Phase 1 and 2
Environmental Site Assessment
Former and Current Service Stations
and
Bulk Storage Facilities
Cle Elum, Washington

December 1996

Washington State Department of Ecology
Central Regional Office
Toxics Cleanup Program
Yakima, Washington 98902-3401

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1.0 EXECUTIVE SUMMARY

Washington Department of Ecology (Ecology) Central Regional Office Toxics Cleanup Program (CRO-TCP) completed a limited Phase 1 and Phase 2 Environmental Site Assessment of former and current service stations/bulk storage facilities located on 1st Street in the City of Cle Elum, Washington. The study area extends from the west end of 1st Street (Stafford Avenue) to the east (Cottage Avenue) for a distance of approximately 1.6 miles (2.5 km). The site is generally flat with a topographic relief of approximately 40 feet (12 meters) across the study area. Native soils at the study area consist of silty sandy clay underlain by dense gravel with cobbles.

The components of the Phase 1 and Phase 2 Environmental Site Assessment consist of:

- Historical Review of Environmental Information
- Soil Vapor Survey
- Soil Monitoring Program
- Ground Water Monitoring Program.

The following is a summary of the Environmental Site Assessment conducted for the study area.

1.1 Historical Review

Twenty-four sites located along 1st Street were identified where petroleum products are/were stored and sold. Many of these sites have terminated petroleum products related operations for many years; underground storage tanks for many of the former service stations have been excavated and removed offsite for disposal. Currently, there are eight sites still involved in the retailing or distribution of petroleum products.

Ecology CRO records show seven sites located within the study area have reported releases of petroleum products. Contaminated soils from four sites have been excavated and removed offsite for disposal. The remaining three sites are in the investigation stage of the cleanup process.

1.2. Soil Vapor Survey

In April 1996, twenty temporary soil vapor probe boreholes were drilled adjacent to and down-gradient of former and operating service stations and bulk storage facilities. *In situ* soil vapor samples were analyzed using an organic vapor analyzer with flame ionization detector. The soil vapor survey results indicate four areas with potentially high petroleum contamination. These four areas are:

- Knife Works - 316 W 1st Street
- Willette's Shell Service - 901 E 1st Street
- Former Unocal Bulk Plant 0095/DeVere & Sons Distributing - Short and 1st Street
- Susannes Service - 1310 E 1st Street.

Vapor samples from these locations exceeded 1000 parts per million (ppm) as methane, the upper analytical range of the analyzer. For the Susannes Service (Storeys) site, flame-out condition was encountered for one soil vapor probe borehole location (No. 20.5). The flame-out condition may have been due to the high petroleum vapor mixture encountered in the borehole.

Low concentrations of organic vapors were consistently detected in areas down-gradient from former and existing service stations/bulk plants.

1.3 Soil Monitoring Program

In May 1996, twenty soil borings were drilled throughout 1st Street to investigate subsurface conditions. Subsurface soil samples were collected and analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX), total petroleum hydrocarbons (TPH), and total lead. Results of the soil sampling program show:

- Detectable concentrations of BTEX were found in soil borings SB-5 (near Timber Lodge Motel), SB-7 (Simpson's Texaco), SB-19 (near Willette's Fuel Oil), and SB-23 (Susannes Service). All detectable concentrations are below the Model Toxics Control Act (MTCA) Method A cleanup levels.

- Gasoline-range hydrocarbons were found in soil borings SB-5 (near Timber Lodge Motel), SB-7 (Simpson's Texaco), SB-12 (near Dairy Queen), SB-17 (near Willette's Shell), SB-19 (near Willette's Fuel Oil), and SB-23 (Susannes Service). Soil samples from SB-5, SB-7, SB-19, and SB-23 exceeded the MTCA Method A cleanup level of 100.0 milligrams per kilogram (mg/kg).

- Diesel-range hydrocarbons were found in soil borings SB-9 (near Kittitas Glass), SB-19 (near Willette's Fuel Oil), and SB-23 (Susannes Service). Soil samples from SB-19 and SB-23 exceeded the MTCA Method A cleanup level of 200.0 mg/kg.

- Lube oil-range hydrocarbons were found in SB-7 (Simpson's Texaco), SB-9 (near Kittitas Glass), and SB-13 (near Golden Ocean Restaurant). Soil samples from SB-7 and SB-9 exceeded the MTCA Method A cleanup level of 200.0 mg/kg.

1.4 Ground Water Monitoring Program

A ground water monitoring well was completed in each of the twenty soil borings. Two separate rounds of ground water samples were collected and analyzed for benzene, toluene, ethylbenzene, xylenes, total petroleum hydrocarbons, and total lead. Results of the ground water sampling program show:

- Substantially higher than Method A cleanup levels for BTEX were found in MW-7 (Simpson's Texaco), and MW-23/MW-24 (Susannes Service).

- High gasoline-range hydrocarbons were found in ground water samples from MW-7 (Simpson's Texaco) and MW-23/MW-24 (Susannes Service). Lower concentrations of diesel-range hydrocarbons were found in MW-19 (near Willette's Fuel Oil) and MW-24

(Susannes Service). The total petroleum hydrocarbons concentrations (gasoline TPH + diesel TPH) in MW-7 and MW-24 are higher than the ground water Method A cleanup level of 1000 micrograms per liter (ug/L).

1.5 Conclusions

The results of the field investigation: soil vapor survey, soil boring sampling, and ground water sampling indicate inactive sites generally do not pose as potential sources of subsurface petroleum contamination. Only two inactive sites, inferred by adjacent soil boring samples, may contain petroleum contaminants above the Method A cleanup levels. Ground water samples, however, are below the Method A cleanup levels for petroleum contaminants. These two inactive sites are:

1. Timber Lodge Motel
2. Kittitas County Glass.

The residual subsurface contamination at these two sites may be due to releases from leaking underground storage tanks and/or past common housekeeping practices such as site cleanup with gasoline.

Petroleum contaminants, above the MTCA Method A cleanup levels, have been found in soil and/or ground water samples from soil borings and monitoring wells adjacent to or within three operating facilities. These three facilities are:

1. Simpson's Texaco
2. Willette's Fuel Oil
3. Susannes Service.

At Simpson's Texaco, ground water contaminants BTEX and gasoline-range hydrocarbons were found at substantially higher than Method A cleanup levels. However, it is not readily apparent as to the source(s) of the subsurface and ground water contamination. The on-site underground storage tanks may be eliminated as a source since they have been upgraded and there are no reported releases of gasoline products. A purported source, the release of petroleum products at the Timber Lodge Motel (former Preston Phillips 66), may also be eliminated from further consideration due to non-detect BETX results from monitoring wells MW-5 and MW-6. These wells are up-gradient of the Simpson's Texaco service station.

Subsurface contamination at Willette's Fuel Oil was found to be substantially above the Method A cleanup level for diesel-range hydrocarbons. Contaminants have been detected in a ground water sample but are below the Method A cleanup levels. The residual subsurface contamination at this site may be due to historical rail tankcar unloading activities rather than releases from the above-ground storage tanks.

Ground water contaminants BTEX and gasoline-range hydrocarbons were found at substantially higher than Method A cleanup levels at Susannes Service. The petroleum contamination in the vicinity of the tank farm—the area is unpaved—is most likely due to

releases from product off-loading and storage tank cleaning activities. Products released from the underground piping may account for the high level of soil contamination in the vicinity of the below-ground storage tanks.

1.6 Recommendations

This limited Phase 1 and Phase 2 Environmental Site Assessment identified three sites with petroleum products impacted soils and/or ground water. These three sites are: Simpson's Texaco, Willette's Fuel Oil, and Susannes Service. Two other sites, the former Unocal Bulk Plant 0095 and De Vere and Sons Distributing/Mini Mart, are being investigated via the independent remedial action process.

