSTED

47304

Date 10/13/99 19

Date Required

How Ship

Terms

		PRICE	UNIT
20			
21			
22			

IMPORTANT

OUR ORDER NUMBER MUST APPEAR ON ALL INVOICES, PACKAGES, ETC.

PLEASE NOTIFY US IMMEDIATELY IF YOU ARE UNABLE TO SHIP COMPLETE ORDER BY DATE SPECIFIED.

FOR ALL SUBCONTRACTORS PERFORMING WORK ON-SITE, ACCEPTANCE OF THIS PURCHASE ORDER IS ACCEPTANCE OF THE TERMS AND CONDITIONS LISTED ON THE REVERSE SIDE.

DATE ORDERED:

[signature]

Purchasing Agent

WHITE - Accounting Copy YELLOW - Customer Copy PINK - Field Copy

APPENDIX E

EXCAVATION SOIL DISPOSAL LOAD REPORT

Soil Master (c)

TPS Technologies, Inc.

Completed Loads

Quarterly Summary Report

FAC – Job – Load Number	City/State	Net Tons
A09 -- 04236 -- 0001	MILWAUKIE, OR	24.32
A09 -- 04236 -- 0002	MILWAUKIE, OR	21.93
A09 -- 04236 -- 0003	MILWAUKIE, OR	24.16
A09 -- 04236 -- 0004	MILWAUKIE, OR	23.21
A09 -- 04236 -- 0005	MILWAUKIE, OR	23.23
A09 -- 04236 -- 0006	MILWAUKIE, OR	22.71
A09 -- 04236 -- 0007	MILWAUKIE, OR	22.19
A09 -- 04236 -- 0008	MILWAUKIE, OR	20.22
Totals for: 10/06/99		**181.97**
A09 -- 04236 -- 0009	MILWAUKIE, OR	19.54
A09 -- 04236 -- 0010	MILWAUKIE, OR	23.62
Totals for: 10/08/99		**43.16**
A09 -- 04236 -- 0011	MILWAUKIE, OR	21.81
A09 -- 04236 -- 0012	MILWAUKIE, OR	24.14
A09 -- 04236 -- 0013	MILWAUKIE, OR	24.49
A09 -- 04236 -- 0014	MILWAUKIE, OR	22.07
A09 -- 04236 -- 0015	MILWAUKIE, OR	22.29
A09 -- 04236 -- 0016	MILWAUKIE, OR	19.26
A09 -- 04236 -- 0017	MILWAUKIE, OR	24.27
A09 -- 04236 -- 0018	MILWAUKIE, OR	29.57
A09 -- 04236 -- 0019	MILWAUKIE, OR	23.10
Totals for: 10/11/99		**211.00**
A09 -- 04236 -- 0020	MILWAUKIE, OR	18.52
A09 -- 04236 -- 0021	MILWAUKIE, OR	17.84
A09 -- 04236 -- 0022	MILWAUKIE, OR	19.86
A09 -- 04236 -- 0023	MILWAUKIE, OR	20.17
A09 -- 04236 -- 0024	MILWAUKIE, OR	18.52
A09 -- 04236 -- 0025	MILWAUKIE, OR	21.06
A09 -- 04236 -- 0026	MILWAUKIE, OR	20.35
A09 -- 04236 -- 0027	MILWAUKIE, OR	17.67
Totals for: 10/12/99		**153.99**
A09 -- 04236 -- 0028	MILWAUKIE, OR	20.77
A09 -- 04236 -- 0029	MILWAUKIE, OR	21.97
A09 -- 04236 -- 0030	MILWAUKIE, OR	21.50
A09 -- 04236 -- 0031	MILWAUKIE, OR	23.64
A09 -- 04236 -- 0032	MILWAUKIE, OR	23.28
A09 -- 04236 -- 0033	MILWAUKIE, OR	22.10
A09 -- 04236 -- 0034	MILWAUKIE, OR	20.95
A09 -- 04236 -- 0035	MILWAUKIE, OR	17.91

Soil Master (c)

TPS Technologies, Inc.

Completed Loads
Quarterly Summary Report

FAC -- Job -- Load Number	City/State	Net Tons
A09 -- 04236 -- 0036	MILWAUKIE, OR	21.82
A09 -- 04236 -- 0037	MILWAUKIE, OR	21.43
A09 -- 04236 -- 0038	MILWAUKIE, OR	21.45
A09 -- 04236 -- 0039	MILWAUKIE, OR	18.47
Totals for: 10/13/99		**255.29**
A09 -- 04236 -- 0040	MILWAUKIE, OR	17.40
A09 -- 04236 -- 0041	MILWAUKIE, OR	18.03
Totals for: 10/14/99		**35.43**
A09 -- 04236 -- 0042	MILWAUKIE, OR	22.13
A09 -- 04236 -- 0043	MILWAUKIE, OR	19.43
Totals for: 10/15/99		**41.56**
A09 -- 04236 -- 0044	MILWAUKIE, OR	18.71
A09 -- 04236 -- 0045	MILWAUKIE, OR	15.59
A09 -- 04236 -- 0046	MILWAUKIE, OR	20.69
A09 -- 04236 -- 0047	MILWAUKIE, OR	22.44
A09 -- 04236 -- 0048	MILWAUKIE, OR	21.77
A09 -- 04236 -- 0049	MILWAUKIE, OR	16.63
A09 -- 04236 -- 0050	MILWAUKIE, OR	23.08
Totals for: 10/18/99		**138.91**
A09 -- 04236 -- 0051	MILWAUKIE, OR	27.30
A09 -- 04236 -- 0052	MILWAUKIE, OR	14.91
A09 -- 04236 -- 0053	MILWAUKIE, OR	22.60
A09 -- 04236 -- 0054	MILWAUKIE, OR	24.20
A09 -- 04236 -- 0055	MILWAUKIE, OR	11.22
A09 -- 04236 -- 0056	MILWAUKIE, OR	21.00
A09 -- 04236 -- 0057	MILWAUKIE, OR	21.18
A09 -- 04236 -- 0058	MILWAUKIE, OR	18.67
A09 -- 04236 -- 0059	MILWAUKIE, OR	12.35
A09 -- 04236 -- 0060	MILWAUKIE, OR	23.46
A09 -- 04236 -- 0061	MILWAUKIE, OR	20.75
A09 -- 04236 -- 0062	MILWAUKIE, OR	11.62
A09 -- 04236 -- 0063	MILWAUKIE, OR	22.07
A09 -- 04236 -- 0064	MILWAUKIE, OR	19.38
A09 -- 04236 -- 0065	MILWAUKIE, OR	12.82
Totals for: 10/19/99		**283.53**
A09 -- 04236 -- 0066	MILWAUKIE, OR	11.16
A09 -- 04236 -- 0067	MILWAUKIE, OR	13.13
A09 -- 04236 -- 0068	MILWAUKIE, OR	22.83

