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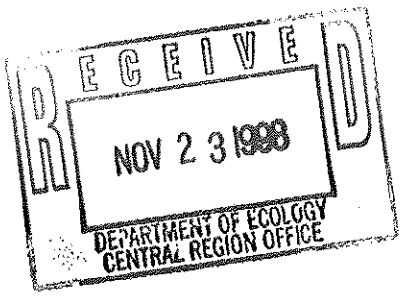

REPORT OF SOIL / GROUNDWATER CHARACTERIZATION ASSESSMENT
SPORTLAND MINI-MART TEXACO SERVICE STATION SITE
4400 BULLFROG ROAD
CLE ELUM, WASHINGTON

Prepared for
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EXECUTIVE SUMMARY

GN Northern, Inc. (GN Northern) has completed soil and groundwater characterization assessment activities for the Sportland Mini-mart Texaco Service Station site located at 4400 Bullfrog Road in Cle Elum, Washington. The purpose of the investigation was to assist responsible parties in complying with current Washington State Department of Ecology (WDOE) regulations and guidelines for the assessment of underground storage tank (UST) sites contaminated by petroleum hydrocarbons. Soil and groundwater contaminated with petroleum hydrocarbons was discovered in the vicinity of the former dispenser pump island on September 22, 1998, during UST installation and upgrade activities. Subsequent characterization activities were conducted between the dates of October 6 and 8, 1998.

Five borings were completed at the site using a drill rig equipped with a tubex system to evaluate subsurface conditions. Following the completion of boring and soil sampling activities, monitoring wells were constructed in the borings in accordance with WDOE guidelines. Groundwater samples were collected from the wells on October 7, 1998. Selected soil and groundwater samples were submitted to Transglobal Environmental Geosciences Northwest, Inc. (TEG), a WDOE approved laboratory, for total petroleum hydrocarbons as gasoline (TPH-G) analysis by Method NWTPH-G and benzene, toluene, ethylbenzene, and xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8020.

Analytical laboratory test results show that gasoline range petroleum hydrocarbons were detected in soil samples collected from the monitoring well MW-3 and MW-5 boring locations. Contaminant concentrations, however, were below Model Toxics Control Act (MTCA) Method A cleanup levels. Petroleum hydrocarbons were not detected in soil samples collected from the MW-1, 2, and 4 boring locations. Concentrations of gasoline range petroleum hydrocarbons, if present, were below the detection limits of the analytical method and below MTCA Method A cleanup levels.

Petroleum hydrocarbons were detected in groundwater samples collected from MW-3. Concentrations of TPH-G (213,500 ug/l), benzene (2,720 ug/l), toluene (17,200 ug/l), ethylbenzene (25,000 ug/l), and xylenes (5,700 ug/l) exceeded established MTCA Method A cleanup levels of 1000

ug/l (TPH-G), 5 ug/l (benzene), 40 ug/l (toluene), 30 ug/l (ethylbenzene), and 20 ug/l (xylenes) for these compounds. Free product has been detected in MWs-3 and 5.

The full extent of petroleum contamination could not be determined by this assessment. The vertical extent of the release appears to be limited by the surface of the groundwater table at depths ranging between 17 and 22 feet below ground surface (BGS). The petroleum hydrocarbon plume appears to be spreading in a northeast-southwest direction from the former dispenser pump island. At the time of our investigation, the plume had not reached MWs-1, 2, and 4. Additional characterization will be necessary to define the horizontal extent of impacted soil and groundwater.

Well gauging and on-going groundwater sampling is recommended to monitor the thickness of the free product in MWs-3 and 5 and general water quality conditions at the site. It is not known if subsurface conditions will be further impacted by seasonal fluctuations of the groundwater table through petroleum contaminated soil zones. At the time of this report, free product recovery has been initiated in MW-3 using a peristaltic active skimmer system. The goals of liquid hydrocarbon recovery are to remove as much free product as possible while establishing controls over continued subsurface migration.

Drill cuttings generated during boring activities can be used as backfill at the site, because petroleum hydrocarbon concentrations were below MTCA Method A cleanup levels in the collected samples. Well development water containerized in 55 gallon drums at the site must be disposed of in a manner consistent with WDOE guidelines. GN Northern can assist in scheduling a company which specializes in petroleum hydrocarbon recycling to pump the water from the drums and dispose of the material at an approved facility.

This report fulfills the reporting requirements of Washington Administrative Code (WAC) 173-340-300 thru 320. Notification can be completed by filing this report with WDOEs Central Region office in Yakima, Washington. Under WAC 173-340-350, a state remedial investigation/feasibility study is required to develop and evaluate sufficient information regarding a site to enable the selection of a cleanup action under WAC 173-340-360. This report addresses the initial steps of the remedial

investigation/feasibility study process, but additional characterization will be required before the selection of a long term cleanup action can be determined.

1.0 PROJECT DESCRIPTION

1.1 Introduction

At the request of Mr. Jeff Anderson, GN Northern, Inc. (GN Northern) has completed soil and groundwater characterization assessment activities for the Sportland Mini-mart Texaco Service Station site located at 4400 Bullfrog Road in Cle Elum, Washington (Site Location Map - Figure 1, Appendix 1). This report presents the results of our environmental site assessment (ESA) to evaluate subsurface soil and groundwater conditions at the site. Soil and groundwater contaminated with petroleum hydrocarbons was discovered at the site on September 22, 1998, during underground storage tank (UST) installation and upgrade activities. GN Northern's characterization assessment was conducted between the dates of October 6 and 8, 1998.

1.2 Purpose and Scope

The purpose of this project was to assist responsible parties in complying with current Washington State Department of Ecology (WDOE) regulations and guidelines for the assessment of UST sites contaminated by petroleum hydrocarbons (Ecology, 1992, 1995, and 1996). The Model Toxics Control Act (MTCA), Chapter 70.105D Revised Code of Washington (RCW), is the primary legislative mechanism used to achieve cleanup of petroleum hydrocarbon impacted sites in the State of Washington.

The following scope of services were performed for this assessment:

- An environmental professional was mobilized to the site with the appropriate equipment to perform the required ESA and to observe monitoring well installation activities. The environmental professional was registered with WDOE to perform ESAs and had 40 hour Occupational Safety and Health Administration health and safety training.

- Five borings were completed at the site using a drill rig equipped with a tubex system to evaluate subsurface conditions.

- Representative soil samples were collected from the borings for analytical laboratory analysis. Subsurface soils were evaluated by our environmental professional for signs of contamination including visible free product, soil discoloration, and odor. Selected

soil samples were screened with a photoionization detector (PID) to determine the presence or absence of volatile organic vapors.

- Five monitoring wells were installed in the borings to evaluate groundwater quality. The wells were developed prior to sampling to establish continuity with the aquifer and to remove disturbed water created during drilling activities. Following well development, groundwater samples were collected from each well for analytical laboratory analysis.

- Selected soil and groundwater samples were shipped to a WDOE approved laboratory for analysis of total petroleum hydrocarbons as gasoline (TPH-G) by Method NWTPH-G and volatile constituents: benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020.

- This report was prepared in general accordance with WDOE publication no. 91-30 (*Guidance for Remediation of Releases from Underground Storage Tanks)* to summarize the field activities performed and the findings of the ESA. The report renders our evaluation concerning petroleum hydrocarbon contamination at the site.

2.0 BACKGROUND INFORMATION AND SITE DESCRIPTION

2.1 Project Background

GN Northern was contacted on September 21, 1998, by Mr. Anderson to assist in the preliminary evaluation of a petroleum hydrocarbon release at the site prior to performing UST site assessment activities. The release was discovered by Joe Hall Construction of Selah, Washington, during UST installation and upgrade activities. GN Northern mobilized an environmental professional to the site on September 22, 1998, to document field conditions and collect representative subsurface media samples for characterization and laboratory analysis. Groundwater was observed at a depth of 16.5 feet below ground surface (BGS) in the new tank excavation.

Soil samples *B-16'BGS* and *SP-1* were collected from the base of the new tank excavation at a depth of 16'BGS and the stockpiled contaminated soil, respectively. Groundwater sample *GW-1* was collected by hand in a 40 ml VOA vial from the base of the new tank excavation to provide an estimate of groundwater contaminant concentrations (Figure 2, Appendix 1). The soil and groundwater samples were submitted to Transglobal Environmental Geosciences Northwest, Inc. (TEG) for analysis of TPH-G and BTEX. Because leaded gasoline was historically used at the site, the soil samples were also analyzed for lead.

Analytical laboratory test results indicated that soil samples *B-16'BGS* and *SP-1* contained gasoline range petroleum hydrocarbon concentrations of 190 mg/kg and 1,800 mg/kg, respectively. These concentrations exceeded the MTCA Method A cleanup level of 100 mg/kg for gasoline range petroleum hydrocarbons in soil. Elevated BTEX concentrations were also detected in both samples, but only soil sample *SP-1* contained benzene and xylene concentrations which exceeded MTCA Method A cleanup levels. Lead was not detected in either sample.

Elevated BTEX and TPH-G concentrations were detected in groundwater sample *GW-1*. Concentrations of BTEX and TPH-G were 470 ug/l, 1,600 ug/l, 440 ug/l, 1,900 ug/l, and 31,000 ug/l, respectively. The concentrations exceeded the MTCA Method A cleanup levels for these compounds.

2.1.1 Underground Storage Tank Site Assessment

Two 10,000 gallon underground storage tanks (USTs), one covered pump island, and associated equipment were decommissioned between the dates of September 29, and October 1, 1998. Prior to conducting excavation activities, the tanks were pumped of remaining product and inerted. Residual petroleum product pumped from the USTs prior to removal was stored on-site in five 55-gallon drums until disposal/recycling logistics can be finalized. The condition of the removed tanks and ancillary equipment was visually verified by GN Northern personnel. The steel tanks and removed piping were in good condition with no signs of perforations and/or seam failures.

Analytical laboratory test results revealed that gasoline range petroleum hydrocarbons were detected in soil sample # *Disp. Island* collected from a depth of 3.5 feet BGS beneath the dispenser island (Figure 2, Appendix 1). TPH-G and xylene concentrations of 3,370 mg/kg and 54.4 mg/kg were detected above MTCA Method A cleanup levels in the sample. Concentrations of BTEX were below MTCA Method A cleanup levels. Petroleum hydrocarbons were not detected in soil samples collected from the former tank excavation or beneath the piping run between the dispenser island and the tank excavation (198-334.RPT, 1998). Copies of the analytical laboratory test results and chain-of-custody documentation are provided in the Appendices

2.2 Site Location

The site is identified as the Sportland Mini-mart Texaco located at 4400 Bullfrog Road in Cle Elum, Washington. The present owner of the property is Mr. Jack Wadkins. The project contact person is Mr. Jeff Anderson who can be reached by mail at Sportland Mini-mart Texaco, 4400 Bullfrog Road, Cle Elum, Washington 98922. Mr. Anderson may be contacted by telephone at (509) 649-2258.

An approximate legal description of the site is the southwest quarter of the southwest quarter of section 21, township 20 north, range 15 east of the W.M., Kittitas County, Washington. Based on the USGS 7.5 minute series topographic map of the area (Cle Elum Quadrangle), the latitude is 47 degrees 12 minutes 30 seconds and the longitude is 120 degrees 58 minutes 48 seconds. A Site Plan, showing specific site features (Figure 3), is provided in Appendix 1. The site is bounded by

State Route 903 and residential properties to the north, residential properties to the east, undeveloped vacant land to the south, and Bullfrog Road and undeveloped vacant land to the west.