Simpson's Texaco

Subsurface soil and ground water in this site were found to be contaminated with gasoline and diesel-range petroleum products exceeding MTCA Method A cleanup levels. The impacted zone, inferred by non-detected results in monitoring well MW-8, may be limited to the vicinity of monitoring well MW-7.

A preliminary site hazard assessment (SHA) has been completed based on the ground water to human health exposure pathway. Non-applicable exposure pathways relating to surface water, air, and marine sediment were not used for the ranking analysis. The Washington Ranking Method (WARM) derived a ranking of 5 for the case where ground water, in the vicinity of this site, is not used for irrigation. A score of 1 represents the highest level of concern relative to other sites, and a score of 5 the lowest.

In view of the preliminary ranking of 5 where cleanup priority is the lowest, site remediation activities are not warranted at this site. To assess the viability of natural biodegradation to effect site cleanup, an annual ground water sampling program should be implemented.

Willett's Fuel Oil

At this site, fuel oil contamination is limited to the subsurface soil. Gasoline and diesel-range hydrocarbons in the ground water are below the ground water cleanup levels. Given the low levels of contamination identified, no further action is recommended for this site.

Susannes Service

Subsurface soil and ground water at this site were found to be contaminated with gasoline and diesel-range petroleum products exceeding MTCA Method A cleanup levels. The impacted zone, as inferred by contaminants in monitoring wells MW-23 and MW-24, may encompass an area underlying the below-ground storage tanks and the above-ground tank farm.

This site is listed in the Site Register and has been assigned a ranking of 1. This score represents the highest level of environmental concern.

In view of the ranking, site remediation activities are warranted to eliminate or minimize environmental risks posed by the contaminated soil and ground water. To assess the extent of the contamination and to identify appropriate cleanup measures, Susannes Service will need to initiate a remedial investigation and feasibility study (RI/FS). In addition to the RI/FS, Susannes Service will also need to evaluate housekeeping measures and facility modification requirements so as to eliminate site contamination from future releases of petroleum products from storage and fueling activities.

Susannes Service is under an order issued by the Kittitas County Public Services Department, Building & Fire Safety Division to correct violations of the Uniform Fire Code on motor vehicle fuel dispensing stations and flammable and combustible liquids. Compliance with the corrective measures as specified in the order should eliminate future releases of petroleum products to the environment from storage and fueling activities.

2.0 INTRODUCTION

This report presents the results of a limited Phase 1 and Phase 2 Environmental Site Assessment of former and current service station/bulk storage facilities located in the City of Cle Elum, Washington. The study area is described as a section of 1st Street bounded to the west by Stafford Avenue and to the east by Cottage Avenue for a distance of approximately 1.6 miles (2.5 km).

This environmental site assessment was prompted by reports of subsurface petroleum contamination from leaking underground and above-ground storage tanks in the Cle Elum area. Review of Ecology CRO records shows the following sites with reported releases of petroleum products.

- Timber Lodge Motel - Billing Avenue and 1st Street
- D & J Exxon - 201 West 1st Street
- Chevron Service Station No. 1417 - 302 East 1st Street
- B & G Service Station - 517 East 1st Street
- Former Unocal Bulk Plant 0095 - Short Avenue and 1st Street
- De Vere and Sons Distributing, Inc. - 1000 East 1st Street
- De Vere and Son's Mini Mart - Short Avenue and 1st Street.

2.1 Objective and Scope

The objective of this study was to assess the potential presence of petroleum contaminated soil and ground water at the study area at past and/or current retail and wholesale distribution businesses.

The scope of work for this study consists of a limited Phase 1/Phase 2 Environment Site Assessment. Specifically, the assessment includes the following elements:

Historical Review of Environmental Information

- Review historical records to identify former/current petroleum products handling facilities and reported petroleum contaminated sites.
- Review available geologic information in the vicinity of the study area.

Soil Vapor Survey

- Collect *in situ* soil vapor measurements in the vicinity of potential subsurface petroleum contaminated sites.

Soil Monitoring Program

- Collect soil boring samples using hollow-stem auger drilling equipment.
- Conduct field screening of soil boring and soil sample vapors using an organic vapor analyzer.

- Collect and analyze discrete soil boring samples for the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX), total petroleum hydrocarbons (TPH), and total lead.

Ground Water Monitoring Program

- Install a 2-inch (5-cm) diameter PVC ground water monitoring well with a flush-grade traffic-rated monument in each soil boring.
- Conduct analytical screening of monitoring well and ground water sample vapors using an organic vapor analyzer.
- Survey monitoring well monument elevations to within 0.01 feet (0.003 meter) accuracy using a US Coast & Geodetic Survey benchmark.
- Measure monitoring well ground water elevations to within 0.01 feet (0.003 meter) accuracy.
- Determine the local ground water flow direction and hydraulic gradient.
- Collect and analyze ground water samples for the presence of BTEX, TPH, and total lead.

3.0 SITE DESCRIPTION

The City of Cle Elum is located in the northwest region of Kittitas County, approximately 33 miles (53 km) east of the Snoqualmie Pass and 25 miles (40 km) west of the City of Ellensburg. To the north are abandoned coal mines. Coal mining in Cle Elum ended in 1963. Interstate 90 and the Yakima River lie approximately 0.3 miles (0.5 km) south of the city.

The study area encompasses most of 1st Street, also known as State Route 903, for a distance of about 1.6 miles (2.5 km). Prior to the opening of Interstate 90, SR-903 was the main route connecting Seattle/Tacoma to cities in Central and Eastern Washington. Consequently, the city had a higher density of gasoline retailers in relation to cities of similar size. Currently, there are six gasoline retailers and two bulk storage plants that are in operation.

According to the United States Geological Survey (USGS) Cle Elum quadrangle, Washington-Kittitas County, 7.5 minute series, the elevation of the study area is approximately 1910 feet (583 meters) above mean sea level (msl). Topographic relief is small and is estimated at about 20 feet (6 meters) across the study area. Based on topographic features and the flow direction of the Yakima River, the inferred regional ground water flow is towards the east-southeast.

A site map showing the study area is presented as Figure 3.1.

3.1 Regional Geology

Cle Elum lies within the generally east west trending valley known as the Roslyn Basin. The Basin is bounded on the north by rocks of the Roslyn Formation and the east by the Teanaway Basalt and the Andesite of Peoh Point. The valley margins are composed of landslide debris and moraine remnants from Pleistocene valley glaciation. The valley bottom is filled with approximately 300 feet (90 meters) of varved clay and sands overlying the Roslyn Formation with approximately 30 feet (9 meters) of surficial deposits consisting of glacial outwash and alluvium from the modern Yakima River.

The oldest rock exposed in the Cle Roslyn Basin is the Teanaway Basalt. This basalt is thought to have an age ranging from 39 to 47 million years. The basalt is characteristically glassy to very fine grained black rock without phenocrysts (Tabor et al. 1982). The Teanaway basalt outcrops to the south of Cle Elum in the area of Peoh Point.

Conformably overlying the Teanaway basalt is the Eocene Roslyn Formation. The Roslyn Formation is composed of a thick bedded nonmarine arcosic sandstone with numerous coal seams. The sandstone is conspicuously white weathering to yellow (Tabor et al. 1982). The sandstone outcrops directly north of Cle Elum, where it forms the hill which borders the city.