Soil Master (c)

TPS Technologies, Inc.

Completed Loads

Quarterly Summary Report

FAC -- Job -- Load Number	City/State	Net Tons
A09 -- 04236 -- 0069	MILWAUKIE, OR	25.10
A09 -- 04236 -- 0070	MILWAUKIE, OR	23.47
A09 -- 04236 -- 0071	MILWAUKIE, OR	12.32
A09 -- 04236 -- 0072	MILWAUKIE, OR	16.41
A09 -- 04236 -- 0073	MILWAUKIE, OR	23.34
A09 -- 04236 -- 0074	MILWAUKIE, OR	22.60
A09 -- 04236 -- 0075	MILWAUKIE, OR	21.91
A09 -- 04236 -- 0076	MILWAUKIE, OR	11.00
A09 -- 04236 -- 0077	MILWAUKIE, OR	14.80
A09 -- 04236 -- 0078	MILWAUKIE, OR	22.71
A09 -- 04236 -- 0079	MILWAUKIE, OR	21.50
A09 -- 04236 -- 0080	MILWAUKIE, OR	21.56
A09 -- 04236 -- 0081	MILWAUKIE, OR	14.83
A09 -- 04236 -- 0082	MILWAUKIE, OR	12.66
A09 -- 04236 -- 0083	MILWAUKIE, OR	24.19
A09 -- 04236 -- 0084	MILWAUKIE, OR	22.36
A09 -- 04236 -- 0085	MILWAUKIE, OR	19.66
A09 -- 04236 -- 0086	MILWAUKIE, OR	16.38
A09 -- 04236 -- 0087	MILWAUKIE, OR	19.33
A09 -- 04236 -- 0088	MILWAUKIE, OR	20.47
Totals for: 10/20/99		**433.72**
A09 -- 04236 -- 0089	MILWAUKIE, OR	20.12
A09 -- 04236 -- 0090	MILWAUKIE, OR	12.56
A09 -- 04236 -- 0091	MILWAUKIE, OR	15.56
A09 -- 04236 -- 0092	MILWAUKIE, OR	15.63
A09 -- 04236 -- 0093	MILWAUKIE, OR	18.58
A09 -- 04236 -- 0094	MILWAUKIE, OR	16.99
A09 -- 04236 -- 0095	MILWAUKIE, OR	20.40
A09 -- 04236 -- 0096	MILWAUKIE, OR	11.07
A09 -- 04236 -- 0097	MILWAUKIE, OR	16.13
A09 -- 04236 -- 0098	MILWAUKIE, OR	12.11
A09 -- 04236 -- 0099	MILWAUKIE, OR	20.74
A09 -- 04236 -- 0100	MILWAUKIE, OR	20.51
A09 -- 04236 -- 0101	MILWAUKIE, OR	11.43
A09 -- 04236 -- 0102	MILWAUKIE, OR	20.34
A09 -- 04236 -- 0103	MILWAUKIE, OR	13.65
A09 -- 04236 -- 0104	MILWAUKIE, OR	16.08
A09 -- 04236 -- 0105	MILWAUKIE, OR	11.39
A09 -- 04236 -- 0106	MILWAUKIE, OR	23.55
A09 -- 04236 -- 0107	MILWAUKIE, OR	20.69
A09 -- 04236 -- 0108	MILWAUKIE, OR	11.23
A09 -- 04236 -- 0109	MILWAUKIE, OR	22.85
A09 -- 04236 -- 0110	MILWAUKIE, OR	11.83

Soil Master (c) TPS Technologies, Inc.