2.3 Topography and Geology

The City of Cle Elum is situated between the Cascade Range and the Columbia River Plateau physiographic province. The Columbia Plateau is comprised of a series of flood basalts which cover most of central and eastern Washington. In the site vicinity, the Cascade Range is composed of Eocene age volcanic basalt of the Teanaway Formation. Overlying the Teanaway Formation are sedimentary coastal plain deposits of the Roslyn Formation (Alt and Hyndman, 1984). The site area is generally level with elevations ranging between 2,120 and 2,135 feet above mean sea level (USGS, 1984).

During our site assessment activities, the soil was generally found to be Silty GRAVEL (GM) to a depth of about 25 feet BGS. The silty gravel was slightly moist, non-plastic, loose to very dense, and brown in color. This coarse grained soil contains greater than 12% fines and less than 15% sand.

The nearest surface water is the southeasterly flowing Crystal Creek, located about 0.20 mile northeast of the site. The Crystal Creek drainage area is primarily northwest of the site. Crystal Creek flows into the Yakima River, approximately 2.0 miles east of the site.

2.4 Groundwater Conditions

The groundwater table was encountered at a depth of about 16.5 feet BGS during our assessment activities. Static groundwater levels in the completed monitoring wells were observed at depths ranging between 17 and 22 feet BGS. Regional groundwater flow is estimated to be toward the south and the Yakima River.

3.0 FIELD INVESTIGATION METHODS

3.1 Drilling and Soil Sample Collection

On October 6 and 7, 1998, five exploratory boring were completed at the site. The borings were completed by R & R Drilling of Puyallup, Washington, under GN Northern's observation, using a truck-mounted drill rig (Mobile B-61). Prior to commencing drilling activities at the site, utilities were cleared by the local utility companies.

Borings were advanced with a 6 inch tubex drilling system. Soil samples were collected using a 2 inch inside diameter (I.D.) split spoon sampler driven into the subsurface strata using a 140 pound hammer falling 30 inches. Poor sample recovery was encountered due to the gravelly subsurface conditions. The split spoon samplers were decontaminated with a soap wash between sampling events to prevent possible cross-contamination of soil samples. Drill cuttings were stored in five 55-gallon drums at the site pending the results of laboratory analysis.

Soils were visually examined for evidence of hydrocarbon contamination. Selected samples were screened for volatile organic compounds (VOCs) using a Microtip MP-100 PID. Headspace samples are prepared by the sampler according to the following procedure: a) collect the samples in airtight plastic bags; b) puncture each bag with the PID instrument probe after sample temperatures have equilibrated; and c) withdraw the trapped air for analysis. These field analyses provide a qualitative indication of the relative amounts of volatile residual liquid hydrocarbons present in the sample and are not to be interpreted as actual contaminant concentrations.

Soils were classified based on visual and textural identification in general accordance with American Society for Testing and Materials (ASTM) D2488, a method based on the Unified Soil Classification System. Soil classification descriptions and headspace results are recorded on the monitoring well installation logs provided in Appendix 2. Selected soil samples were submitted to TEG for analysis of TPH-G by Method NWTPH-G and BTEX by EPA Method 8020.

3.2 Monitoring Well Installation

Groundwater monitoring wells were installed in the borings in accordance with WDOE guidelines. Completion depth for the wells was about 25 feet BGS. The screened interval in each monitoring well was placed so that the estimated seasonal fluctuation of the groundwater table would remain within the screened zone. Monitoring wells were constructed using threaded, flush joint 2 inch I.D. Schedule 40 PVC casing. Ten foot sections of manufactured screen with 0.020 inch openings (No. 20 slot) were installed in the wells. Washed silica sand was placed in the annular space through the screened interval and a bentonite seal was placed above the sand to within one foot of ground surface. Flush mounted, tamper resistant well protectors were set in place with concrete to prevent surface water from seeping into the annular space around the casing.

3.3 Groundwater Sampling and Analysis

Groundwater samples were collected from monitoring wells MW-1, 2, and 3 on October 7, 1998, and submitted to TEG for TPH-G analysis by Method NWTPH-G and BTEX by EPA Method 8020. Groundwater samples were not collected from monitoring wells MW-4 and MW-5, because MW-4 was dry and about 3 inches of free product was encountered on the surface of the groundwater table in MW-5. Generally, free liquid hydrocarbons will remain in the soil pore spaces if the hydrocarbon release exceeds the adsorptive capacity of the sediments in the unsaturated zone (API, 1989).

Groundwater samples were obtained using GN Northern's standard field procedures described below. Well development water was stored in 55-gallon drums at the site pending the results of laboratory analysis.

- Prior to sampling at least three well volumes and sufficient casing volumes to result in minimal turbidity in the newly installed wells were evacuated with an electric pump. Groundwater samples were then collected using disposable bailers. Precleaned 40 milliliter (ml) vials with teflon septa were filled for analytical laboratory analysis. All samples were kept cool with ice and insulated chests following collection, and remained in the custody of GN Northern personnel until shipment to the analytical laboratory. Time and date of sample collection, sample identification numbers, custody personnel, and time and date received by the laboratory were transcribed on the chain-of-custody forms for each sample.

A level survey was conducted by Cruse and Nelson, Inc., of Ellensburg, Washington, using differential leveling techniques to determine the relative elevations of designated measuring points on the casings of each well. Casing elevations were referenced to Kittitas County "Station 0066-1993" (Elevation 2097.4). A copy of the survey drawing is provided in Appendix 3. Static water levels were measured to provide data used to determine the flow direction of the shallow groundwater system at the site.

3.4 Hydrogeologic Data

Static water levels were measured in the wells on October 7 and 20, 1998. Table 1 lists the well completion data and groundwater level information for the installed monitoring wells. Well locations are shown on Figure 2 (Appendix 1) and on the survey drawing in Appendix 3.

Table 1
Summary of Groundwater Monitoring Well Data
Sportland Mini-mart Texaco

Monitoring Well	Elevation of TOC[1] (feet)	Date	Depth to Water Below TOC (feet)	Elevation of Static Water Level (feet)	Screened Interval (feet)
MW-1	2134.85	10-7-98 10-20-98	21.90 21.10	2112.95 2113.75	10.00 - 25.00
MW-2	2132.95	10-7-98 10-20-98	20.95 21.75	2112.00 2111.20	10.00 - 25.00
MW-3	2134.44	10-7-98* 10-20-98**	16.37 22.60	2118.07 2111.84	10.00 - 25.00
MW-4	2134.06	10-7-98 10-20-98	Dry[2] Dry	N/A[3] N/A	10.00 - 25.00
MW-5	2132.93	10-7-98** 10-20-98**	18.49 19.25	2114.44 2113.68	10.00 - 25.00

Notes: 1) TOC = Top of casing- north side.
2) Dry = Water, if present, was below the sensor of the water level indicator.
3) N/A = Not applicable.
* = Petroleum hydrocarbon sheen observed on the surface of the groundwater table (visual observation).
** = Free product on surface of groundwater table (visual observations confirmed with interface probe).

The groundwater flow direction at the site was calculated to be towards the northeast and State Route 903 on October 7, 1998. Subsequent groundwater flow direction calculations in late-October revealed that the gradient had reversed to the south-southeast. The calculated groundwater flow directions on October 7 and 20, 1998, are shown on the survey drawing in Appendix 3.

Table 2
Summary of Free Product Data
Sportland Mini-mart Texaco

Monitoring Well	Elevation of TOC[1] (feet)	Date	Depth to Product Below TOC (feet)	Elevation of Product (feet)	Product Thickness (feet)
MW-3	2134.44	10-7-98* 10-20-98**	16.37 20.40	2118.07 2114.04	Sheen 2.2
MW-5	2132.93	10-7-98** 10-20-98**	18.29 18.80	2114.64 2114.13	0.20 0.45

Notes: 1) TOC = Top of casing- north side.
* = Petroleum hydrocarbon sheen observed on the surface of the groundwater table (visual observation).
** = Free product on surface of groundwater table (visual observations confirmed with interface probe).

A "Solinst" Model 122 interface probe and disposable bailers were used to gauge free product thickness in monitoring wells MW-3 and MW-5. The interface probe uses infra-red refraction to detect free product and conductivity to distinguish water. This method of measurement is accurate to within 1/8 of an inch.

On October 7, 1998, a petroleum hydrocarbon sheen and 0.20 feet of product were observed on the surface of the groundwater table in MW-3 and MW-5, respectively. Subsequent measurements on October 20, 1998, revealed that the thickness of the free product had increased to 2.2 feet in MW-3 and 0.45 feet in MW-5.

4.0 CLEANUP STANDARDS

4.1 Selection of Cleanup Standards

"MTCA defines a two-step approach for establishing cleanup requirements for individual sites: establishing cleanup standards and selecting cleanup actions. Establishing cleanup standards for individual sites requires the specification of the following: 1) hazardous substance concentrations that protect human health and the environment ("cleanup levels"), 2) the location on the site where those cleanup levels must be attained ("points of compliance"), and 3) additional regulatory requirements that apply to a cleanup action because of the type of action and/or the location of the site. These requirements are specified in applicable state and federal laws and are generally established in conjunction with the selection of a specific cleanup action (Ecology, 1996)."

MTCA Method A cleanup levels for soil and groundwater were selected for the site, because these standards are the most stringent for the contaminants identified. WDOE has determined that compliance with these levels should be sufficient to protect human health and the environment. Briefly, Method A cleanup levels for hazardous substances are established at concentrations at least as stringent as concentrations specified in applicable state and federal laws. Method A cleanup levels for substances not addressed under applicable state and federal laws are established at concentrations which do not exceed the natural background concentration or the practical quantitation limit for the substance in question. Method A cleanup levels have been defined for 25 of the most common hazardous substances found at sites. Further information regarding cleanup standards and cleanup actions is provided in WDOE publication no. F-TC-94-130 (*Cleaning Up Hazardous Waste Sites: Cleanup Standards and Cleanup Actions*) located in Appendix 4.

5.0 ANALYTICAL LABORATORY ANALYSIS

5.1 Analytical Results

Representative soil and groundwater samples, obtained during site characterization activities, were collected in laboratory supplied containers, labeled, and placed in coolers with ice for temporary storage until received by the analytical laboratory. The soil and groundwater samples were submitted to TEG, a WDOE approved laboratory, for analysis of TPH-G by Method NWTPH-G and BTEX by EPA Method 8020. Analytical laboratory test results are summarized in Tables 3 and 4.