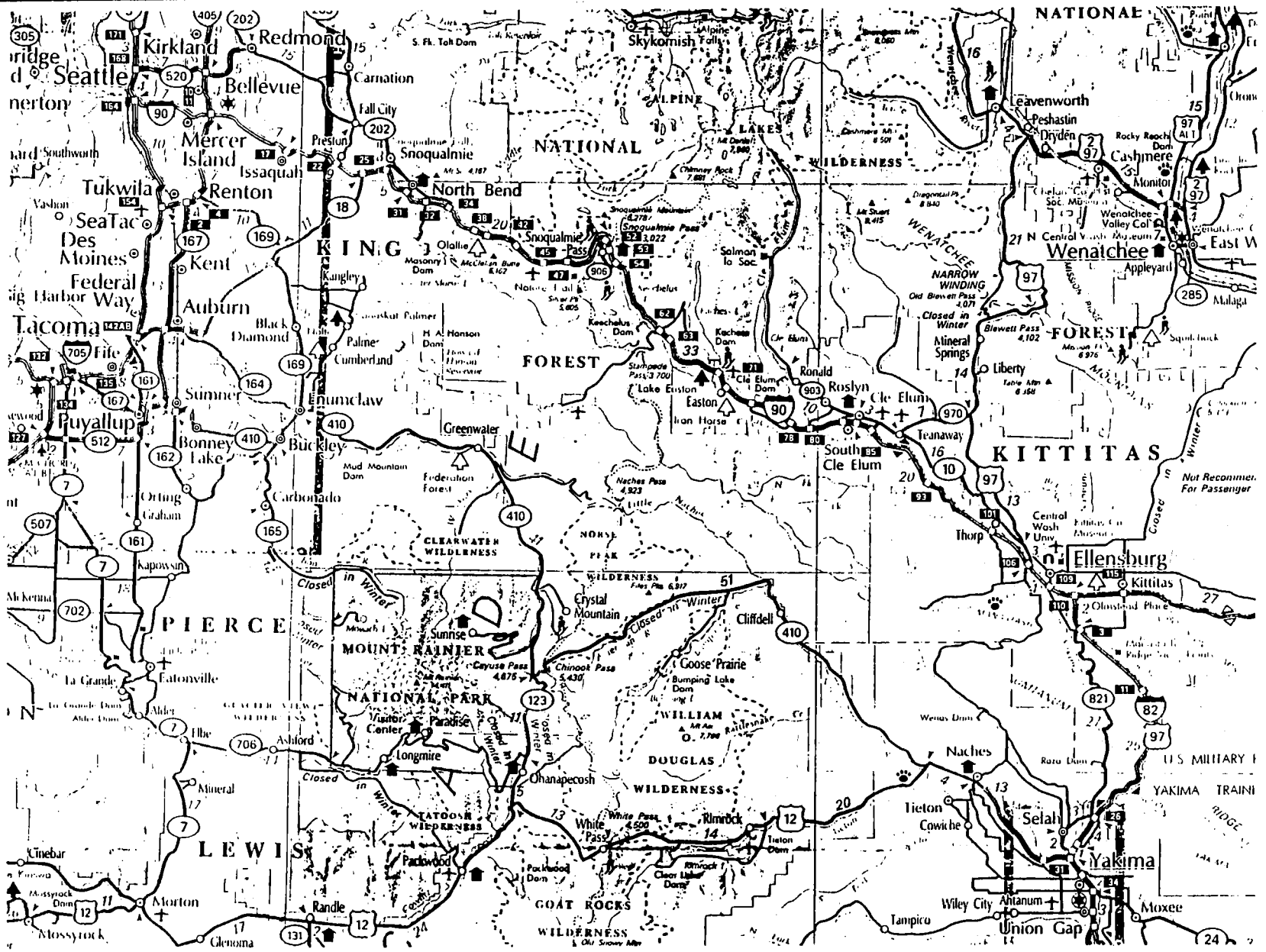

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FIGURE 3.1 – STUDY AREA SITE MAP

SITE NAME: CLE ELUM PETROLEUM CONTAMINATION

TCP ID: C–19–2007–000

The Andesite of Peoh Point is a uniform mass of highly altered hornblende-hypersthene dacite which resembles some of the lavas of the Taneum Andesite, which is not exposed in the area, and is believed to be early Eocene in age. Peoh Point is a prominent cliff south of the City of Cle Elum.

Moraines, outwash, and lacustrine deposits record at least three glaciations in the Roslyn Basin. Pleistocene glaciation has scoured the valley exposing the Teanaway basalt and Roslyn sandstone. In addition, the glaciers deposited glacial till and drift along the north and south margins of the valley. The valley fill is composed of till and drift overlying the Roslyn Formation, a thick sequence of varved lacustrian clay, and coarse gravel and sand which are the result glacial outwash and post glacial alluvium from the Yakima River and its tributaries.

The lacustrian clay is the result of the Indian John terminal moraine complex which blocked the Yakima River with a thick plug of till and outwash. The clay extends from Lakedale east to the Indian John moraine (Porter 1976). The clay has been found to be from 60 to 300 feet (20 to 90 meters) thick as evidenced by water well drilling in the valley.

4.0 HISTORICAL REVIEW

The following sections present a summary of the pertinent results of the historical review completed for this assessment. The historical search identified former and current petroleum products retailers, bulk petroleum products storage facilities, and reported petroleum products releases in the study area.

4.1 Former and Current Petroleum Products Facilities

Presented in Table 4.1 is a listing of former and current gasoline/diesel retailers and bulk petroleum products facilities. The general locations of these facilities are as shown in Figure 4.1. The listing was compiled using the 1940 Sanborn Fire Insurance Map, Pacific Northwest Bell/US West Telephone Directories for years 1959 - 1996, Ecology records, the Ecology underground storage tank database (USTBase), and information provided by the City of Cle Elum.

The table identified 24 sites where petroleum products are/were stored and sold. As indicated in the table, petroleum products related operations for many of the sites have been terminated for many years. Of the 24 sites, eight remaining sites (shown in bolded text) have continued in the retailing or distribution of petroleum products.

The potential source areas are referred to for the remainder of this report by the present business operating at the property.

Table 4.1 - City of Cle Elum - Former and Current Petroleum Products Facilities

Site Location	Former Gas & Oil Operator & UST Status	Facility Status	Current Business Operator
316 W 1st Street	Pheasant Service & Confectionery (In place, not operational)	Closed in 1967	Knife Works
301 W 1st Street	Preston Phillips 66 (Removed)	Closed in 1977	Timber Lodge Motel.
207 W 1st Street	Simpson's Texaco (In place)	Operational	**Simpson's Texaco**
202 W 1st Street	Unknown (In place, not operational)	Closed prior to 1959	Kittitas County Glass
201 W 1st Street	Spot Service Station (1981) (Old USTs removed - May 1991)	Operational	**D & J Mini-Mart**
120 W 1st Street	Unknown (In place, not operational)	Closed prior to 1959	Real Estate
119 W 1st Street	Unknown (In place, not operational)	Closed prior to 1959	John L Scott
102 E 1st Street	Conoco (In place)	Operational	**Brad's Cle Elum Conoco**
302 E 1st Street	Chevron Service Station No. 1417 (Removed - February 1991)	Closed in 1991	Dairy Queen
321 E 1st Street	Jim's U-save (Removed - June 1990)	Closed in 1991	Golden Ocean Restaurant
401 E 1st Street	Bill's ARCO (In place, not operational)	Closed in 1983	Cle Elum Motors
402 E 1st Street	Alexander Chevrolet (In place, not operational)	Closed in ?	Frank Auto Sales