Completed Loads
Quarterly Summary Report

FAC -- Job -- Load Number	City/State	Net Tons
A09 -- 04236 -- 0111	MILWAUKIE, OR	19.72
A09 -- 04236 -- 0112	MILWAUKIE, OR	11.85
A09 -- 04236 -- 0113	MILWAUKIE, OR	25.08
A09 -- 04236 -- 0114	MILWAUKIE, OR	11.72
A09 -- 04236 -- 0115	MILWAUKIE, OR	20.75
A09 -- 04236 -- 0116	MILWAUKIE, OR	20.95
A09 -- 04236 -- 0117	MILWAUKIE, OR	12.95
A09 -- 04236 -- 0118	MILWAUKIE, OR	18.25
A09 -- 04236 -- 0119	MILWAUKIE, OR	12.39
Totals for: 10/21/99		**517.10**
A09 -- 04236 -- 0120	MILWAUKIE, OR	20.81
A09 -- 04236 -- 0121	MILWAUKIE, OR	13.27
A09 -- 04236 -- 0122	MILWAUKIE, OR	20.83
A09 -- 04236 -- 0123	MILWAUKIE, OR	13.31
A09 -- 04236 -- 0124	MILWAUKIE, OR	13.68
A09 -- 04236 -- 0125	MILWAUKIE, OR	21.39
A09 -- 04236 -- 0126	MILWAUKIE, OR	18.16
A09 -- 04236 -- 0127	MILWAUKIE, OR	19.72
A09 -- 04236 -- 0128	MILWAUKIE, OR	10.54
A09 -- 04236 -- 0129	MILWAUKIE, OR	18.29
A09 -- 04236 -- 0130	MILWAUKIE, OR	11.27
A09 -- 04236 -- 0131	MILWAUKIE, OR	10.68
A09 -- 04236 -- 0132	MILWAUKIE, OR	17.48
A09 -- 04236 -- 0133	MILWAUKIE, OR	19.90
A09 -- 04236 -- 0134	MILWAUKIE, OR	20.68
A09 -- 04236 -- 0135	MILWAUKIE, OR	10.34
A09 -- 04236 -- 0136	MILWAUKIE, OR	19.17
A09 -- 04236 -- 0137	MILWAUKIE, OR	19.16
A09 -- 04236 -- 0138	MILWAUKIE, OR	11.43
A09 -- 04236 -- 0139	MILWAUKIE, OR	12.97
A09 -- 04236 -- 0140	MILWAUKIE, OR	19.84
A09 -- 04236 -- 0141	MILWAUKIE, OR	23.67
A09 -- 04236 -- 0142	MILWAUKIE, OR	22.72
A09 -- 04236 -- 0143	MILWAUKIE, OR	10.39
A09 -- 04236 -- 0144	MILWAUKIE, OR	9.69
A09 -- 04236 -- 0145	MILWAUKIE, OR	18.35
A09 -- 04236 -- 0146	MILWAUKIE, OR	18.33
A09 -- 04236 -- 0147	MILWAUKIE, OR	22.83
A09 -- 04236 -- 0148	MILWAUKIE, OR	18.28
A09 -- 04236 -- 0149	MILWAUKIE, OR	18.56
A09 -- 04236 -- 0150	MILWAUKIE, OR	21.44
A09 -- 04236 -- 0151	MILWAUKIE, OR	9.84
Totals for: 10/22/99		**537.02**

Soil Master (c) TPS Technologies, Inc.

Completed Loads
Quarterly Summary Report

FAC -- Job -- Load Number	City/State	Net Tons
A09 -- 04236 -- 0152	MILWAUKIE, OR	9.12
A09 -- 04236 -- 0153	MILWAUKIE, OR	11.64
A09 -- 04236 -- 0154	MILWAUKIE, OR	21.99
A09 -- 04236 -- 0155	MILWAUKIE, OR	19.66
A09 -- 04236 -- 0156	MILWAUKIE, OR	25.09
A09 -- 04236 -- 0157	MILWAUKIE, OR	8.81
A09 -- 04236 -- 0158	MILWAUKIE, OR	5.76
A09 -- 04236 -- 0159	MILWAUKIE, OR	11.67
A09 -- 04236 -- 0160	MILWAUKIE, OR	16.93
A09 -- 04236 -- 0161	MILWAUKIE, OR	26.51
A09 -- 04236 -- 0162	MILWAUKIE, OR	23.20
A09 -- 04236 -- 0163	MILWAUKIE, OR	11.33
A09 -- 04236 -- 0164	MILWAUKIE, OR	8.38
A09 -- 04236 -- 0165	MILWAUKIE, OR	10.87
A09 -- 04236 -- 0166	MILWAUKIE, OR	21.24
A09 -- 04236 -- 0167	MILWAUKIE, OR	19.19
A09 -- 04236 -- 0168	MILWAUKIE, OR	13.45
Totals for: 10/25/99		**264.84**
A09 -- 04236 -- 0169	MILWAUKIE, OR	25.06
A09 -- 04236 -- 0170	MILWAUKIE, OR	25.35
A09 -- 04236 -- 0171	MILWAUKIE, OR	21.81
A09 -- 04236 -- 0172	MILWAUKIE, OR	24.15
A09 -- 04236 -- 0173	MILWAUKIE, OR	23.25
A09 -- 04236 -- 0174	MILWAUKIE, OR	23.07
A09 -- 04236 -- 0175	MILWAUKIE, OR	24.57
A09 -- 04236 -- 0176	MILWAUKIE, OR	23.88
A09 -- 04236 -- 0177	MILWAUKIE, OR	25.52
A09 -- 04236 -- 0178	MILWAUKIE, OR	18.92
A09 -- 04236 -- 0179	MILWAUKIE, OR	22.20
A09 -- 04236 -- 0180	MILWAUKIE, OR	21.21
A09 -- 04236 -- 0181	MILWAUKIE, OR	18.12
A09 -- 04236 -- 0182	MILWAUKIE, OR	20.45
A09 -- 04236 -- 0183	MILWAUKIE, OR	20.81
A09 -- 04236 -- 0184	MILWAUKIE. OR	17.56
A09 -- 04236 -- 0185	MILWAUKIE, OR	18.49
A09 -- 04236 -- 0186	MILWAUKIE, OR	21.54
A09 -- 04236 -- 0187	MILWAUKIE, OR	23.10
Totals for: 10/26/99		**419.06**
A09 -- 04236 -- 0188	MILWAUKIE, OR	21.70
A09 -- 04236 -- 0189	MILWAUKIE, OR	22.96
A09 -- 04236 -- 0190	MILWAUKIE, OR	21.99

Soil Master (c) TPS Technologies, Inc.