Table 3
Summary of NWTPH-G and BTEX Analysis in Soil
Sportland Mini-mart Texaco

Date Sample No.	Location[1]	Sample Type Matrix	Analyte				
			TPH-G[2] (mg/kg)[3]	Benzene (mg/kg) (B)	Toluene (mg/kg) (T)	Ethylbenzene (mg/kg) (E)	Xylenes (mg/kg) (X)
MW-1	MW-1, 15 ft.	Grab Soil	ND	ND	ND	ND	ND
MW-2	MW-2, 15 ft.	Grab Soil	ND	ND	ND	ND	ND
MW-3	MW-3, 15 ft.	Grab Soil	25	ND	ND	0.13	0.1
MW-4	MW-4, 15 ft.	Grab Soil	ND	ND	ND	ND	ND
MW-5	MW-5, 17 ft.	Grab Soil	14	ND	ND	ND	ND

Notes: 1) Sample locations are characterized by area from which the sample was obtained and the depth (in feet) below ground surface.
2) TPH-G = Total petroleum hydrocarbons as gasoline.
3) Soil sample results are reported as a dry weight basis in milligrams per kilogram (mg/kg).
ND indicates analyte not detected at the listed method detection limit.
Method Detection Limit: Gasoline (10 mg/kg), Benzene (0.05 mg/kg), Toluene (0.05 mg/kg), Ethylbenzene (0.05 mg/kg), and Xylenes (0.05 mg/kg).
Model Toxics Control Act (MTCA) Method A cleanup level for: TPH-G (100 mg/kg), Benzene (0.5 mg/kg), Toluene (40.0 mg/kg), Ethylbenzene (20.0 mg/kg), and Xylenes (20.0 mg/kg).
Samples analyzed by Method NWTPH-G and EPA Method 8020.

Table 4
Summary of NWTPH-G and BTEX Analysis in Water
Sportland Mini-mart Texaco

Date Sample No.	Location[1]	Sample Type Matrix	Analyte				
			TPH-G[2] (ug/l)[3]	Benzene (ug/l) (B)	Toluene (ug/l) (T)	Ethylbenzene (ug/l) (E)	Xylenes (ug/l) (X)
MW-1	MW-1	Grab Water	ND	ND	ND	ND	ND
MW-2	MW-2	Grab Water	ND	ND	ND	ND	ND
MW-3	MW-3	Grab Water	213,500	2,720	17,200	25,000	5,700

Notes: 1) Sample locations are characterized by monitoring well from which the sample was obtained.
2) TPH-G = Total petroleum hydrocarbons as gasoline.
3) Soil sample results are reported in micrograms per liter (ug/l).
ND indicates analyte not detected at the listed method detection limit.
Method Detection Limit: Gasoline (100 ug/l), Benzene (1.0 ug/l), Toluene (1.0 ug/l), Ethylbenzene (1.0 ug/l), and Xylenes (1.0 ug/l).
Model Toxics Control Act (MTCA) Method A cleanup level for: TPH-G (1000 ug/l), Benzene (5.0 ug/l), Toluene (40.0 ug/l), Ethylbenzene (30.0 ug/l), and Xylenes (20.0 ug/l).
Highlighted box indicates analyte concentration exceeds MTCA Method A cleanup level.
Samples analyzed by Method NWTPH-G and EPA Method 8020.

Analytical laboratory test results (Table 3) show that gasoline range petroleum hydrocarbons were detected in soil samples collected from the MW-3 and MW-5 boring locations. Contaminant concentrations, however, were below MTCA Method A cleanup levels. Petroleum hydrocarbons were not detected in soil samples collected from the MW-1, 2, and 4 boring locations. Concentrations of gasoline range petroleum hydrocarbons, if present, were below the detection limits of the analytical method and below MTCA Method A cleanup levels.

Table 4 shows that petroleum hydrocarbons were detected in groundwater samples collected from MW-3. Concentrations of TPH-G (213,500 ug/l), benzene (2,720 ug/l), toluene (17,200 ug/l), ethylbenzene (25,000 ug/l), and xylenes (5,700 ug/l) exceeded established MTCA Method A cleanup levels of 1000 ug/l (TPH-G), 5 ug/l (benzene), 40 ug/l (toluene), 30 ug/l (ethylbenzene),

and 20 ug/l (xylenes) for these compounds. Analytical laboratory test reports and chain-of-custody documentation are provided in Appendix 5.

6.0 SUMMARY AND CONCLUSIONS

GN Northern has completed soil and groundwater characterization assessment activities for the Sportland Mini-mart Texaco Service Station site. The purpose of the investigation was to assist responsible parties in complying with current WDOE regulations and guidelines for the assessment of UST sites contaminated by petroleum hydrocarbons. Soil and groundwater contaminated with petroleum hydrocarbons was discovered in the vicinity of the former dispenser pump island on September 22, 1998, during UST installation and upgrade activities. Subsequent characterization activities were conducted between the dates of October 6 and 8, 1998.

Five borings were completed at the site using a drill rig equipped with a tubex system to evaluate subsurface conditions. Following the completion of boring and soil sampling activities, monitoring wells were constructed in the borings in accordance with WDOE guidelines. Groundwater samples were collected from the wells on October 7, 1998. Selected soil and groundwater samples were submitted to TEG for TPH-G analysis by Method NWTPH-G and BTEX by EPA Method 8020.

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The full extent of petroleum contamination could not be determined by this assessment. The vertical extent of the release appears to be limited by the surface of the groundwater table at depths ranging between 17 and 22 feet BGS. The petroleum hydrocarbon plume appears to be spreading in a northeast-southwest direction from the former dispenser pump island. At the time of our investigation, the plume had not reached MWs-1, 2, and 4. Additional subsurface characterization will be necessary to define the horizontal extent of impacted soil and groundwater.

Well gauging and on-going groundwater sampling is recommended to monitor the thickness of free product in MWs-3 and 5 and general water quality conditions at the site. It is not known if subsurface conditions will be further impacted by seasonal fluctuations of the groundwater table through PCS zones. At the time of this report, free product recovery has been initiated in MW-3 using a peristaltic active skimmer system. The goals of liquid hydrocarbon recovery are to remove as much free product as possible while establishing controls over continued subsurface migration.

Drill cuttings generated during boring activities can be used as backfill at the site, because petroleum hydrocarbon concentrations were below MTCA Method A cleanup levels in the collected soil samples. Well development water containerized in 55 gallon drums on-site must be disposed in a manner consistent with WDOE guidelines. GN Northern can assist in scheduling a company which specializes in petroleum hydrocarbon recycling to pump the water from the drums and dispose of the material at an approved facility.

This report fulfills the reporting requirements of WAC 173-340-300 thru 320. Notification can be completed by filing this report with WDOEs Central Region office in Yakima, Washington. Under WAC 173-340-350, a state remedial investigation/feasibility study is required to develop and evaluate sufficient information regarding a site to enable the selection of a cleanup action under WAC 173-340-360. This report addresses the initial steps of the remedial investigation/feasibility study process, but additional characterization will be required before the selection of a long term cleanup action can be determined.

7.0 LIMITATIONS

This work was performed in accordance with the generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. GN Northern observed a degree of care and skill generally exercised by other consultants under similar circumstances and conditions. GN Northern's findings and conclusions must be considered not as scientific certainties, but as opinions based on our professional judgement concerning the significance of the data gathered during the course of monitoring. Other than this, no warranty is implied or intended.

8.0 REFERENCES

198-334.RPT, 1998. *Report of Underground Storage Tank Site Assessment, Sportland Mini-mart Texaco, 4400 Bullfrog Road, Cle Elum, Washington.* Prepared by GN Northern, Inc., Kennewick, Washington, October 22, 1998.

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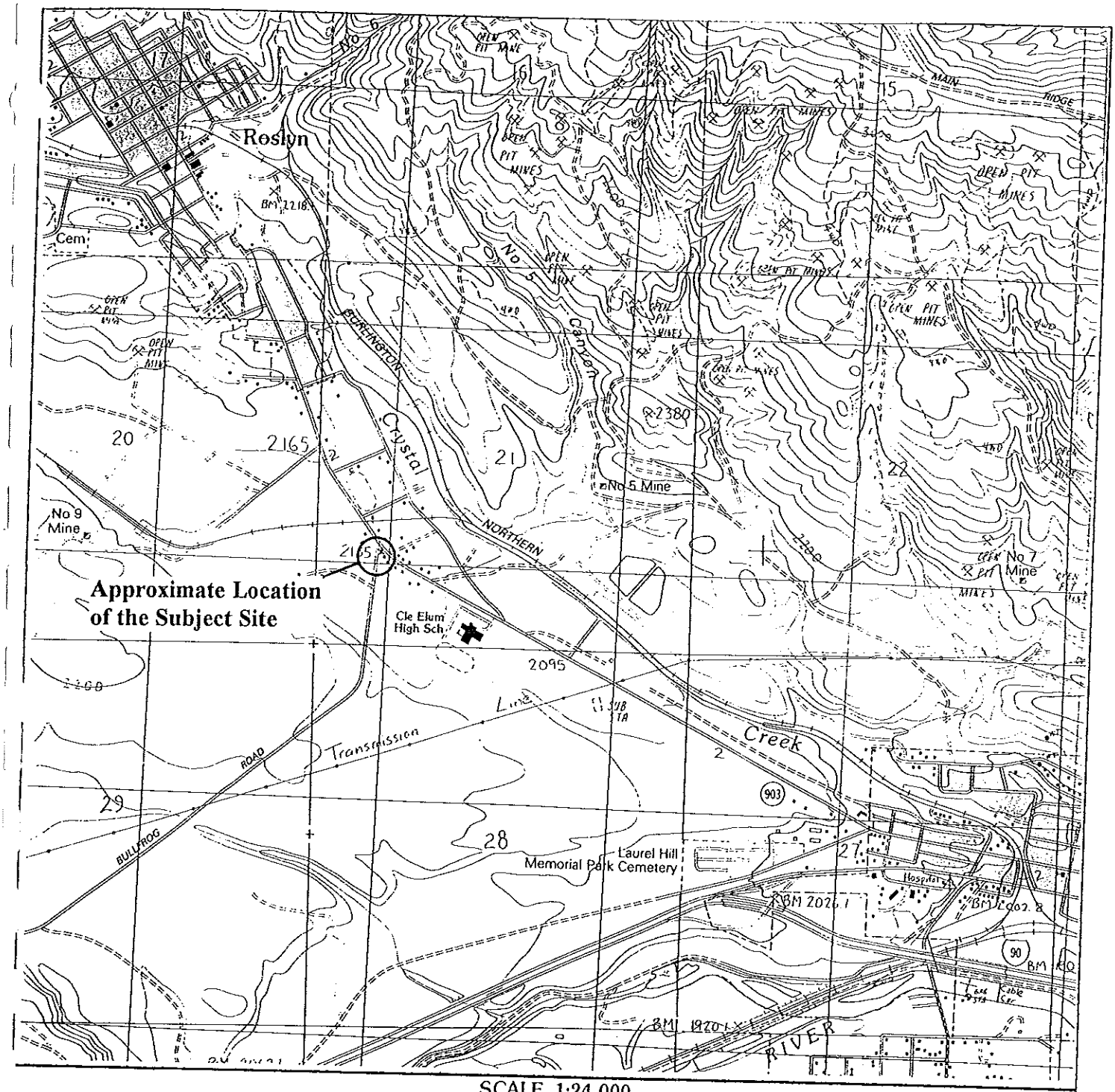
APPENDICES