Table 4.1 - City of Cle Elum - Former and Current Petroleum Products Facilities (Continued)			
Site Location	**Former Gas & Oil Operator & UST Status**	**Facility Status**	**Current Business Operator**
520 E 1st Street	G & D Service (Removed - September 92)	Closed in 1991	B & G Service Station
521 E 1st Street	Mus Motel (In place, not operational)	Closed in ?	Aster Inn
703 E 1st Street	Unknown (?)	Closed in ?	Tom's Auto Repair
719 E 1st Street	Simpson Exxon (In place, not operational)	Closed in 1984	Gerth's Garage
901 E 1st Street	Willett's Shell Service (In place)	Operational	**Willette's Shell Service**
Kerman & 1st Street	Willett's Fuel Oil (Above-ground storage tanks)	Operational	**Willette's Fuel Oil**
922 E 1st Street	Former Mobile Oil Bulk Plant (Removed, 40's)	Closed in 40's	Cle Elum Feed & Pet Supplies
Short & 1st Street	Former Unocal Bulk Plant 0095 (Closed - Independent Cleanup)	Closed in 1992	Unocal
1000 E 1st Street	De Vere & Sons Distributing (Above-ground storage tanks)	Operational	**De Vere & Sons Distributing**
Short & 1st Street	De Vere & Sons Town Pump & Pantry (In place)	Operational	**De Vere & Son's Mini Mart**
1102 E 1st Street	Stanley Service (Removed - ?)	Closed in ?	Northern Expresso
1310 E 1st Street	Susannes Service (Storeys) (Below-ground and above-ground storage tanks)	Operational	**Susannes Service (Storeys)**

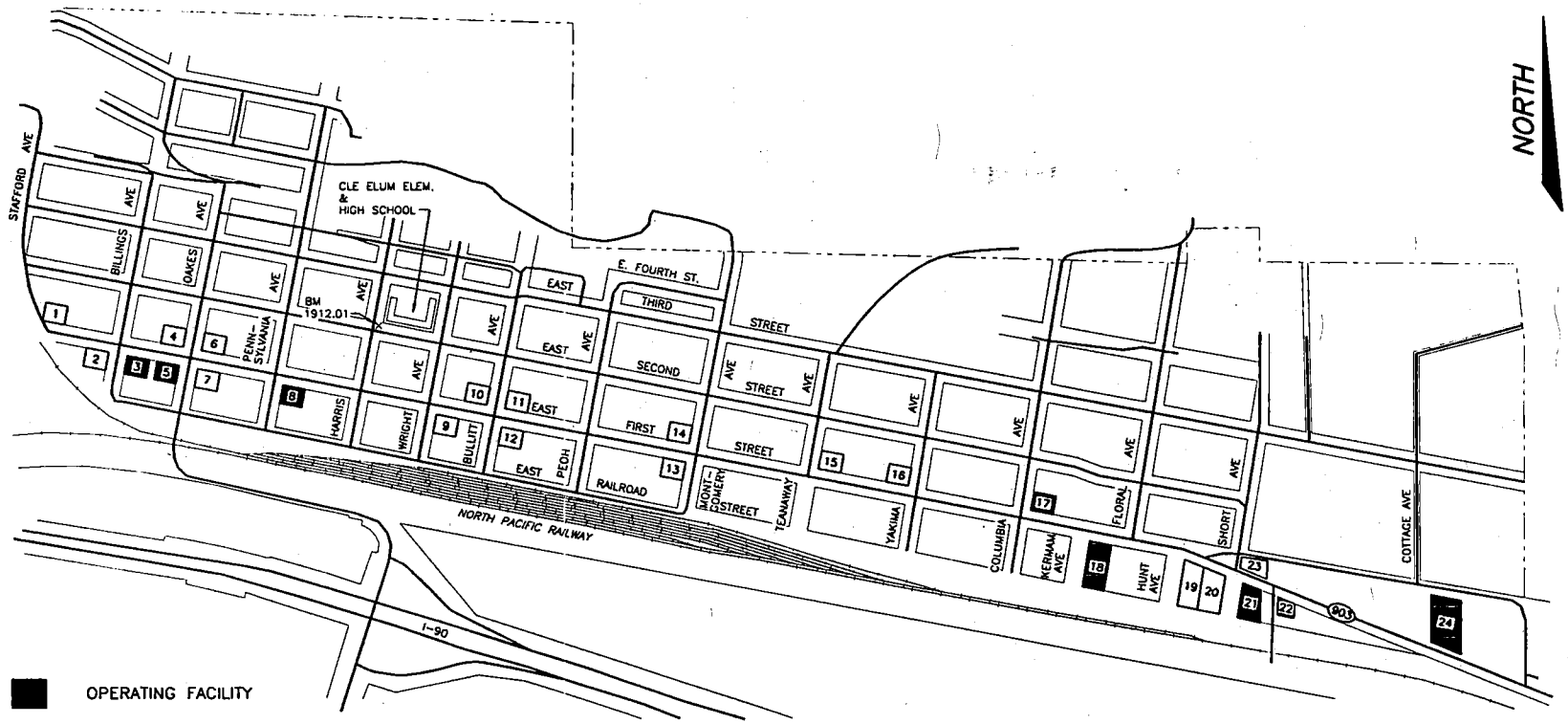
4.2 Reported Releases of Petroleum Products

Ecology CRO records were reviewed to identify reported releases of petroleum products in the study area. Presented in the following is a summary of the review.

Timber Lodge Motel (Former Preston Phillips 66)

On 19 November 1991, a US West crew, in the course of installing telephone cables, encountered petroleum products inside a manhole excavation. The manhole (#4) is located at the corner of 1st Street and Billings Avenue. Petroleum contaminated soil was found at approximately 10 feet (3 meters) below the street elevation.

The property adjacent to the manhole is currently occupied by the Timber Lodge Motel. Prior to the construction of the motel, it once housed the Preston Phillips 66 service station. According to the current property owners, Tom and Jami McKnight, the fuel dispensing pumps were approximately 10 feet (3 meters) from the manhole excavation. The fuel tanks, two 1000-gallon (3.8 m^3) underground storage tanks (UST) and one 500-gallon (1.9 m^3) UST were removed offsite for disposal when they purchased the property.



1	KNIFE WORKS	7	JOHN L SCOTT	13	B & G SERVICE STATION	19	CLE ELUM FEED & PET SUPPLIES
2	TIMBER LODGE MOTEL	8	BRAD'S CL ELUM CONOCO	14	ASTER INN	20	UNOCAL BULK PLANT 0095
3	SIMPSON'S TEXACO	9	DAIRY QUEEN	15	TOM'S AUTO REPAIR	21	DE VERE & SONS DISTRIBUTING
4	KITTITAS COUNTY GLASS	10	GOLDEN OCEAN RESTAURANT	16	GERTH'S GARAGE	22	DE VERE & SON'S MINI MART
5	D & J MINI-MART	11	CLE ELUM MOTORS	17	WILLETTE'S SHELL SERVICE	23	NORTHERN EXPRESSO
6	REAL ESTATE	12	FRANK AUTO SALES	18	WILLETTE'S FUEL OIL	24	SUSANNES SERVICES

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FIGURE 4.1 – FORMER & CURRENT PETROLEUM PRODUCTS FACILITIES

SITE NAME: CLE ELUM PETROLEUM CONTAMINATION

TCP ID: C-19-2007-000

D & J Food Mart (Former D & J Exxon)

In May 1991, underground storage tanks were removed from the D & J Exxon service station. Soil and ground water samples collected on 29 May 1991 indicated petroleum contamination. The highest reported TPH values were 7000 mg/kg for soil and 720 milligrams per liter (mg/L) for ground water. Petroleum contaminated soil was removed offsite for disposal.

Dairy Queen (Former Chevron Service Station No. 1417)

On 27 February 1991, three 10,000-gallon (38-m^3) fiberglass gasoline USTs, one 1,000-gallon (4-m^3) fiberglass fuel oil UST, one 550-gallon (2-m^3) steel fuel oil UST, and one 1,000-gallon (4-m^3) fiberglass used oil UST were excavated and removed from the site. Soils under the former pump islands were found to be contaminated with TPH and BTEX at greater than the MTCA Method A cleanup levels. The highest reported values were 230 mg/kg of TPH, 7.1 mg/kg of benzene, 40 mg/kg of ethylbenzene, and 62 mg/kg of xylenes. Approximately 450 yds^3 (340 m^3) of contaminated soil were removed offsite for disposal.