Completed Loads
Quarterly Summary Report

FAC -- Job -- Load Number	City/State	Net Tons
A09 -- 04236 -- 0191	MILWAUKIE, OR	18.71
A09 -- 04236 -- 0192	MILWAUKIE, OR	19.45
A09 -- 04236 -- 0193	MILWAUKIE, OR	18.56
A09 -- 04236 -- 0194	MILWAUKIE, OR	15.34
A09 -- 04236 -- 0195	MILWAUKIE, OR	15.80
A09 -- 04236 -- 0196	MILWAUKIE, OR	18.13
A09 -- 04236 -- 0197	MILWAUKIE, OR	22.51
A09 -- 04236 -- 0198	MILWAUKIE, OR	20.70
A09 -- 04236 -- 0199	MILWAUKIE, OR	16.79
A09 -- 04236 -- 0200	MILWAUKIE, OR	20.91
A09 -- 04236 -- 0201	MILWAUKIE, OR	19.88
A09 -- 04236 -- 0202	MILWAUKIE, OR	19.96
A09 -- 04236 -- 0203	MILWAUKIE, OR	23.68
A09 -- 04236 -- 0204	MILWAUKIE, OR	20.39
A09 -- 04236 -- 0205	MILWAUKIE, OR	21.39
A09 -- 04236 -- 0206	MILWAUKIE, OR	19.95
A09 -- 04236 -- 0207	MILWAUKIE, OR	23.35
Totals for: 10/27/99		**402.15**
A09 -- 04236 -- 0208	MILWAUKIE, OR	23.60
A09 -- 04236 -- 0209	MILWAUKIE, OR	22.52
A09 -- 04236 -- 0210	MILWAUKIE, OR	21.77
A09 -- 04236 -- 0211	MILWAUKIE, OR	22.36
A09 -- 04236 -- 0212	MILWAUKIE, OR	21.64
A09 -- 04236 -- 0213	MILWAUKIE, OR	22.17
A09 -- 04236 -- 0214	MILWAUKIE, OR	17.59
A09 -- 04236 -- 0215	MILWAUKIE, OR	21.42
A09 -- 04236 -- 0216	MILWAUKIE, OR	19.75
A09 -- 04236 -- 0217	MILWAUKIE, OR	16.60
Totals for: 10/28/99		**209.42**
A09 -- 04236 -- 0218	MILWAUKIE, OR	21.66
A09 -- 04236 -- 0219	MILWAUKIE, OR	9.85
A09 -- 04236 -- 0220	MILWAUKIE, OR	18.37
A09 -- 04236 -- 0221	MILWAUKIE, OR	19.54
A09 -- 04236 -- 0222	MILWAUKIE, OR	13.66
A09 -- 04236 -- 0223	MILWAUKIE, OR	22.58
A09 -- 04236 -- 0224	MILWAUKIE, OR	19.03
A09 -- 04236 -- 0225	MILWAUKIE, OR	9.97
A09 -- 04236 -- 0226	MILWAUKIE, OR	16.05
Totals for: 11/03/99		**150.71**
A09 -- 04236 -- 0227	MILWAUKIE, OR	7.12

Soil Master (c) TPS Technologies, Inc.

Completed Loads
Quarterly Summary Report

FAC -- Job -- Load Number	City/State	Net Tons
A09 -- 04236 -- 0228	MILWAUKIE, OR	8.39
Totals for: 11/09/99		**15.51**
A09 -- 04236 -- 0229	MILWAUKIE, OR	11.26
A09 -- 04236 -- 0230	MILWAUKIE, OR	9.84
Totals for: 11/10/99		**21.10**
A09 -- 04236 -- 0231	MILWAUKIE, OR	12.75
A09 -- 04236 -- 0232	MILWAUKIE, OR	13.88
A09 -- 04236 -- 0233	MILWAUKIE, OR	18.39
A09 -- 04236 -- 0234	MILWAUKIE, OR	12.55
A09 -- 04236 -- 0235	MILWAUKIE, OR	15.61
A09 -- 04236 -- 0236	MILWAUKIE, OR	17.55
A09 -- 04236 -- 0237	MILWAUKIE, OR	23.54
A09 -- 04236 -- 0238	MILWAUKIE, OR	11.32
A09 -- 04236 -- 0239	MILWAUKIE, OR	17.12
Totals for: 11/17/99		**142.71**
A09 -- 04236 -- 0240	MILWAUKIE, OR	14.19
A09 -- 04236 -- 0241	MILWAUKIE, OR	11.78
A09 -- 04236 -- 0242	MILWAUKIE, OR	13.12
A09 -- 04236 -- 0243	MILWAUKIE, OR	11.36
A09 -- 04236 -- 0244	MILWAUKIE, OR	10.39
A09 -- 04236 -- 0245	MILWAUKIE, OR	15.09
A09 -- 04236 -- 0246	MILWAUKIE, OR	11.10
A09 -- 04236 -- 0247	MILWAUKIE, OR	12.26
A09 -- 04236 -- 0248	MILWAUKIE, OR	14.87
A09 -- 04236 -- 0249	MILWAUKIE, OR	15.06
Totals for: 11/29/99		**129.22**
A09 -- 04236 -- 0250	MILWAUKIE, OR	13.54
A09 -- 04236 -- 0251	MILWAUKIE, OR	18.91
A09 -- 04236 -- 0252	MILWAUKIE, OR	12.83
A09 -- 04236 -- 0253	MILWAUKIE, OR	15.90
A09 -- 04236 -- 0254	MILWAUKIE, OR	11.43
A09 -- 04236 -- 0255	MILWAUKIE, OR	13.18
A09 -- 04236 -- 0256	MILWAUKIE, OR	12.05
A09 -- 04236 -- 0257	MILWAUKIE, OR	16.28
A09 -- 04236 -- 0258	MILWAUKIE, OR	12.41
A09 -- 04236 -- 0259	MILWAUKIE, OR	14.44
A09 -- 04236 -- 0260	MILWAUKIE, OR	13.53
A09 -- 04236 -- 0261	MILWAUKIE, OR	10.65
A09 -- 04236 -- 0262	MILWAUKIE, OR	12.74

Soil Master (c) TPS Technologies, Inc.