Appendix 1
Figures



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MILES

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FEET

N

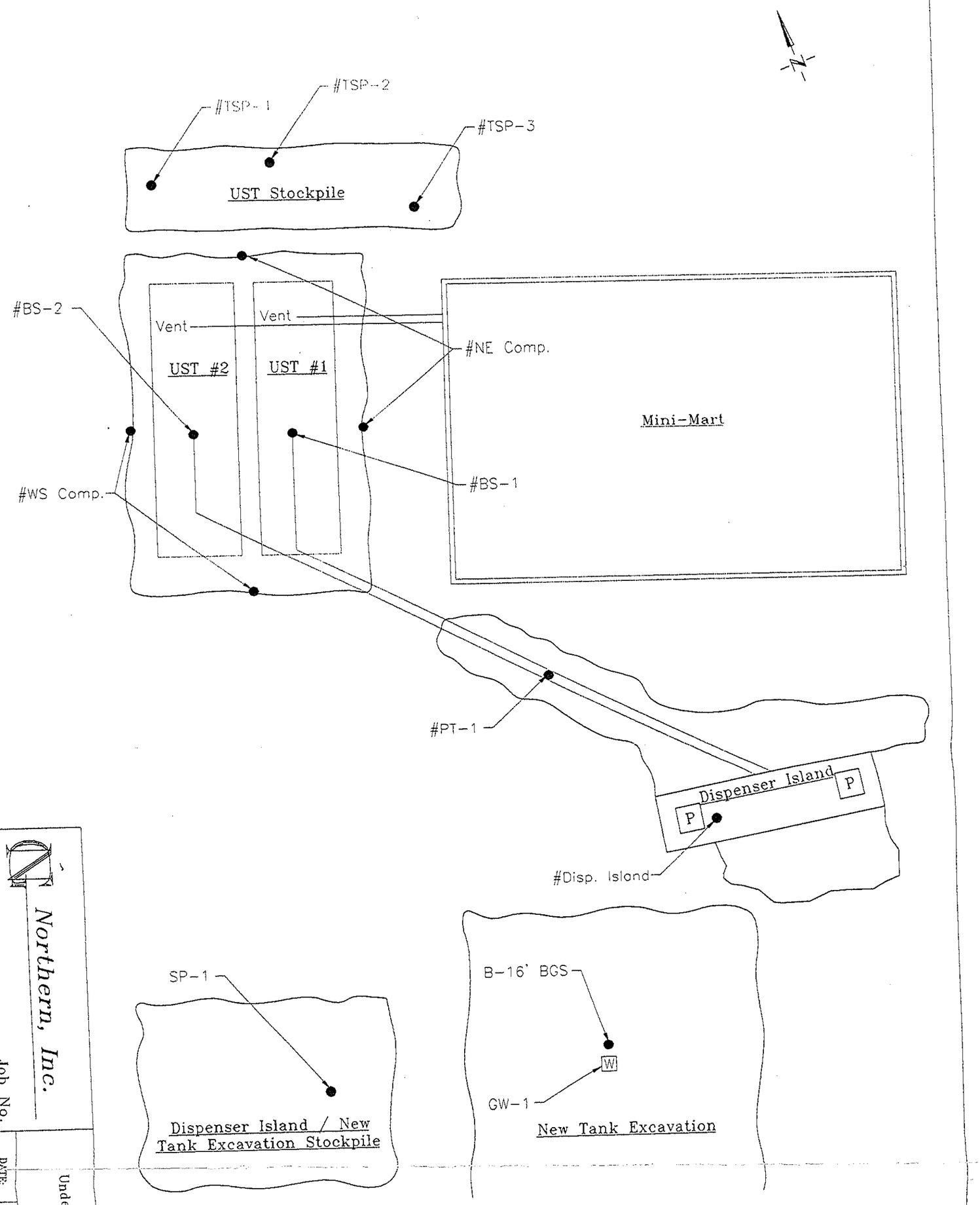
CONTOUR INTERVAL 40 FEET

Northern, Inc.

Job No.
198-334-1

Site Location Map
USGS 7.5 Minute Series (Cle Elum Quadrangle)
Soil/Groundwater Characterization Assessment
Anderson Texaco Site
Cle Elum, Washington

DATE:	DRAWN BY:	REVIEWED BY:	SCALE:	FIGURE NO.
1994	JB	GH	As Shown	1



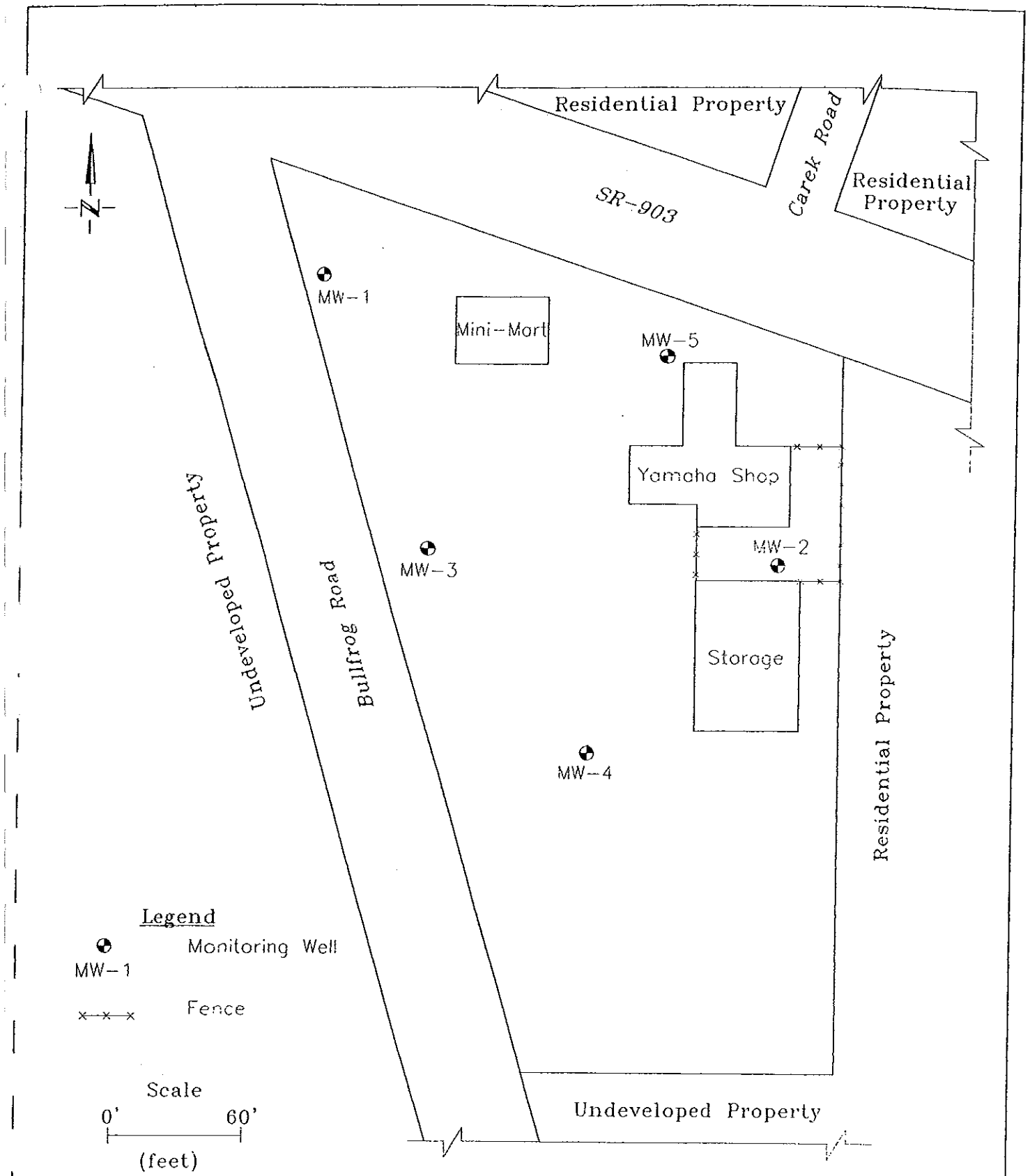
Northern, Inc.

Job No. 198-334

Site Plan

Underground Storage Tank Site Assessment
Anderson Texaco Site
Cle Elu, Washington

DATE: 10/98	DRAWN BY: JB	REVIEWED BY: GH	SCALE: As Shown	FIGURE NO. 2



Northern, Inc.

Site Map
Soil/Groundwater Characterization Assessment
Anderson Texaco Site
Cle Elum, Washington

Job No. 198-334-1

DATE:	DRAWN BY:	REVIEWED BY:	SCALE:	FIGURE NO.
10/98	JB	GH	As Shown	3

Appendix 2
Monitoring Well Installation Logs

MONITORING WELL INSTALLATION LOG — GN Northern, Inc.

PROJECT: SPORTLAND MINI-MART TEXACO SERVICE STATION, 4400 BULLFROG ROAD, CLE ELUM, WASHINGTON

JOB NO.: 198-334-1 WELL NO: MW-1 PAGE: 1 of 1

LOCATION: 10 ft. West 2 ft. North of South Sign Pole Post

DRILL TYPE: Mobile B-61 SOIL: 6 inch ODEX ROCK: N/A

DRILLED BY: R & R Drilling, Puyallup, WA LOGGED BY: Bolles

ELEVATION: CASING - 2134.85 ft. TC N.S. GROUNDWATER - 21.90 ft. BTC N.S.

DATE: STARTED - 10-6-98 COMPLETED - 10-6-98

CASING: DIAMETER - 2 in. SCH. 40 PVC SLOT SIZE - 20 slot

DEPTH IN FEET (BGS)	CLASSIFICATION AND DESCRIPTION	SYMBOL	GEOLOGIC ORIGIN	SAMPLE NO./TYPE	Hammer Blows per 6" 1st	2nd	3rd	WELL COMPLETION
0.0 - 15.0	SILTY GRAVEL; slightly moist, non-plastic, very dense, brown. Grey basalt gravels.	(GM)	Native	LSS (3.5'-5') No recovery, no staining or odor in cuttings.	50 for 5"			FLUSH MOUNT; 0.5 CONCRETE; BENTONITE CHIPS; 7.0
				LSS (7.5'-9') No recovery, no staining or odor in cuttings.	50 for 5"			10-20 SILICA SAND; 10.0
15.0 - 25.0	SILTY GRAVEL; very moist, non-plastic, very dense, brown. Grey basalt gravels. Soil Sample: MW-1@15'BGS (12:00P)	(GM)	Native	LSS (13.5'-15') Poor recovery, no staining or odor.	50 for 5"			▽ 21.90
	Base of boring at about 25.0' BGS							25.0

This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The information presented is a simplification of actual conditions encountered.

MONITORING WELL INSTALLATION LOG — GN Northern, Inc.

PROJECT: SPORTLAND MINI-MART TEXACO SERVICE STATION, 4400 BULLFROG ROAD, CLE ELUM, WASHINGTON

JOB NO.: 198-334-1 WELL NO: MW-2 PAGE: 1 of 1

LOCATION: 10 ft. South 3 ft. West of Southeast Corner of Yamaha Shop

DRILL TYPE: Mobile B-61 SOIL: 6 inch ODEX ROCK: N/A

DRILLED BY: R & R Drilling, Puyallup, WA LOGGED BY: Bolles

ELEVATION: CASING - 2132.95 ft. TC N.S. GROUNDWATER - 20.95 ft. BTC N.S.