Results of ground water samples collected on 19 April 1991 show non-detect for BTEX and TPH for two of the three monitoring wells. Other than a benzene concentration of 5 ug/L, results for the remaining monitoring well also show non-detect for other petroleum contaminants.

B & G Service Station

On 15 - 16 September 1992, two 12,000-gallon (45-m^3) leaded gasoline USTs, one 1,000-gallon (4-m^3) diesel UST, and one 3,000-gallon (11-m^3) leaded gasoline UST were excavated and removed from the site. Analytical results of soil and standing water samples confirmed petroleum contamination in the vicinity of the five USTs. Reported TPH values for soil samples were 27000 mg/kg for diesel and 12000 mg/kg for gasoline. Approximately 300 yd^3 (230 m^3) of petroleum contaminated soil were removed from the site. An estimated 20 yds^3 (15 m^3) of diesel contaminated soil beneath the sidewalk on 1st Street were left in-place to minimize structural impacts to the sidewalk and underground utilities.

Former Unocal Bulk Plant 0095

A geotechnical report, dated 29 April 1992, identified the presence of soil contamination by diesel and heavier petroleum products at the Cle Elum Unocal bulk plant. A high concentration of heavy oil (34000 mg/kg) was reported for a soil sample beneath the warehouse floor. Surface soil contamination was visible near the pipeline pumps. The report concluded cleanup by either aeration or soil vapor extraction was not appropriate for this site.

The bulk plant was demolished in August 1992. Petroleum contaminated soil was removed offsite for disposal.

The 25 August 1995 ground water samples from monitoring wells located near the former warehouse and the railroad track show diesel/oil TPH concentrations at higher than the MTCA Method A cleanup levels. Concentrations of 0.81 mg/L for diesel and 1.2 mg/L for oil were

reported for the warehouse monitoring well. For the monitoring well near the railroad track, reported concentrations were 0.36 mg/L and 1.5 mg/L for diesel and oil respectively.

De Vere and Sons Distributing, Inc.

On 10 March 1994, De Vere and Sons Distributing reported a loss of approximately 8400 gallons (32 m^3) of diesel from an above-ground storage tank located at the site. The release was determined to have originated from a ruptured 2-inch (5-cm) fiberglass supply line. The supply line was accidentally punctured by De Verde's environmental contractor in the course of conducting a tracer tank/line test at the site. Following the release, De Vere and Sons Distributing initiated a soil and ground water characterization investigation program and interim remedial actions.

Approximately 400 gallons (1.5 m^3) of products have been recovered via hydrocarbon collection units installed in two onsite monitoring wells. Further free product recovery was judged to be unfeasible based on the results of a product recovery test. De Vere and Sons Distributing is currently focusing on completing the Remedial Investigation Feasibility Study at the site.

De Vere and Son's Mini Mart

On 10 April 1995, De Vere and Sons discovered gasoline was leaking from a 1,000-gallon (4-m^3) UST located at the Mini Mart. Approximately 200 gallons (0.8 m^3) of unleaded gasoline were reportedly lost over a period of several months. The tank has since been drained and removed from service. Remediation for this site has been planned and will be conducted in conjunction with the 8400-gallon (32-m^3) diesel release incident at the De Vere and Sons distribution facility. Both releases are in the same general proximity.

5.0 SOIL VAPOR SURVEY

A soil vapor survey was conducted to determine the presence and relative concentrations of volatile organic contaminants in the overburden. The soil vapor data were used as a field screening guide to identify areas with high contamination and to determine the placement of soil borings/ground water monitoring wells.

Twenty soil vapor probe borehole locations were identified adjacent to and down-gradient of former and operating service stations and bulk petroleum products storage facilities. The locations were selected based on the historical review results and in consultation with Mr. Jim Leonhard, City of Cle Elum Superintendent, and utility locators for TCI Cable, Puget Power, and US West Communications. To minimize disruptions to business operators, nineteen of the twenty soil vapor probe boreholes are located on the City of Cle Elum's right-of-ways. The remaining borehole is located within the Susannes Service (Storeys) property. The soil vapor probe borehole locations are as shown in the Figure 5.1 site map.

Because of limited site access and/or interference from underground utilities, soil vapor probe borehole locations could not be placed at one operating and four former service station sites. These five sites are:

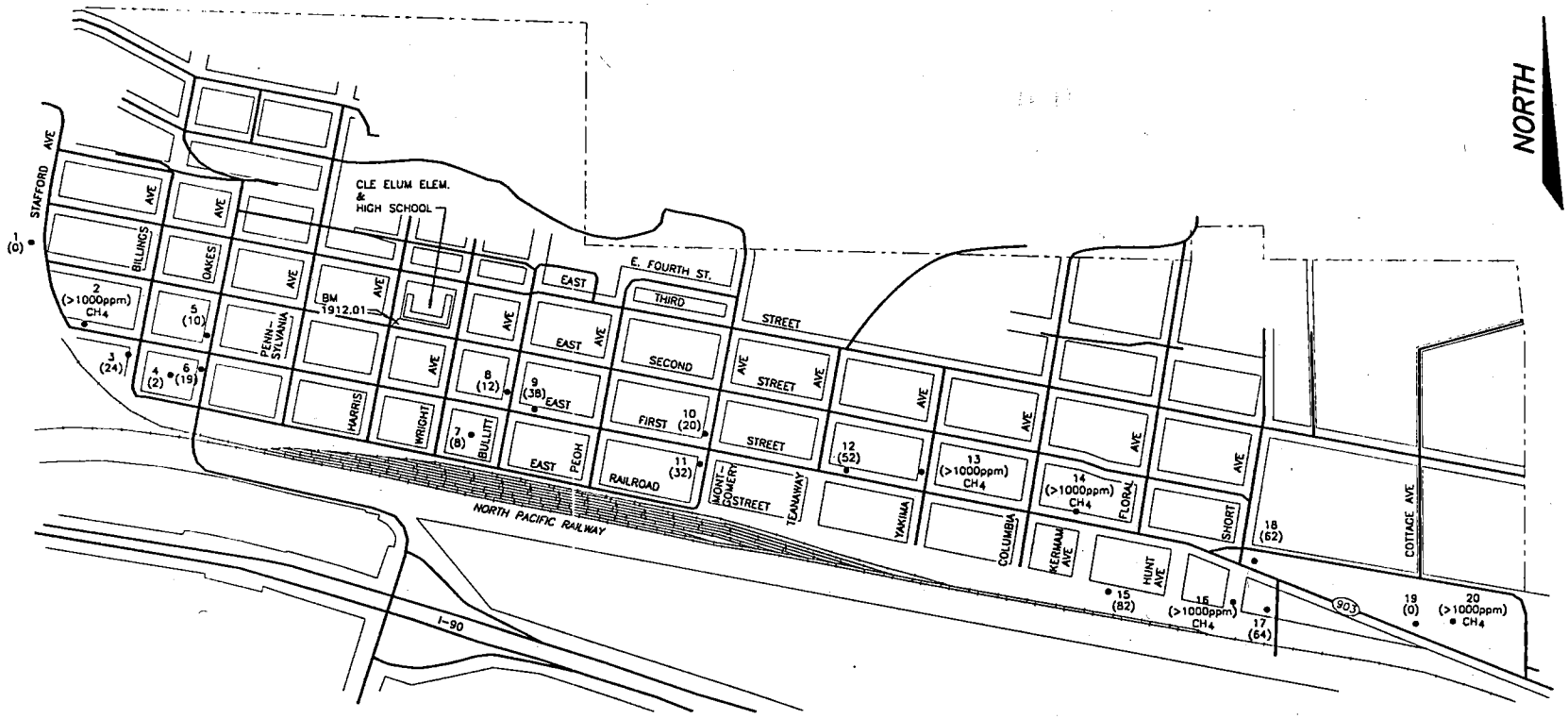
- Real Estate - 120 West 1st Street
- John L. Scott - 119 West 1st Street
- Brad's Cle Elum Conoco - 102 East 1st Street
- Frank Auto Sales - 402 East 1st Street
- Former Mobile Oil Bulk Plant - Short and 1st Street.