Completed Loads
Quarterly Summary Report

FAC -- Job -- Load Number	City/State	Net Tons
A09 -- 04236 -- 0263	MILWAUKIE, OR	15.76
A09 -- 04236 -- 0264	MILWAUKIE, OR	11.56
Totals for: 11/30/99		**205.21**
A09 -- 04236 -- 0265	MILWAUKIE, OR	10.36
A09 -- 04236 -- 0266	MILWAUKIE, OR	14.79
A09 -- 04236 -- 0267	MILWAUKIE, OR	13.62
A09 -- 04236 -- 0268	MILWAUKIE, OR	14.13
A09 -- 04236 -- 0269	MILWAUKIE, OR	14.16
A09 -- 04236 -- 0270	MILWAUKIE. OR	14.32
A09 -- 04236 -- 0271	MILWAUKIE, OR	13.39
A09 -- 04236 -- 0272	MILWAUKIE, OR	15.23
A09 -- 04236 -- 0273	MILWAUKIE, OR	11.58
Totals for: 12/01/99		**121.58**
A09 -- 04236 -- 0274	MILWAUKIE, OR	8.18
A09 -- 04236 -- 0275	MILWAUKIE, OR	13.59
A09 -- 04236 -- 0276	MILWAUKIE, OR	14.19
A09 -- 04236 -- 0277	MILWAUKIE, OR	9.47
A09 -- 04236 -- 0278	MILWAUKIE, OR	11.88
Totals for: 12/02/99		**57.31**
A09 -- 04236 -- 0279	MILWAUKIE, OR	10.81
A09 -- 04236 -- 0280	MILWAUKIE, OR	11.75
A09 -- 04236 -- 0281	MILWAUKIE, OR	11.94
Totals for: 12/20/99		**34.50**
Total for Quarter:		**5,006.00**

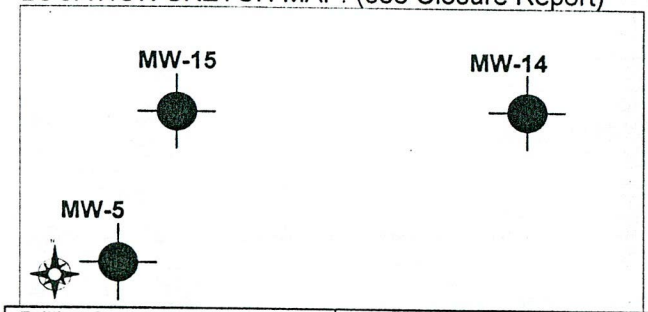
APPENDIX F

MONITOR WELLS LOGS (MW-14 AND MW-15) AND WELL SURVEY

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

GEOLOGIC LOG

LOCATION SKETCH MAP: (see Closure Report)



Project No./Name:	CLIENT:
990621/Delco	Delco Petroleum Co. LLC
Project Location: 17873 SE McLoughlin Blvd. Milwaukie, Oregon	Drill Hole No.: **MW-14**
Drilling Co./Foreman: Stratus/S. Flaherty	Geologist: Richard Kent
Drilling Method/C57/Rig: 10" PVC placed in excavation	Sampling Method(s): None: during excavation

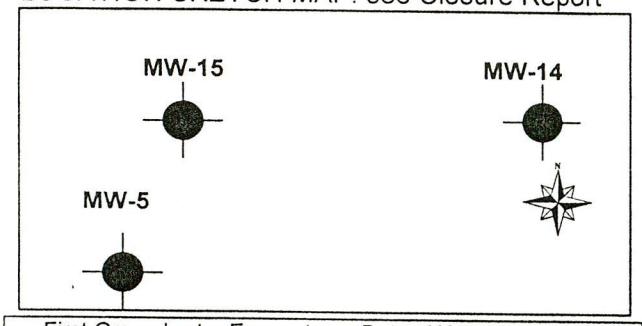
Drilling Start Date/Time:	Drilling End Date/Time:	Elevation:	Total Depth:	Surface Conditions:	Samples:
11/17/99	11/17/99	95.65-ft msl	9.0-ft	open excavation	0 Water
Depth 1st Water Date/Time:	**Geophys. Logs:**	**Sec-Tws-Rng**	**Laboratory:**	**C-O-C Number:**	0 Soil (see excavation sample map)
>10-ft	na	SE/SW/18-2S-2E	na	na	

DEPTH (feet)	SAMPLE NO.	SPT	Time	HC Odor	USCS CLASS	NAME	DENSITY	COLOR	MOISTURE	REMARKS
1						3" asphalt surface				
2										unwashed crushed rock
3					NA	Backfill: 1-1/4" minus				
4										permeable geofabric
5										
6					NA	Backfill: 2"-4" gabion				
7										unwashed crushed rock
8										
9	9.0-ft									
10	TOTAL DEPTH									
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