DATE: STARTED - 10-6-98 COMPLETED - 10-6-98

CASING: DIAMETER - 2 in. SCH. 40 PVC SLOT SIZE - 20 slot

DEPTH IN FEET (BGS)	CLASSIFICATION AND DESCRIPTION	SYMBOL	GEOLOGIC ORIGIN	SAMPLE NO./TYPE	Hammer Blows per 6" 1st	2nd	3rd	WELL COMPLETION
0.0 - 15.0	SILTY GRAVEL; slightly moist, non-plastic, very dense, brown. Grey basalt gravels.	(GM)	Native	LSS (3.5'-5') No recovery, no staining or odor in cuttings.	50 for 5"			FLUSH MOUNT; 0.5 Concrete; BENTONITE CHIPS; 7.0
				LSS (7.5'-9') No recovery, no staining or odor in cuttings.	50 for 5"			10-20 SILICA SAND; 10.0
15.0 - 25.0	SILTY GRAVEL; very moist, non-plastic, very dense, brown. Grey basalt gravels. Soil Sample: MW-2@15'BGS (3:35P)	(GM)	Native	LSS (13.5'-15') Poor recovery, no staining or odor. PID=0.0 ppm	50 for 5"			▽ 20.95
	Base of boring at about 25.0' BGS							25.0

This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The information presented is a simplification of actual conditions encountered.

MONITORING WELL INSTALLATION LOG

GN Northern, Inc.

PROJECT: SPORTLAND MINI-MART TEXACO SERVICE STATION, 4400 BULLFROG ROAD, CLE ELUM, WASHINGTON

JOB NO.: 198-334-1 WELL NO: MW-3 PAGE: 1 of 1

LOCATION: 21 ft. West 3 ft. North of Southwest Corner South Pump Island

DRILL TYPE: Mobile B-61 SOIL: 6 inch ODEX ROCK: N/A

DRILLED BY: R & R Drilling, Puyallup, WA LOGGED BY: Bolles

ELEVATION: CASING - 2134.44 ft. TC N.S. GROUNDWATER - 16.37 ft. BTC N.S.

DATE: STARTED - 10-7-98 COMPLETED - 10-7-98

CASING: DIAMETER - 2 in. SCH. 40 PVC SLOT SIZE - 20 slot

DEPTH IN FEET (BGS)	CLASSIFICATION AND DESCRIPTION	SYMBOL	GEOLOGIC ORIGIN	SAMPLE NO./TYPE	Hammer Blows per 6" 1st / 2nd / 3rd	WELL COMPLETION
0.0 - 15.0	SILTY GRAVEL; slightly moist, non-plastic, very dense, brown. Grey basalt gravels.	(GM)	Native	LSS (3.5'-5') Poor recovery, no staining or odors. PID=0.0 ppm	50 for 3"	Flush Mount; 0.5 Concrete; Bentonite Chips; 7.0; 10-20 Silica Sand; 10.0
				LSS (7.5'-9') Fair to poor recovery, no staining or odors. PID=0.0 ppm	50 for 4"	
15.0 - 25.0	SILTY GRAVEL; very moist, non-plastic, very dense, brown. Grey basalt gravels. Soil Sample: MW-3@15'BGS (9:30A)	(GM)	Native	LSS (13.5'-15') Fair recovery, no staining, but mild odor. PID=0.0 ppm Sheen observed on groundwater.	23 / 50 for 4"	▽ 16.37
	Base of boring at about 25.0' BGS					25.0

This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The information presented is a simplification of actual conditions encountered.

MONITORING WELL INSTALLATION LOG

GN Northern, Inc.

PROJECT: SPORTLAND MINI-MART TEXACO SERVICE STATION, 4400 BULLFROG ROAD, CLE ELUM, WASHINGTON

JOB NO.: 198-334-1 WELL NO: MW-4 PAGE: 1 of 1

LOCATION: 11 ft. South 39 ft. West of Southwest Storage Building Corner

DRILL TYPE: Mobile B-61 SOIL: 6 inch ODEX ROCK: N/A

DRILLED BY: R & R Drilling, Puyallup, WA LOGGED BY: Bolles

ELEVATION: CASING - 2134.06 ft. TC N.S. GROUNDWATER - Well Dry

DATE: STARTED - 10-7-98 COMPLETED - 10-7-98

CASING: DIAMETER - 2 in. SCH. 40 PVC SLOT SIZE - 20 slot

DEPTH IN FEET (BGS)	CLASSIFICATION AND DESCRIPTION	SYMBOL	GEOLOGIC ORIGIN	SAMPLE NO./TYPE	Hammer Blows per 6" 1st	2nd	3rd	WELL COMPLETION
0.0 - 15.0	SILTY GRAVEL; slightly moist, non-plastic, very dense, brown. Grey basalt gravels.	(GM)	Native	LSS (3.5'-5') Poor recovery, no staining or odors. PID=0.0 ppm	50 for 3"			FLUSH MOUNT; 0.5 CONCRETE; BENTONITE CHIPS; 7.0
				LSS (7.5'-9') Poor recovery, no staining or odors. PID=0.0 ppm	20 / 50 for 3"			10-20 SILICA SAND; 10.0
15.0 - 25.0	SILTY GRAVEL; very moist, non-plastic, very dense, brown. Grey basalt gravels. Soil Sample: MW-4@15'BGS (1:50P)	(GM)	Native	LSS (13.5'-15') Poor recovery, no staining or odors. PID=0.0 ppm	24 / 50 for 5"			
	Base of boring at about 25.0' BGS							25.0

This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The information presented is a simplification of actual conditions encountered.

MONITORING WELL INSTALLATION LOG — GN Northern, Inc.

PROJECT: SPORTLAND MINI-MART TEXACO SERVICE STATION, 4400 BULLFROG ROAD, CLE ELUM, WASHINGTON

JOB NO.: 198-334-1 WELL NO: MW-5 PAGE: 1 of 1

LOCATION: 7.5 ft. West 2.5 ft. North of Northwest Cornerof Yamaha Shop

DRILL TYPE: Mobile B-61 SOIL: 6 inch ODEX ROCK: N/A

DRILLED BY: R & R Drilling, Puyallup, WA LOGGED BY: Bolles

ELEVATION: CASING - 2132.93 ft. TC N.S. GROUNDWATER - 18.49 ft. BTC N.S.

DATE: STARTED - 10-7-98 COMPLETED - 10-7-98

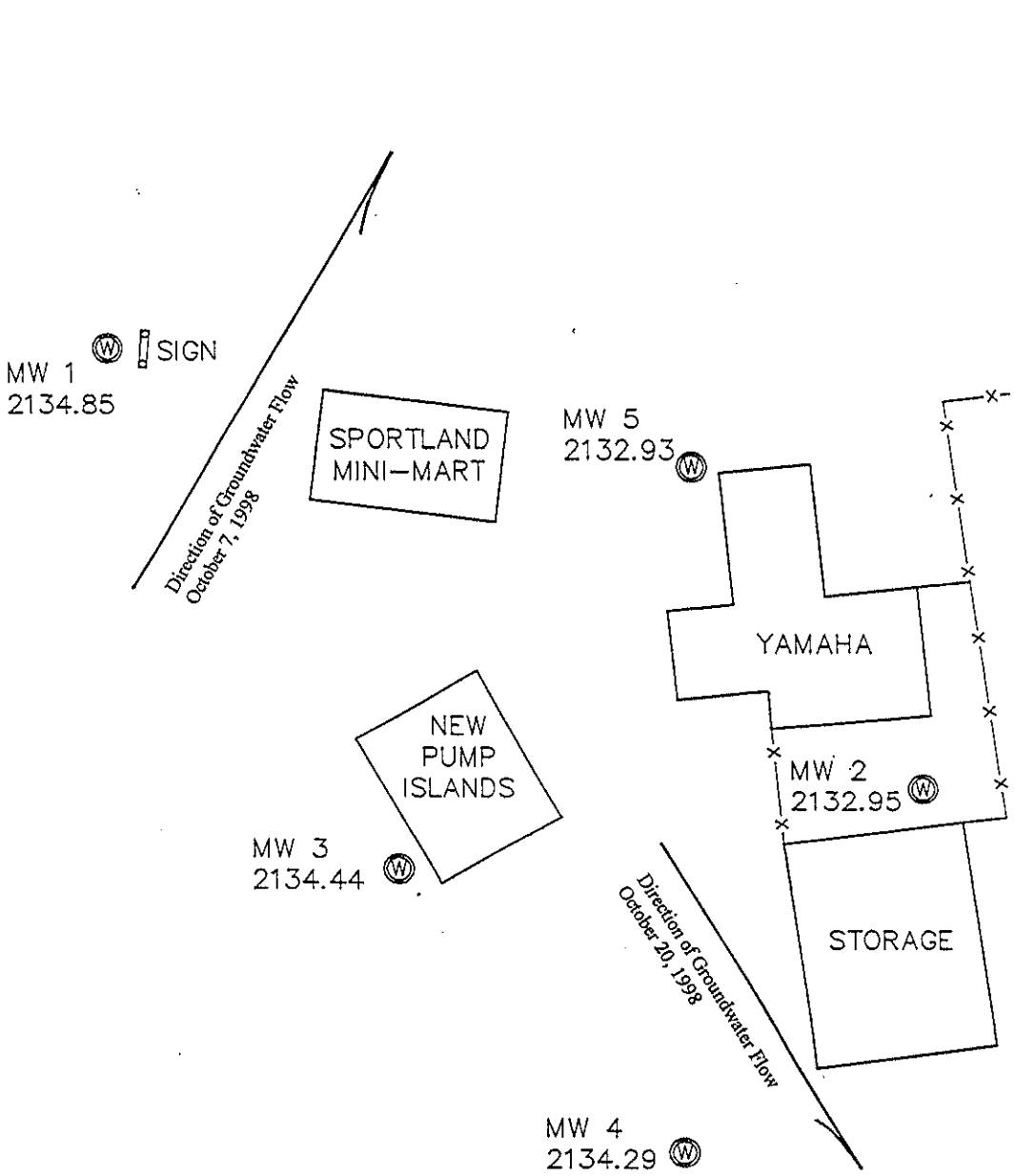
CASING: DIAMETER - 2 in. SCH. 40 PVC SLOT SIZE - 20 slot

DEPTH IN FEET (BGS)	CLASSIFICATION AND DESCRIPTION	SYMBOL	GEOLOGIC ORIGIN	SAMPLE NO./TYPE	Hammer Blows per 6" 1st	2nd	3rd	WELL COMPLETION
0.0 - 15.0	SILTY GRAVEL; slightly moist, non-plastic, very dense, brown. Grey basalt gravels.	(GM)	Native	LSS (3.5'-5') Good recovery, no staining or odors. PID=10.1 ppm	50 for 3"			FLUSH MOUNT; 0.5 CONCRETE; BENTONITE CHIPS; 7.0
				LSS (7.5'-9') Poor recovery, no staining or odors.	50 for 6"			10-20 SILICA SAND; 10.0
15.0 - 25.0	SILTY GRAVEL; very moist, non-plastic, very dense, brown. Grey basalt gravels. Soil Sample: MW-5@17'BGS (4:00P)	(GM)	Native	LSS (13.5'-15') Poor recovery, no staining, but mild odor. PID=178 ppm 0.20 ft. of free product observed on groundwater.	50 for 5"			▽ 18.49
	Base of boring at about 25.0' BGS							25.0

This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The information presented is a simplification of actual conditions encountered.

Appendix 3
Differential Level Survey Drawing

SEC. 21, T. 20 N., R. 15 E., W.M.