5.1 Field Investigation

A 1.5-inch (4-cm) diameter hollow hardened steel probe was driven into undisturbed ground by an electric rotary impact hammer. After reaching the pre-determined depth, an *in situ* continuous soil vapor sample was withdrawn through the probe by a MSA Flow-Lite portable air pump to a portable organic vapor analyzer. For each soil vapor probe borehole, hydrocarbon vapor concentrations were measured at various depths using a Foxboro OVA 128 Century Organic Vapor Analyzer.

The Foxboro instrument utilizes a hydrogen flame ionization (FID) detector to measure organic vapors. According to the manufacturer, the overall precision of the FID when analyzing a known analyte is ±10 percent. The range of the analyzer at the survey mode spans from 0.2 ppm to 1000 ppm of methane with a response time of two seconds or less for obtaining a reading. For this study, the highest vapor reading was recorded.

Prior to each organic vapor measurement, the analyzer was calibrated with a 95 parts per million (ppm) methane gas standard. At the conclusion of each vapor measurement, the analyzer again was tested with the calibration gas to check for detector flame-out condition.



LEGEND	
•	SOIL BOREHOLE
15	SOIL BOREHOLE NUMBER
(82)	ppm AS METHANE (MAXIMUM VALUE DETECTED)

1	KNIFE WORKS	7	JOHN L SCOTT	13	B & G SERVICE STATION	19	CLE ELUM FEED & PET SUPPLIES
2	TIMBER LODGE MOTEL	8	BRAD'S CL ELUM CONOCO	14	ASTER INN	20	UNOCAL BULK PLANT 0095
3	SIMPSON'S TEXACO	9	DAIRY QUEEN	15	TOM'S AUTO REPAIR	21	DE VERE & SONS DISTRIBUTING
4	KITTITAS COUNTY GLASS	10	GOLDEN OCEAN RESTAURANT	16	GERTH'S GARAGE	22	DE VERE & SON'S MINI MART
5	D & J MINI-MART	11	CLE ELUM MOTORS	17	WILLETTE'S SHELL SERVICE	23	NORTHERN EXPRESSO
6	REAL ESTATE	12	FRANK AUTO SALES	18	WILLETTE'S FUEL OIL	24	SUSANNES SERVICES

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FIGURE 5.1 – SOIL VAPOR PROBE BOREHOLE LOCATIONS & SELECTED VAPOR RESULTS

SITE NAME: CLE ELUM PETROLEUM CONTAMINATION

TCP ID: C-19-2007-000

After completion of vapor measurement for each borehole, the steel probe was extracted and wiped to remove any soil that is present on the outer surface and disassembled to remove any soil particles that may have entered the probe through the slotted probe screen. The vapor screen slots were cleared with a knife blade to ensure that openings are not clogged. Ambient air was drawn through the steel tubes by the air pump to purge any residual soil vapors. Drill cuttings were used to backfill each soil vapor probe borehole.

5.2 Soil Vapor Survey Results

The Soil Vapor Survey was conducted on 1 - 4 April 1996. Presented in Table 5.1 is a summary of the soil vapor survey results. The highest vapor reading for each soil vapor probe borehole is also presented in Figure 5.1, the soil vapor probe borehole location site map.

Whenever possible, vapor measurements for each soil vapor probe borehole were made at several depths or to probe refusal to obtain a vertical profile of contamination in the subsurface. As noted in the result summary, several soil vapor probe boreholes were not able to completed to desired depths due to subsurface obstruction.

Table 5.1 - Soil Vapor Survey Results

Soil Vapor Probe Borehole Location	Borehole No.	Depth (feet)	Borehole VOC[1/] (ppm of CH_4)
Stafford and 2nd Street	1	2.5	0
(Reference background)		5	0
		7.5	0
		10	0
Knife Works - 316 W 1st Street	2	2.5	>1000
(Former Pheasant Service)			
Timber Lodge Motel - 301 W 1st Street	3	2.5	16
(Former Preston Phillips 66)		3.7	24
		5	24
Simpson's Texaco - 207 W 1st Street	4	2.5	2
(Alley south of the station)		3.7	2
		5	0
Kittitas County Glass - 202 W 1st Street	5	2.5	0
(Former service station)		3.7	2
		5	10
Cle Elum Apartments - Oakes and 1st Street	6.1	(refusal)	
(South of D & J Mini-Mart)	6.2	(refusal)	
	6.3	2.5	6
		3.7	19
		4.3 (refusal)	4
Dairy Queen - 302 E 1st Street	7	2.5 (refusal)	8
(Former Chevron Service Station)			
Golden Ocean Restaurant - 321 E 1st Street	8	2.5	2
(Former Jim's U-Save)		3.7	12
		5	8

Table 5.1 - Soil Vapor Survey Results (Continued)			
Soil Vapor Probe Borehole Location	Borehole No.	Depth (feet)	Borehole VOC[1/] (ppm of CH_4)
Cle Elum Motor - 401 E 1st Street	9	2.5	0
(Former Bill's ARCO)		3.7	2
		5 (refusal)	38
Aster Inn - 521 E. 1st Street	10.1	2.5 (refusal)	20
(Former gas station)	10.2	(refusal)	
B & G Service - 520 E 1st Street	11.1	2.5 (refusal)	32
	11.2	(refusal)	
	11.3	(refusal)	
Tom's Auto Repair - 703 E 1st Street	12	2.5	52
(Former service station)		3.7	18
		5 (refusal)	14
Gerth's Garage - 719 E 1st Street	13.1	2.5	>1000
(Former Simpson's Exxon)		3.7	78
		5	48
	13.2	2.5(refusal)	84
Willette's Shell Service - 901 East 1st Street	14.1	2.5	>1000
		3.7	>1000
	14.2	2.5	>1000
Willette's Fuel Oil - Kerman & 1st Street	15.1	2.5	10
(Grass field south of bulk plant)		5	50
	15.2	2.5	82
		5	40
Unocal and De Vere & Sons Distributing -	16.1	2.5	62
Short & 1st Street		5	>1000
	16.2	2.5	62
		5	>1000
De Vere & Son's Mini Mart -	17.1	2.5	47
Short & 1st Street	17.2	1.5	64
		2.5	58
		5	52
Northern Espresso - 1102 East 1st Street	18.1	2.5	22
		5	62
	18.2	2.5	0
		3.7	28
SR 903 West of Susannes Service (Storeys)	19.1	2.5	0
		5	0
		7.5	0

Table 5.1 - Soil Vapor Survey Results (Continued)			
Soil Vapor Probe Borehole Location	Borehole No.	Depth (feet)	Borehole VOC[1/] (ppm of CH_4)
Susannes Service (Storeys) - 1310 E 1st Street 12' east of midpoint of below ground tanks	20.1	2.5 5	0.5 >1000
Susannes Service (Storeys) - 1310 E 1st Street 12' east of north edge of below ground tanks	20.2	2.5 5	>1000 >1000
Susannes Service (Storeys) - 1310 E 1st Street 20' east of north edge of below ground tanks	20.3	2.5 5	0 2
Susannes Service (Storeys) - 1310 E 1st Street 10' east of north edge of station	20.4	2.5 5	0 1
Susannes Service (Storeys) - 1310 E 1st Street North of below ground tanks piping	20.5	2.5 5	flame-out flame-out
Susannes Service (Storeys) - 1310 E 1st Street East of below ground tanks, driveway	20.6	2.5 5	10 10
Susannes Service (Storeys) - 1310 E 1st Street South of above ground tanks	20.7	2.5 5	0 20

Note: [1/] Highest vapor reading
VOC Volatile Organic Compounds
>1000 Exceeded the range of the instrument

The Soil Vapor Survey results indicate four areas of potentially high petroleum contamination. These four areas are:

- Knife Works - 316 W 1st Street
- Willette's Shell Service - 901 E 1st Street
- Former Unocal Bulk Plant 0095/DeVere & Sons Distributing - Short and 1st Street
- Susannes Service (Storeys) - 1310 E 1st Street.