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

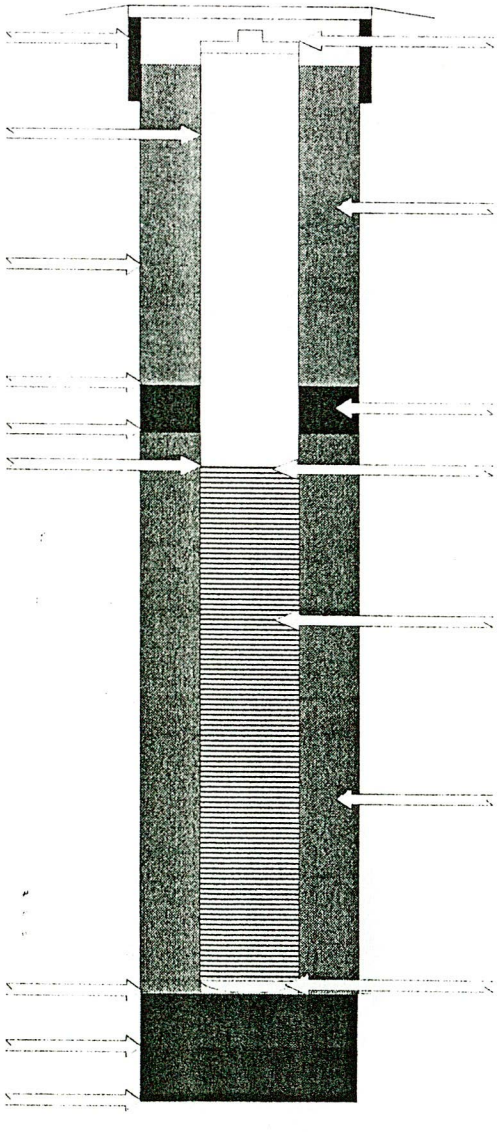
AS-BUILT WELL INSTALLATION SKETCH

LOCATION SKETCH MAP: see Closure Report



Project No./Name: 990621/Delco	CLIENT: Delco Petroleum Co. LLC
Install Date/Time: Start: 1/14/00: 0900 End: 1/18/00: 1200	Well No.: **MW-14**
	Project Location: 17873 SE McLoughlin Blvd. Milwaukie, Oregon

First Groundwater Encounter During Drilling Was:	Date: NA Time: 10" PVC Casing placed into excavation Depth:	Elevation: 95.65-ft msl	Total Drilled Depth: 9.0-ft	Drilling Co./Foreman: Status Corp./Scott Flaherty, #10077	Type of Well: Monitor
Development Method: 1/31/00, bailer	Geologist: Richard Kent	Sec-Tws-Rng SE/SW/18-2S-2E	Padlock No.: P150 KA	Drill Rig Type: NA	Install SWL: 5.0 bgs



☑'Christy'-type traffic and security surface box or ☐Above Ground Casing

Blank casing ID 4- inches

Boring OD 10- inches

Seal depth to top 1- feet

Filter pack depth to top 4- feet

Screen depth to top 4- feet

Depth bottom of casing 9- feet

Overdrill sand backfill bottom 0- feet

Overdrill bentonite backfill bottom 0- feet

Water-tight well plug with padlock

Surface annular seal
☑Bentonite or
☐Type I-II cement

Bentonite seal

Flush threaded O-ring coupling

Schedule 40 PVC screen slot size 0.010 inches

Granular filter pack kiln dried sand, #10x20

Bottom flush threaded cap
☑pointed tip T-200 or
☐round cap

STATE OF OREGON

MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

L 13022

Start Card # 101856

(1) OWNER/PROJECT:

WELL NO. MW-14

Name OELCO PETROLEUM CO.

Address 14 LONGLEAF DR.

City HAMILTON State NJ Zip 08690

(2) TYPE OF WORK:

☑ New construction ☐ Alteration (Repair/Recondition)

☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger ☑ Other TEMP PVC PIPE

(6) LOCATION OF WELL By legal description

Well Location: County MULTNOMAH

Township 2S (N or S) Range 2E (E or W) Section 18

1. SE 1/4 of SW 1/4 of above section.

2. **Either** Street address of well location 17873 SE McLOUGLIN MILWAUKIE, OR 97267

or Tax lot number of well location 1700

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:

5.0 Ft. below land surface. Date 11/14/00

Artesian Pressure _____ lb/sq. in. Date _____

BORE HOLE CONSTRUCTION

Special Standards ☐ Yes ☑ No

Depth of completed well 9 ft.

Land surface

Vault 0 ft. TO 1 ft.

Seal 1 ft. TO 4 ft.

Filter pack 4 ft. TO 9 ft.

Water-tight cover

Surface flush vault

Locking cap

Casing diameter 4 in.

material PVC

Welded ☐ Threaded ☑ Glued ☐

Liner diameter N/A in.

material _____

Welded ☐ Threaded ☐ Glued ☐

Well seal:

Material HOLE PLUG

Amount 6 BAGS

Grout weight _____

Borehole diameter 10 in.

☐ Bentonite plug at least 3 ft. thick

Screen material PVC

interval(s):

From 4 To 9

From _____ To _____

Slot size .010 in.

Filter pack:

Material SAND

Size 10X20 in.

(8) WATER BEARING ZONES:

Depth at which water was first found 5.0

From	To	Est. Flow Rate	SWL

(9) WELL LOG:

Ground elevation _____

Material	From	To	SWL
10" PVC CASING WAS PLACED INTO EXCAVATION AND EXCAVATION WAS BACKFILLED.			
CONSTRUCT WELL IN 10" CASING REMOVE CASING			

Date started _____ Completed _____

(5) WELL TEST:

☐ Pump ☑ Bailer ☐ Air ☐ Flowing Artesian

Permeability _____ Yield _____ GPM

Conductivity _____ PH _____

Temperature of water _____ °F/C Depth artesian flow found _____ ft.