SCALE: 1"=50'

ELEVATION DATUM NAVD '88

BASED ON KITTITAS CO.
"STN. 0066 1993"
ELEV. 2097.4

ELEVATIONS TAKEN TO
BLACK MARK ON 2" PVC

CHARLES A. CRUSE, JR.
STATE OF WASHINGTON
LS 18078
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES: 6/8/99

10-26-98

Appendix 4
WDOE Publication No. F-TC-94-130

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Toxics Information

Cleaning Up Hazardous Waste Sites:
Cleanup Standards and Cleanup Actions

Background

Washington's hazardous waste cleanup law, the Model Toxics Control Act (RCW 70.105D), mandates that site cleanups protect the state's citizens and environment. In developing the Act's cleanup regulation, Ecology established cleanup standards and requirements for cleanup actions that fulfill this mandate. A major portion of this effort was completed in February 1991 with amendments to the industrial site cleanup standards in January 1996.

The Department of Ecology has worked with the state Science Advisory Board and representatives from business, local government and environmental groups to define site cleanup levels.

Determining Cleanup Requirements

The Model Toxics Control Act cleanup regulation (WAC 173-340) defines a two-step approach for establishing cleanup requirements for individual sites:

- **Establishing Cleanup Standards.** The standards provide a uniform, statewide approach to cleanup that can be applied on a site-by-site basis. The two primary components of the standards, cleanup levels and points of compliance, must be established for each site. Cleanup levels determine at what level a particular hazardous substance does *not* threaten human health or the environment. Points of compliance designate the location on the site where the cleanup levels must be met.
- **Selecting Cleanup Actions.** This step involves evaluating methods that could be used to clean a site and then deciding which of those methods would best achieve cleanup standards. Aside from meeting the standards, the cleanup actions must also provide permanent cleanup solutions, a reasonable timeframe for cleanup and include monitoring to ensure effectiveness.

Step 1: How Cleanup Levels Are Set

Eliminating all risks at a contaminated site often is not possible, even after cleanup. And since any level of exposure to a hazardous substance is assumed to result in some risk, "clean" generally means that a site is cleaned up to the point that contamination no longer poses an unacceptable threat to human health and the environment.

- For *cancer-causing substances*, the acceptable level for each substance at a site must be below that which could cause illness in humans. If more than one substance at a site affects the body in the same way, the effect of all of those substances combined must be considered when setting cleanup levels.
- For *non-carcinogenic substances*, the cleanup level for each substance at a site must be below that which could cause illness in humans. If more than one substance at a site affects the body in the same way, the effect of all of those substances combined must be considered when setting cleanup levels.

The regulation provides three options for establishing site-specific cleanup levels. Each of the options uses health risk as the main determinant in setting levels:

Method A

How Method A works: Method A defines cleanup levels for 25 of the most common hazardous substances found at sites. These levels were developed using acceptable risk levels outlined in the standards and health-based concentrations included in other applicable state and federal laws.

When is it used? This method is designed for cleanups that are relatively straightforward or involve only a few hazardous substances, all of which must be listed in the Method A tables. This approach will be used mainly by small sites that do not warrant the costs of conducting risk assessments and site studies.

Method B

How Method B works: Method B levels are set using a site risk assessment, which focuses on site characteristics: 1) How hazardous substances interact with each other, 2) What the combined health effects may be, 3) How their movement on- and off-site could threaten human health and the environment. Applicable state and federal laws must also be followed.

The risk level for individual carcinogens cannot exceed one-in-a-million. If more than one type of hazardous substance is present is present, the total risk level at the site may not exceed 1 in 100,000. Levels for non-carcinogens cannot exceed the point at which a substance may cause illness in humans.

Natural background concentrations and laboratory testing limitations of a substance can be considered when setting cleanup levels.

When is it used? This is the most common method for setting cleanup levels when sites are contaminated with substances not listed under Method A.

Method C

How Method C works: This method is similar to Method B. The main differences is that the lifetime cancer risk is set at 1 in 100,000 for both individual substances and for the total risk caused by all substances on a site.

When is it used? When cleanup levels under Method A or B are technically impossible to achieve, lower than background concentrations, or may cause more environmental harm than good, cleanup levels may be set using Method C. This method may also be applied to qualifying industrial properties.

Persons who use this method must provide proof that the cleanup levels will protect human health and the environment.

How Points of Compliance Are Determined

Points of compliance define where on a site cleanup levels must be met. Generally, the point of compliance is the entire site, but technological limitations, environmental conditions and other factors can make it impossible to meet levels throughout a site. Attaining levels at a landfill, for example, would require the excavation of tons of garbage, possibly causing more harm than good.

In such cases, Ecology can establish conditional points of compliance. This requires cleanup levels to be met in specified areas of the site, usually as close to the area of contamination as possible. Any hazardous substances left on the site must be contained within a specified area that protects humans from exposure to the contaminants.

Step 2: Selecting Cleanup Actions

Step 2 of the cleanup process involves choosing the method or methods used to clean up a site.

- **Permanent Cleanups:** Ecology will require use of permanent cleanup methods wherever practical. The regulation lists preferred technologies in this order: 1) Reuse or recycling, 2) Destruction or detoxification, 3) Reduction of the amount of waste, 4) Containment of waste on-site, and 5) On-site or off-site disposal.
- **The Role of Cost:** While cost cannot justify establishing cleanup levels that may compromise human health or the environment, it can play a role in determining points of compliance and cleanup actions. Permitting less stringent cleanup levels based on cost would be inconsistent with the intent of the Model Toxics Control Act.
- **Public Review:** When the cleanup is being done under Ecology's oversight, Ecology describes the method of site cleanup in a draft "cleanup action plan," which is circulated for public review and comment. This plan is then finalized and used as the basis for any negotiations with potentially liable persons who will be doing the site cleanup.

Other Factors Affecting Cleanup Requirements

- **Property Use:** Factors such as zoning, past site use and how adjacent properties are used are important considerations when determining appropriate cleanup levels. For most sites, cleanup levels will be set low enough that uses of the property will not be restricted in the future. Properties in heavy industrial areas may utilize a higher risk level. If site use changes after cleanup, the standards will be reviewed to ensure that cleanup levels protect human health and the environment.
- **Applicable State and Federal Laws:** Cleanup levels and methods used must comply with existing state or federal laws.
- **Environmental Conditions:** Washington's diverse environment presents many variables in soil conditions, water tables, climate, and plant and animal communities. These variables need to be considered because they affect the way hazardous substances interact on a site and how they impact humans and wildlife.
- **Technology:** Although cleanup technologies are developing rapidly, many contaminants are still difficult or impossible to remove from soil and water. For this reason, some flexibility is provided to consider technological limitations when setting cleanup levels. Additionally, in some cases, cleanup levels are set at concentrations lower than what can a be reliably measured using today's sampling and analytical procedures. In those situations, the lowest reliable measurement would initially be used. The availability of improved analytical methods will be periodically reviewed.

Protection After Cleanup

- **Confirmational Monitoring:** Monitoring must be conducted at each site to verify that cleanup actions worked and remain effective over time.
- **Periodic Review:** If hazardous materials remain at a site at levels which exceed Method A or B cleanup levels, Ecology will review the site every five years to ensure continued protection of human health and the environment. Ecology will publish a notice of all periodic reviews in the site register and provide an opportunity for public review and comment.

Leaking underground storage tanks

Because leaking underground storage tanks have the potential to cause fires or explosions and because they can easily contaminate nearby drinking water sources, they generally must be cleaned up more quickly than other sites. Owners and operators of leaking underground storage tanks should contact Ecology for additional requirements which apply to their sites.

For more information

For more information on cleaning up hazardous waste sites, call 1-800-826-7716, or one of the numbers below.

Technical information	Steve Robb	(360) 407-7188
General information	Curtis Dahlgren	(360) 407-7187
Leaking underground storage tanks	Lydia Lindwall	(360) 407-7205

If you have special accommodation needs:

Ecology Headquarters	TDD	(360) 407-6006

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Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98504-7600

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Appendix 5
Analytical Laboratory Test Reports and Chain-of-Custody Documentation

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

7110 38th Drive SE
Lacey, Washington 98503

Mobile Environmental Laboratories
Environmental Sampling Services

Telephone: 360-459-4670
Fax: 360-459-3432

October 12, 1998

Gerry Harper
GN Northern, Inc.
6713 West Clearwater Ave., Suite F
Kennewick, WA 99336

Dear Mr. Harper:

Please find enclosed the analytical data report for the Anderson Texaco Project in Cle Elum, Washington. Soil and water samples were analyzed for Gasoline by NWTPH-Gx and BTEX by Method 8020 on October 9, 1998.

The results of these analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. The invoice for this work has been sent to your Yakima office for payment. A copy of the invoice is enclosed for your records.

TEG Northwest appreciates the opportunity to have provided analytical services to GN Northern for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A. Korosec

Michael A. Korosec
President

QA/QC FOR ANALYTICAL METHODS

GENERAL

The TEG Northwest Laboratory quality assurance and quality control (QA/QC) procedures are conducted following the guidelines and objectives which meet or exceed certification/-accreditation requirements of California DOHS, Washington DOE, and Oregon DEQ. The Quality Control Program is a consistent set of procedures which assures data quality through the use of appropriate blanks, replicate analyses, surrogate spikes, and matrix spikes, and with the use of reference standards that meet or exceed EPA standards.

When analyses are taking place on-site with the mobile lab, the need for Field Blanks or Travel/Trip Blanks is eliminated. If there is going to be a delay before sample preparation for analysis, the sample is stored at 4^{O} C.

ANALYTICAL METHODS

TEG Northwest Labs use analytical methodologies which are in conformity with U. S. Environmental Protection Agency (EPA), Washington DOE, and Oregon DEQ methodologies. When necessary and appropriate due to the nature or composition of the sample, TEG may use variations of the methods which are consistent with recognized standards or variations used by the industry and government laboratories.

TPH-Gasoline, TPH-Diesel
(Gasoline and/or Diesel, Modified EPA 8015, NWTPH-Gx and NWTPH-Dx)

A check standard is run at the beginning of the day. 1) A close standard is run at the end of the day. 2) Both open and close standards must be within 15% of the continuing calibration curve value. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135% unless high sample concentrations interfere with the determination of the recovery percentage. A duplicate sample is run at a rate of 1 per 10 samples. At least 1 method blank is run per 20 samples analyzed.

Purgeable Volatile Aromatics
(BTEX, EPA 602/8020)

A check standard is run at the beginning of the day. The check standard is run at the end of the day. Both open and close standards must be within 15% of the continuing calibration curve value. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135% unless high sample concentrations interfere with the determination of the recovery percentage. At least 1 method blank is run per day.

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST INC.

ANDERSON TEXACO PROJECT
Cle Elum, Washington
GN Northern, Inc.
Project No.: 198-334-1

Gasoline (NWTPH-Gx), & BTEX (EPA 8020) Analyses for Water

Sample Number	Date Analyzed	Benzene ug/l	Toluene ug/l	Eth Benz ug/l	Xylene ug/l	Gasoline ug/l	Recovery (%)
Meth. Blank	10/09/98	nd	nd	nd	nd	nd	105
MW-1	10/09/98	nd	nd	nd	nd	nd	100
MW-1 Dup.	10/09/98	nd	nd	nd	nd	nd	92
MW-2	10/09/98	nd	nd	nd	nd	nd	108
MW-3	10/09/98	2720	17200	25000	5700	213500	83
Detection Limits		1	1	1	1	100	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interferences prevent determination.