Vapor samples from these locations exceeded 1000 ppm as methane, the upper range of the vapor analyzer. For the Susannes Service (Storeys) site, flame-out condition was encountered for borehole location No. 20.5. This flame-out condition, or the extinguishing of the instrument's flame, is caused by low soil-air oxygen levels. In some instances, low soil-air oxygen levels may be due to a high petroleum gas mixture.

Aside from these areas with high organic vapors, low concentrations of organic vapors were consistently detected in areas down-gradient of former and existing service stations/bulk plants. The extent of the petroleum contamination in the subsurface, inferred by the results of the Soil Vapor Survey, may be quantified by the Soil/Ground Water Monitoring Program.

6.0 SOIL MONITORING PROGRAM

Subsurface conditions at the study area were investigated by advancing twenty 4-inch (10-centimeter) diameter hollow-stem auger to depths of 12 to 17 feet (3.7 to 5.2 meters) below the existing site grade. Ground water was generally encountered at about 7 feet (2.1 meters) below surface grade.

A soil sample was collected from each boring to determine if any soil contamination was present at unacceptable levels.

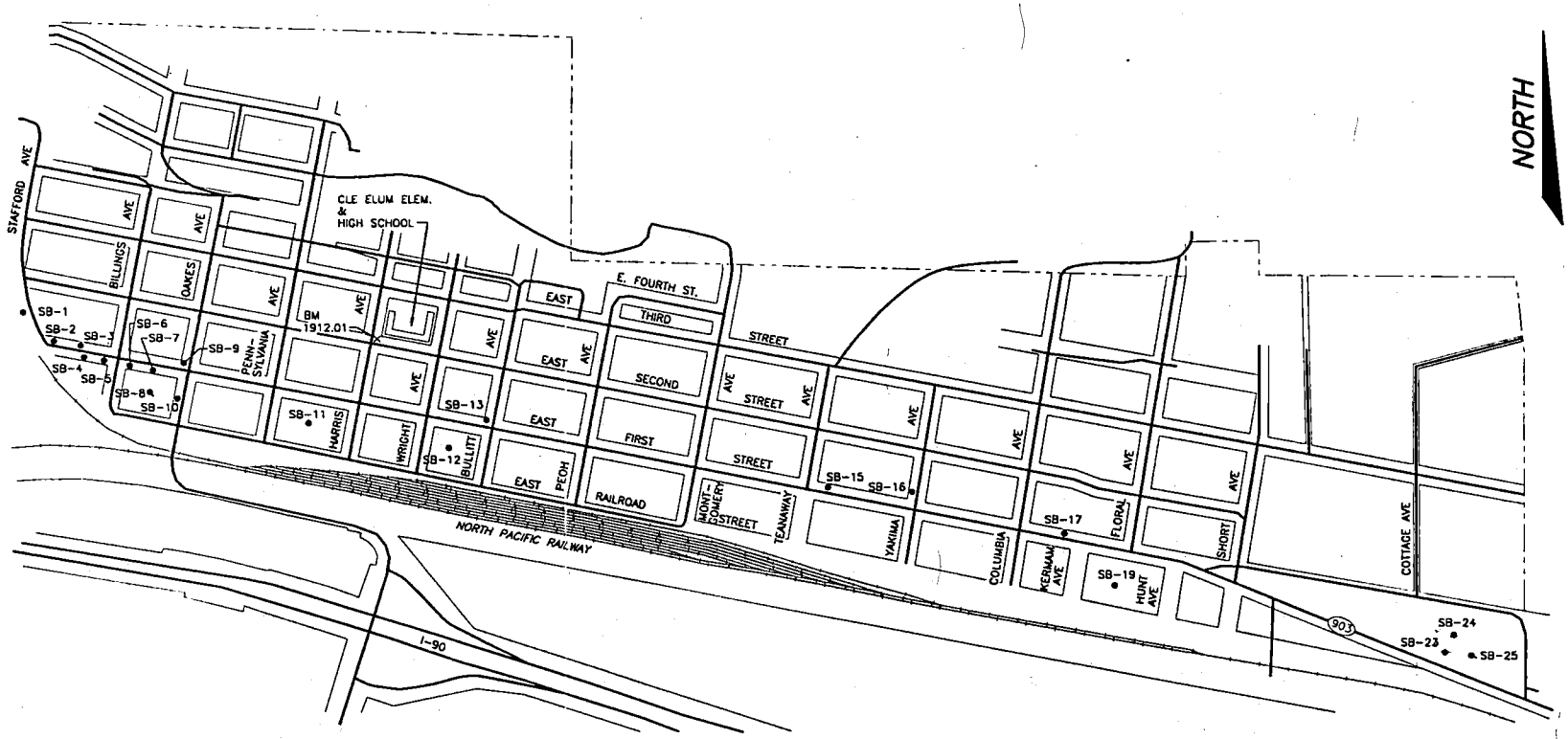
Similar as to the placement of soil vapor probe boreholes, the soil borehole locations were reviewed by Mr. Leonhard, and utility locators for TCI Cable, Puget Power, and US West Communications. Fourteen boreholes are located within the City of Cle Elum's right-of-ways. The remaining six boreholes are located within private properties, with permission from property owners.

The approximate soil borehole locations are as shown in the site map Figure 6.1. General location descriptions are provided in Table 6.1.

Table 6.1 - Soil Borehole/Ground Water Monitoring Well Locations

SB/MW No.	Location Description
1	Stafford Avenue (mid point between 1st and 2nd Street)
2	1st Street and Stafford Avenue (east of the Knife Works)
3	1st Street (north side, midpoint between Billings and Oakes)
4	1st Street (south side, midpoint between Billings and Oakes)
5	Billings Avenue and 1st Street (east of the motel sign)
6	Billings Avenue and 1st Street (near Simpson's Texaco driveway)
7	Northeast corner of Simpson's Texaco property
8	Southeast corner of Simpson's Texaco property
9	Oakes Avenue and 1st Street (east of Kittitas County Glass driveway)
10	Oakes Avenue and 1st Street (east of Cle Elum Apartments)
11	Southeast corner of Cavallini's Pharmacy parking lot
12	Alley south of Dairy Queen
13	Bullitt Avenue and 1st Street (east of Golden Ocean Restaurant)
15	1st Street and Teanaway (east of Tom's Auto Repair)
16	Yakima Avenue and 1st Street (east of Gerth's Garage)
17	Between Willette's Shell and The Cottage
19	Grass field between Kerman and Hunt (south of Willette's Fuel Oil)
23	Susannes Service (Storeys) property (east of below ground storage tanks)
24	Susannes Service (Storeys) property (east of aboveground storage tanks)
25	Susannes Service (Storeys) property (southeast of SB/MW-24)

Soil Borehole SB-1 is located west of the commercial district and about 130 feet (40 meters) northwest of the Knife Works, the site of a former gasoline station (Pheasant Service & Confectionery). Based on an inferred regional ground water flow direction of east-southeast, this borehole is considered to be up-gradient of known potential petroleum contamination sites. For this study, SB-1 is designated as the background ground water monitoring well.