Was water analysis done? ☐ Yes ☑ No

By whom? _____

Depth of strata to be analyzed. From _____ ft. to _____ ft.

Remarks: _____

Name of supervising Geologist/Engineer _____

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number _____

Signed _____ Date _____

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10077

Signed _____ Date 11/18/00

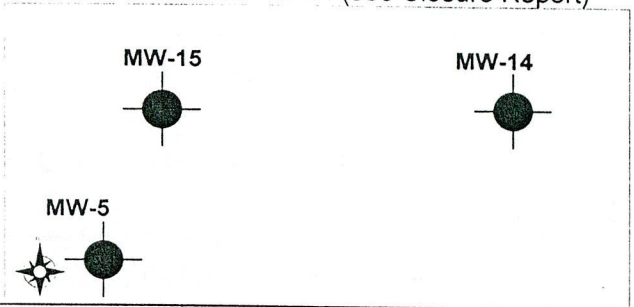
ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT

SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

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

GEOLOGIC LOG
SHEET 1 of 1

LOCATION SKETCH MAP: (see Closure Report)



Project No./Name:	CLIENT:
990621/Delco	Delco Petroleum Co. LLC
Project Location: 17873 SE McLoughlin Blvd. Milwaukie, Oregon	Drill Hole No.: **MW-15**
Drilling Co./Foreman: Stratus/S. Flaherty	Geologist: Richard Kent
Drilling Method/C57/Rig: 10" PVC placed in excavation	Sampling Method(s): None: during excavation

Drilling Start Date/Time:	Drilling End Date/Time:	Elevation:	Total Depth:	Surface Conditions:	Samples:
11/17/99	11/17/99	96.42-ft msl	15.5-ft	open excavation	0 Water
Depth 1st Water Date/Time:	**Geophys. Logs:**	**Sec-Tws-Rng**	**Laboratory:**	**C-O-C Number:**	0 Soil (see excavation sample map)
>10-ft	na	SE/SW/18-2S-2E	na	na	

DEPTH (feet)	SAMPLE NO.	SPT	Time	HC Odor	USCS CLASS	NAME	DENSITY	COLOR	MOISTURE	REMARKS
1					NA	3" asphalt surface Backfill: 1-1/4" minus				unwashed crushed rock
2										
3										
4										
5										
6										
7					NA	Backfill: ½" well-rnded				"pea gravel"
8										
9										
10										
11										
12										
13										
14										
15	15.5-ft									
16	TOTAL DEPTH									
17										
18										
19										
20										

GeoPro Geologic Services
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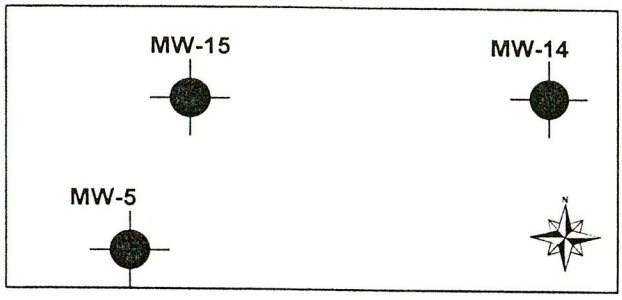
(360) 666-1465