ANDERSON TEXACO PROJECT
Cle Elum, Washington
GN Northern, Inc.
Project No.: 198-334-1

Gasoline (NWTPH-Gx) & BTEX (EPA 8020) Analyses for Soils

Sample Number	Date Analyzed	Benzene mg/kg	Toluene mg/kg	Eth Benz mg/kg	Xylene mg/kg	Gasoline mg/kg	Recovery (%)
Meth. Blank	10/09/98	nd	nd	nd	nd	nd	105
MW-1	10/09/98	nd	nd	nd	nd	nd	89
MW-2	10/09/98	nd	nd	nd	nd	nd	105
MW-3	10/09/98	nd	nd	0.13	0.1	25	100
MW-4	10/09/98	nd	nd	nd	nd	nd	105
MW-5	10/09/98	nd	nd	nd	nd	14	105
Detection Limits		0.05	0.05	0.05	0.05	10	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interferences prevent determination.

teg TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES

CHAIN-OF-CUSTODY RECORD

CLIENT: GN Northern, Inc.
ADDRESS: 6713 W. Clearwater Ave., Suite F
PHONE 509/734-9320 FAX: 509/734-9321
CLIENT PROJECT #: 198-334-1 PROJECT MANAGER: Gerald Harper

DATE: 10-7-98 PAGE 1 OF 1
PROJECT NAME: Anderson Texaco
LOCATION: 4400 Bullfrog Rd., Cle Elum, WA
COLLECTOR: Bolles / Dysland DATE OF COLLECTION 10-6,7,8

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH (8015 (diesel)	TPH 8015 (g & d)	PAH 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	NWTPH-G/BTEX	FIELD NOTES	Total Number of Containers	Laboratory Note Number
MW-1		1300	water	VOA ~~Vial~~ vial															X		10-7-98	3	
MW-2		1300																			10-7-98	3	
MW-3		1300																			10-7-98	3	
~~MW-4~~																						3	
~~MW-5~~																						3	
MW-1 @15'	15'	1200	Soil	Glass Jar																	10-6-98	1	
MW-2 @15'	15'	1535																			10-6-98	1	
MW-3 @15'	15'	0930																			10-7-98	1	
MW-4 @15'	15'	1350																			10-7-98	1	
MW-5 @17'	17'	1600																			10-7-98	1	

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
	10-8-98 3:00P	UPS	10-8-98 3:05P
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS
☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

7110 38th Drive SE
Lacey, Washington 98503

Mobile Environmental Laboratories
Environmental Sampling Services

Telephone: 360-459-4670
Fax: 360-459-3432

October 5, 1998

Justin Bolles
GN Northern, Inc.
6713 West Clearwater Ave., Suite F
Kennewick, WA 99336

Dear Mr. Bolles:

Please find enclosed the analytical data report for the Anderson Texaco Project in Cle Ellum, Washington. Soil samples were analyzed for Gasoline by NWTPH-Gx and BTEX by Method 8020 on October 2, 1998.

The results of these analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. The invoice for this work has been sent to your Yakima office for payment. A copy of the invoice is enclosed for your records.

TEG Northwest appreciates the opportunity to have provided analytical services to GN Northern for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A Korosec

Michael A. Korosec
President

QA/QC FOR ANALYTICAL METHODS

GENERAL

The TEG Northwest Laboratory quality assurance and quality control (QA/QC) procedures are conducted following the guidelines and objectives which meet or exceed certification/-accreditation requirements of California DOHS, Washington DOE, and Oregon DEQ. The Quality Control Program is a consistent set of procedures which assures data quality through the use of appropriate blanks, replicate analyses, surrogate spikes, and matrix spikes, and with the use of reference standards that meet or exceed EPA standards.

When analyses are taking place on-site with the mobile lab, the need for Field Blanks or Travel/Trip Blanks is eliminated. If there is going to be a delay before sample preparation for analysis, the sample is stored at 4^{O} C.

ANALYTICAL METHODS

TEG Northwest Labs use analytical methodologies which are in conformity with U. S. Environmental Protection Agency (EPA), Washington DOE, and Oregon DEQ methodologies. When necessary and appropriate due to the nature or composition of the sample, TEG may use variations of the methods which are consistent with recognized standards or variations used by the industry and government laboratories.

TPH-Gasoline, TPH-Diesel
(Gasoline and/or Diesel, Modified EPA 8015, NWTPH-Gx and NWTPH-Dx)

A check standard is run at the beginning of the day. 1) A close standard is run at the end of the day. 2) Both open and close standards must be within 15% of the continuing calibration curve value. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135% unless high sample concentrations interfere with the determination of the recovery percentage. A duplicate sample is run at a rate of 1 per 10 samples. At least 1 method blank is run per 20 samples analyzed.

Purgeable Volatile Aromatics
(BTEX, EPA 602/8020)

A check standard is run at the beginning of the day. The check standard is run at the end of the day. Both open and close standards must be within 15% of the continuing calibration curve value. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135% unless high sample concentrations interfere with the determination of the recovery percentage. At least 1 method blank is run per day.

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST INC.

ANDERSON TEXACO PROJECT
Cle Ellum, Washington
GN Northern, Inc.
Project No.: 198-334

Gasoline (WTPH-Gx) & BTEX (EPA 8020) Analyses for Soils

Sample Number	Date Analyzed	Benzene mg/kg	Toluene mg/kg	Eth Benz mg/kg	Xylene mg/kg	Gasoline mg/kg	Recovery (%)
Meth. Blank	10/02/98	nd	nd	nd	nd	nd	100
BS-1	10/02/98	nd	nd	nd	nd	nd	86
BS-2	10/02/98	nd	nd	nd	nd	nd	114
NE Comp	10/02/98	nd	nd	nd	nd	nd	95
WS Comp	10/02/98	nd	nd	nd	nd	nd	100
TSP-1	10/02/98	nd	nd	nd	nd	nd	105
TSP-2	10/02/98	nd	nd	nd	nd	nd	95
TSP-3	10/02/98	nd	nd	nd	nd	nd	119
Disp Island-	10/02/98	0.11	0.66	1.66	54.4	3370	133
PT-1	10/02/98	nd	nd	nd	nd	nd	90
Detection Limits		0.05	0.05	0.05	0.05	10	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interferences prevent determination.

teg TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES

CHAIN-OF-CUSTODY RECORD

CLIENT: GN NORTHERN, INC.

ADDRESS: 6713 W. Clearwater Ave. #F KENNEWICK, WA 99336

PHONE (509) 734-9320 FAX: (509) 734-9521

CLIENT PROJECT #: 198-334 PROJECT MANAGER: BOLES

DATE: 9-30-98 PAGE 1 OF 1

PROJECT NAME: ANDERSON TEXACO

LOCATION: CLE ELUM, WA

COLLECTOR: [signature] DATE OF COLLECTION 9-30-98 10-1-98

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH (8015 (diesel)	TPH 8015 (g & d)	PAH 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	WTPH-G/BTEX Combo	FIELD NOTES	Total Number of Containers	Laboratory Note Number
BS-1	14	8:25A	S	4oz Jar															X	X			
BS-2	14	11:30A	S	4oz Jar															X	X			
NE Comp	8	1:00P	S	4oz Jar															X	X	Composite		
WS Comp	8	1:10P	S	4oz Jar															X	X	Composite		
TSP-1	1	9:10A	S	4oz Jar															X	X			
TSP-2	1	9:15A	S	4oz Jar															X	X			
TSP-3	1	9:20A	S	4oz Jar															X	X			
Disp Island-1	3.5	2:00P	S	4oz Jar															X	X			
PT-1	3	8:35A	S	4oz Jar															X	X			

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	4:30P 10-1-98	FEDEXPRESS	4:30P 10-1-98
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

HOLD ALL SAMPLES FOLLOWING ANALYSIS

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

7110 38th Drive SE
Lacey, Washington 98503

Mobile Environmental Laboratories
Environmental Sampling Services

Telephone: 360-459-4670
Fax: 360-459-3432

September 25, 1998

Justin Bolles
GN Northern, Inc.
6713 West Clearwater Ave., Suite F
Kennewick, WA 99336

Dear Mr. Bolles:

Please find enclosed the analytical data report for the Anderson Texaco Project in Cle Ellum, Washington. Soil and water samples were analyzed for Lead by Method 7420, Gasoline by NWTPH-Gx and BTEX by Method 8020 on September 25, 1998.

The results of these analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. The invoice for this work has been sent to your Yakima office for payment. A copy of the invoice is enclosed for your records.

TEG Northwest appreciates the opportunity to have provided analytical services to GN Northern for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A. Korosec
President

QA/QC FOR ANALYTICAL METHODS

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When analyses are taking place on-site with the mobile lab, the need for Field Blanks or Travel/Trip Blanks is eliminated. If there is going to be a delay before sample preparation for analysis, the sample is stored at 4^{O} C.

ANALYTICAL METHODS

TEG Northwest Labs use analytical methodologies which are in conformity with U. S. Environmental Protection Agency (EPA), Washington DOE, and Oregon DEQ methodologies. When necessary and appropriate due to the nature or composition of the sample, TEG may use variations of the methods which are consistent with recognized standards or variations used by the industry and government laboratories.

TPH-Gasoline, TPH-Diesel
(Gasoline and/or Diesel, Modified EPA 8015, NWTPH-Gx and NWTPH-Dx)

A check standard is run at the beginning of the day. 1) A close standard is run at the end of the day. 2) Both open and close standards must be within 15% of the continuing calibration curve value. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135% unless high sample concentrations interfere with the determination of the recovery percentage. A duplicate sample is run at a rate of 1 per 10 samples. At least 1 method blank is run per 20 samples analyzed.

Purgeable Volatile Aromatics
(BTEX, EPA 602/8020)

A check standard is run at the beginning of the day. The check standard is run at the end of the day. Both open and close standards must be within 15% of the continuing calibration curve value. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135% unless high sample concentrations interfere with the determination of the recovery percentage. At least 1 method blank is run per day.

teg TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES

CHAIN-OF-CUSTODY RECORD

CLIENT: GN NORTHERN, INC.
ADDRESS: 6713 W. Clearwater Ave. #F Kennewick, WA 99336
PHONE (509) 734-9320 FAX: (509) 734-9321
CLIENT PROJECT #: 178-334 PROJECT MANAGER: BOLLES

DATE: 9-22-98 PAGE 1 OF 1
PROJECT NAME: ANDERSON TEXACO
LOCATION: CLE ELUM, WA
COLLECTOR: [signature] DATE OF COLLECTION 9-22-98

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH (8015 (diesel)	TPH 8015 (g & d)	PAH 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	WTPH-G/BTEX Cond.	FIELD NOTES	Total Number of Containers	Laboratory Note Number
GW-1	—	1:10P	W	40mL VOA																			
SP-1	1.0	11:20A	S	4oz ~~Jar~~												X			X				
B-16'BGS	16.0	1:00P	S	4oz ~~Jar~~												X			X				
NS-10'BGS	10.0	1:15P	S	4oz ~~Jar~~															X		HOLD		
ES-10'BGS	10.0	1:25P	S	4oz ~~Jar~~																	HOLD		
WS-10'BGS	10.0	1:20P	S	4oz ~~Jar~~																	HOLD		

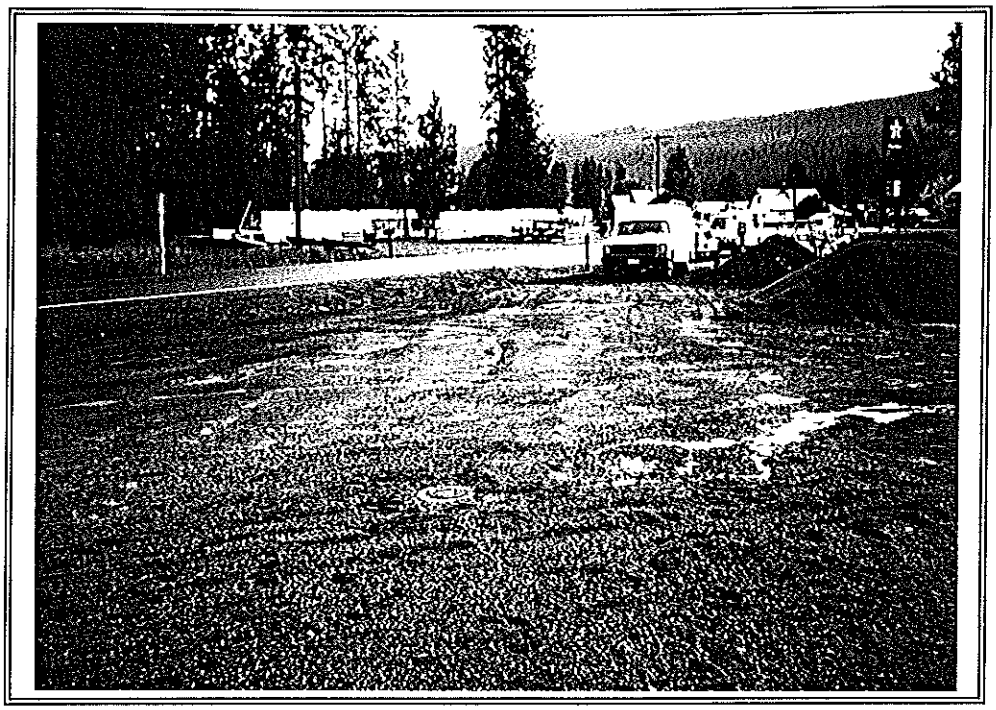
RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature) DATE/TIME
[signature] 9-22-98 4:00P FEDEX 9-22-98 4:05P
RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS
☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:
PLEASE HOLD ALL SAMPLES.
Lead as per phone w/ Linda Bulls 9/23 Dan CK

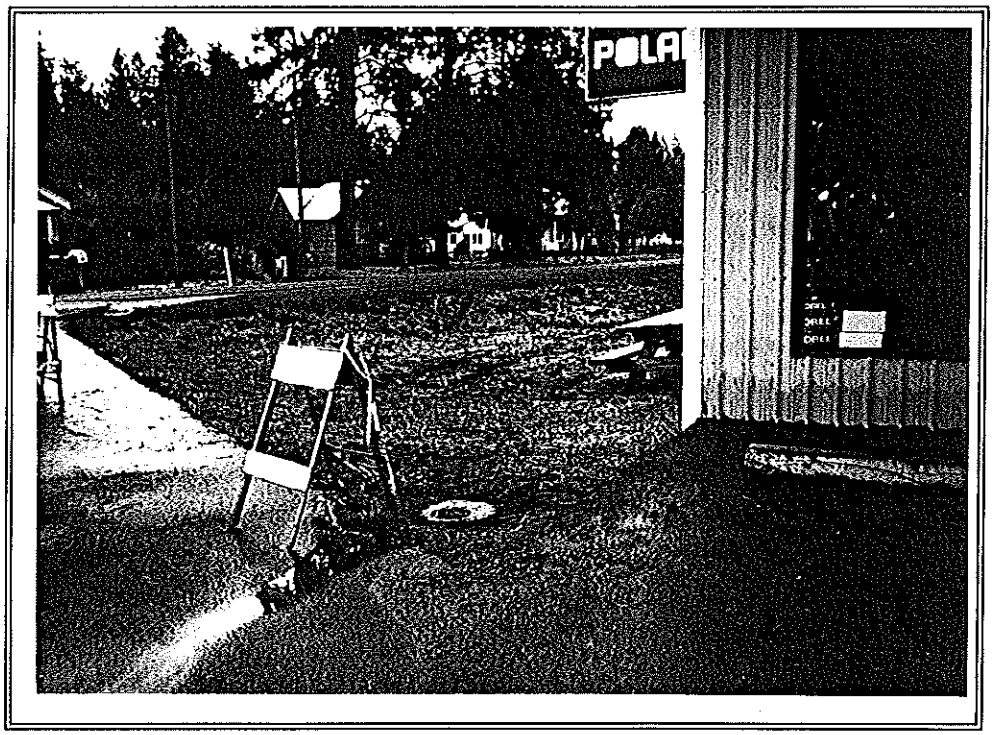
Appendix 6
Site Photographs



PHOTOGRAPHER: Justin Bolles

DATE: 10/8/98

VIEW: Looking northwest toward monitoring well MW-4 location.

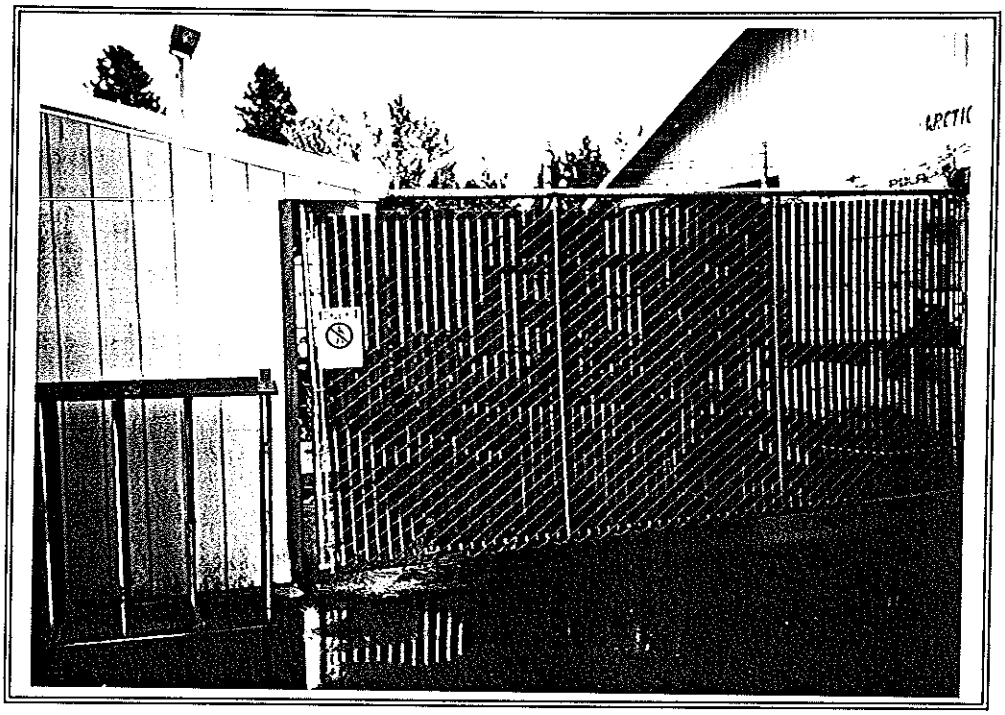


PHOTOGRAPHER: Justin Bolles

DATE: 10/8/98

VIEW: Location of monitoring well MW-5 near the northwest corner of the Yamaha shop.

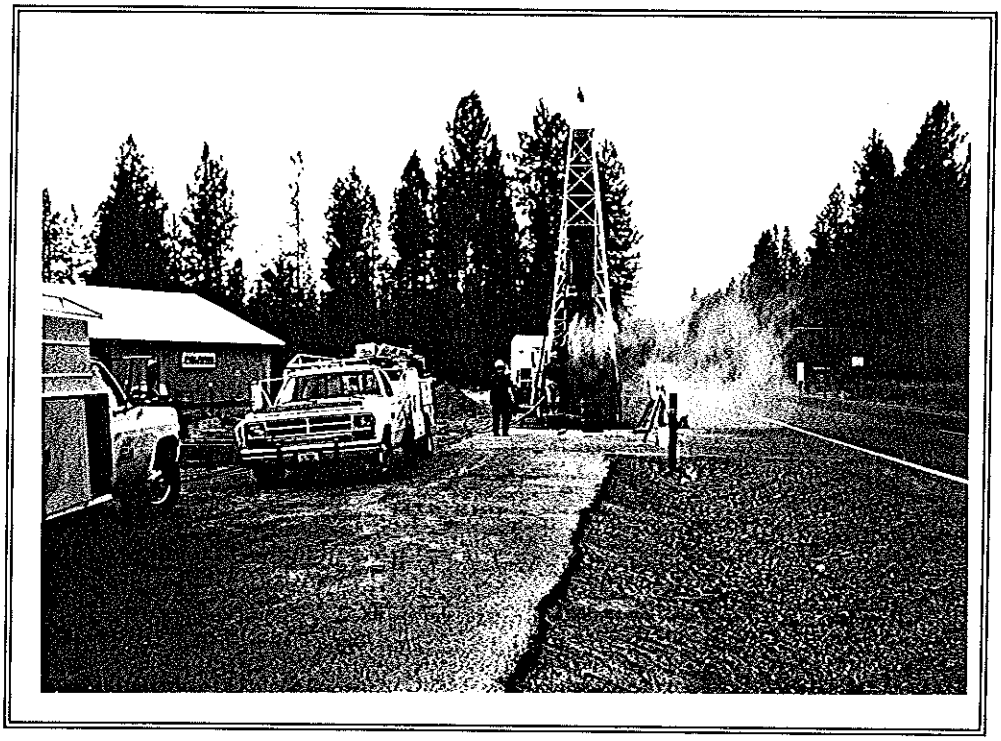
GN NORTHERN Job No.: 198-334-1	SITE PHOTOGRAPHS Soil/Groundwater Characterization Assessment Anderson Texaco Site Cle Elum, Washington			
	DATE: 10/98	MOUNTED BY: JB	REVIEWED BY: GH	EXHIBIT NO. C



PHOTOGRAPHER: Justin Bolles

DATE: 10/8/98

VIEW: Looking east toward fenced enclosure located south of the Yamaha shop. Monitoring well MW-2 is located inside the enclosure near the grey storage building.



PHOTOGRAPHER: Justin Bolles

DATE: 10/8/98

VIEW: Drilling monitoring well MW-3 with a Mobile B-61 rig and ODEX equipment.

GN NORTHERN Job No.: 198-334-1	SITE PHOTOGRAPHS Soil/Groundwater Characterization Assessment Anderson Texaco Site Cle Elum, Washington			
	DATE: 10/98	MOUNTED BY: JB	REVIEWED BY GH	EXHIBIT NO B

PHOTOGRAPHER: Justin Bolles

DATE: 9/22/98

VIEW: Looking northwest from center of property toward the Sportland Mini-mart store and new tank basin.

PHOTOGRAPHER: Justin Bolles

DATE: 10/8/98

VIEW: Developing monitoring well MW-1 located immediately west of sign post.

GN NORTHERN Job No.: 198-334-1	SITE PHOTOGRAPHS Soil/Groundwater Characterization Assessment Anderson Texaco Site Cle Elum, Washington			
	DATE: 10/98	MOUNTED BY: JB	REVIEWED BY: GH	EXHIBIT NO A