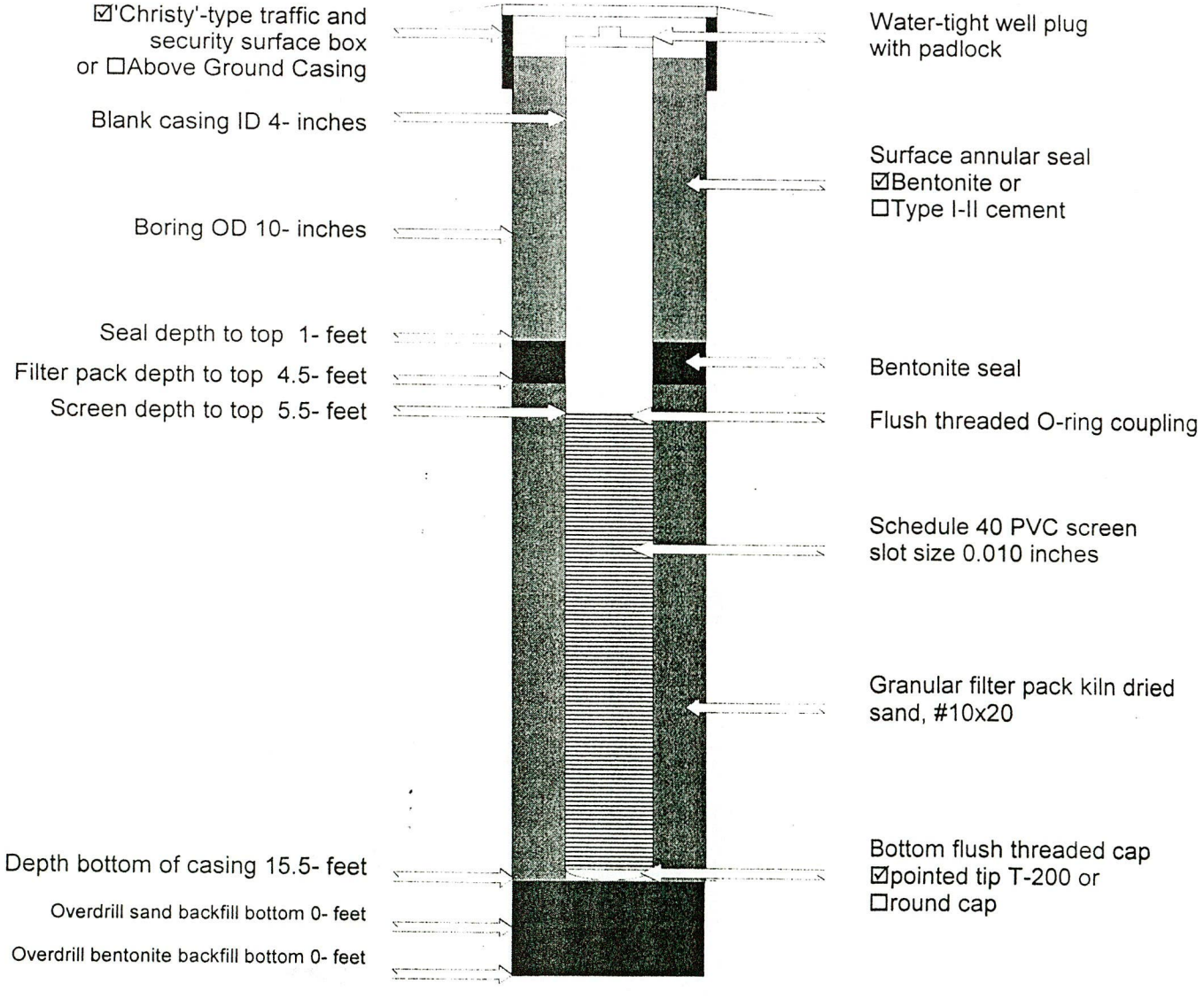
AS-BUILT WELL INSTALLATION SKETCH

LOCATION SKETCH MAP:



Project No./Name: 990621/Delco	CLIENT: Delco Petroleum Co. LLC
Install Date/Time: Start: 1/14/00: 1000 End: 1/18/00: 1200	Well No.: **MW-15**
	Project Location: 17873 SE McLoughlin Blvd. Milwaukie, Oregon

First Groundwater Encounter During Drilling Was:	Date: NA Time: 10" PVC Casing placed into excavation Depth:	Elevation: 96.42-ft msl	Total Drilled Depth: 14.5-ft	Drilling Co./Foreman: Status Corp./Scott Flaherty, #10077	Type of Well: Monitor
Development Method: 1/31/00, bailer	Geologist: Richard Kent	Sec-Tws-Rng SE/SW/18-2S-2E	Padlock No.: P150 KA	Drill Rig Type: NA	Install SWL: 5.3 bgs



STATE OF OREGON

MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

L 13023

Start Card # 101 857

(1) OWNER/PROJECT:

WELL NO. MW-15

Name OELCO PETROLEUM CO.

Address 14 LONGLEAF BLVD

City HAMILTON State N.J Zip 08690

(2) TYPE OF WORK:

☑ New construction ☐ Alteration (Repair/Recondition)

☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger ☑ Other TEMPORARY PVC PIPE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Yes ☑ No

Depth of completed well 15.5 ~~14.5~~ ft.

Land surface

Vault 0 ft. TO 1 ft.

Seal 1 ft. TO 4.5 ft.

Filter pack 4.5 ft. TO 15.5 ft.

Water-tight cover

Surface flush vault

Locking cap

Casing diameter 4 in.

material PVC

Welded ☐ Threaded ☑ Glued ☐

Liner diameter N/A in.

material

Welded ☐ Threaded ☐ Glued ☐

Well seal: Material HOLE PLUG

Amount 1 BAG

Grout weight

Borehole diameter 10 in.

☐ Bentonite plug at least 3 ft. thick

Screen material PVC

interval(s): From 5.5 To 15.5

From To

Slot size .010 in.

Filter pack: Material SAND

Size 10X20 in.

(5) WELL TEST:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability Yield GPM

Conductivity PH

Temperature of water 56 °F °C Depth artesian flow found ft.

Was water analysis done? ☐ Yes ☑ No

By whom?

Depth of strata to be analyzed. From ft. to ft.

Remarks:

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

Well Location: County MULTNOMAH

Township 2S (N or S) Range 2E (E or W) Section 18

1. SE 1/4 of SW 1/4 of above section.

2. **Either** Street address of well location 17873 SE MCLOUGHLIN BLVD MILWAUKIE, OR 97267

or Tax lot number of well location 1700

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:

5.3 Ft. below land surface. Date 11/14/00

Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES:

Depth at which water was first found 5'

From	To	Est. Flow Rate	SWL

(9) WELL LOG:

Ground elevation

Material	From	To	SWL
10" PVC CASING WAS PLACED INTO EXCAVATION AND EXCAVATION WAS BACKFILLED.			
CONSTRUCT WELL IN TEMPORARY 10" CASING, REMOVED 10" CASING			

Date started Completed

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number

Signed Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10077

Signed Date 1/18/00

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT

SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

BARBIERI & ASSOCIATES, INC.
7017 NE HWY 99 SUITE 204
VANCOUVER, WA. 98665
360-695-1001
Tue Feb 01 08:45:35 2000

PROJECT: C:\PRO\JIFF00.PRO

Point Coordinates Listing

	Point	North	East	Elev	Name
	49	4870.9168	4968.5950	98.70	5/8"IR
	50	4867.5422	5158.0749	97.69	5/8"IR
MW-14	152	4992.8679	5095.8737	95.65	PVC
	153	4992.8358	5096.1113	96.05	CASE
MW-15	154	4994.8507	5032.1873	96.42	PVC
	155	4994.0509	5032.1189	96.73	CASE

APPENDIX G

LABORATORY REPORTS INDEX TO DISKETTES