SOIL BOREHOLE	WTPH GASOLINE mg/Kg	WTPH DIESEL mg/Kg	WTPH LUBE OIL mg/Kg
SB-5	270	–	
SB-7	190	–	330
SB-9	ND	150	230
SB-19	400	1300	
SB-23	730	610	

LEGEND	
•	SOIL BOREHOLE
SB-1	SOIL BOREHOLE NUMBER

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FIGURE 6.1 – SOIL BOREHOLE LOCATIONS & SELECTED LABORATORY RESULTS

SITE NAME: CLE ELUM PETROLEUM CONTAMINATION

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Soil Borehole SB-2 is located just east of the Knife Works. Soil Boreholes SB-3 and SB-4 are approximately 160 feet (50 meters) east of SB-2 and are designed to determine the lateral extent of the petroleum contamination, if any, from Pheasant Service. As indicated by the Soil Vapor Survey results, a vapor sample from the vicinity of SB-2 exceeded 1000 ppm as methane.

Soil Borehole SB-5 is located adjacent to US West manhole #4, a reported petroleum contaminated area. Soil Borehole SB-6 is approximately 80 feet (25 meters) east and down-gradient of SB-5.

Soil Borehole SB-7 is located at the northeast corner of Simpson's Texaco and is designed to substantiate undocumented petroleum contamination along 1st Street. Soil Borehole SB-8 is located at the southeast corner of Simpson's Texaco and south of the USTs.

Three borings were drilled within Susannes Service (Storeys) at the eastern boundary of the study area. Soil Borehole SB-23 is located 12 feet (3.7 meters) east of the three below ground storage tanks. This area is characterized by surface staining. SB-24 is located east of the tank farm and is designed to identify petroleum contamination from the fuel transfer operation. SB-25 is located southeast of SB-24 and is designed to determine the extent of the contamination and the ground water flow direction.

Aside from these four clusters of soil borings, each of the remaining borings is located down-gradient from a potential source of petroleum contamination.

6.1 Soil Boring Drilling

Soil borings were drilled on 20 - 31 May 1996 using equipment owned and operated by Geoboring & Development, Inc. of Puyallup, Washington. The drilling equipment was pressure washed prior to each boring. Drill cuttings and drilling equipment decontamination water were stored in clearly labeled DOT-approved 55-gallon (0.2-m^3) drums; and after waste characterization were transported to an approved petroleum contaminated soil landfill for disposal.

Drilling for this project began on the west side of Cle Elum and advanced towards the eastern edge of the city. Overbank deposits from the flooding of Crystal Creek were encountered in soil borings SB-1, SB-2 and SB-3. These deposits consisted of silts, sands, and clays which thinned towards the east. The overbank deposits had thinned out or had been removed by human activity by SB-5 and SB-6 which are approximately 300 feet (90 meters) east of SB-1. All of the monitoring wells are completed in gravels and sands. No effort was made to differentiate between the glacial outwash and Yakima River alluvium.

An on-site Ecology CRO-TCP hydrogeologist determined the exact boring location, examined and logged soils encountered, and prepared a detailed log of the boring. Due to the coarse-grained nature of the soil throughout the stratigraphic column, soil classifications were based

on boring return cuttings. Presented in Appendix A are the soil boring logs completed for the study area.

6.2 Soil Boring Sampling

Soil boring sampling program consisted of soil sampling and VOC vapor measurements. Specifically, the tasks/measurements are:

- Borehole Vapor Measurement
- Soil Sample Collection
- Soil Sample Headspace Measurement.

Borehole Vapor Measurement

Organic vapors in the boreholes were measured using a portable organic vapor analyzer. Prior to each measurement, the instrument was calibrated with a commercial standard 95 ppm methane gas. For each borehole vapor measurement, the highest meter response was recorded. The results are summarized in the soil boring/monitoring well logs presented in Appendix A.

Soil Sample Collection

One set of representative samples from each soil boring was collected by CRO-TCP staff for chemical analysis. Soil samples were collected from the auger flight at the ground water interface region using clean nitrile rubber gloves. Prior to transport for laboratory analysis, soil samples were subjected to the following field screenings: 1) a visual and olfactory examination to identify stain/texture and odor indicative of petroleum related contamination, and 2) headspace analysis to determine relative concentrations of total volatile organic contaminants. Results of the headspace analysis were provided to the analytical laboratory to aid in the analysis.

Soil samples were placed in an iced cooler and, following chain of custody procedures, transported to the Ecology Manchester Environmental Laboratory for chemical analysis. Table 6.2 presents the listing of the analytes and the respective references.

Table 6.2 - Listing of Chemical Analyses (Soil and Ground Water)

Analysis	References
Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)	EPA SW846 Method 8020, Aromatic Volatile Organics
Total Petroleum Hydrocarbons - Gasoline	Washington State Department of Ecology Method WTPH-G
Total Petroleum Hydrocarbons - Diesel	Washington State Department of Ecology Method WTPH-D
Total Lead	Standard Methods EPA SW846, Volume 1, Section A

Soil Headspace Vapor Measurement

A glass jar was three-fourths filled with the soil sample and sealed with aluminum foil. The container was agitated for 10 seconds to expose the soil to the trapped air. After agitation, the sample was allowed to equilibrate for 15 minutes. After which, a VOC measurement was made by puncturing the aluminum foil seal with the Foxboro OVA probe and then reading the concentration of the accumulated headspace gases. For each soil sample, the highest meter response was recorded. Prior to each headspace measurement, the instrument was calibrated with a commercial standard 95 ppm methane gas.

6.3 Soil Sample Analytical Results

Table 6.3 presents a summary of the soil sample analytical results. The MTCA Method A cleanup levels are presented in the bottom of the table. Contaminant concentrations exceeding Method A cleanup levels are shown in bolded text.

The Ecology Manchester Laboratory Analysis reports for the soil boring samples are presented in Appendix B.

Table 6.3 - Summary of Soil Sample Analytical Results

Soil Boring	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	WTPH Gasoline (mg/kg)	WTPH Diesel[1/] (mg/kg)	WTPH Lube Oil (mg/kg)	Total Lead (mg/kg)
SB-1	--	--	--	--	--	--		6.36
SB-2	--	--	--	--	--	--		5.33
SB-3	--	--	--	--	--	--		10.8
SB-4	--	--	--	--	--	--		63.0
SB-5	--	0.16	0.29	--	**270**	--		14.9
SB-6	--	--	--	--	--	--		17.2
SB-7	0.11	0.27	0.20	--	**190**	--	**330**[J]	22.5
SB-8	--	--	--	--	--	--		12.2
SB-9	--	--	--	--	--	**150**[J, 2/]	**230**[J]	42.0
SB-10	--	--	--	--	--	--		5.80
SB-11	--	--	--	--	--	--		17.2
SB-12	--	--	--	--	36	--		8.26
SB-13	--	--	--	--	--	--	68[J]	4.80
SB-15	--	--	--	--	--	--		28.4
SB-16	--	--	--	--	--	--		5.66
SB-17	--	--	--	--	17	--		20.5
SB-19	--	--	0.16	0.30	**400**	**1300**[J, 2/]		8.18
SB-23	0.34	0.20	0.20	--	**730**	**610**		46.7
SB-24	--	--	--	--	--	--		15.5
SB-25	--	--	--	--	--	--		8.51
Method A	0.5	40.0	20.0	20.0	100.0	200.0	200.0	250.0

Note: -- Value is below detection limit
J Positively identified, estimated value
1/ Samples quantified against a #2 diesel standard
2/ Sample patterns match kerosene patterns
Method A Method A Cleanup Levels - Soil

BTEX

Detectable concentrations of BTEX were found in four soil samples: SB-5 (near Timber Lodge Motel), SB-7 (Simpson's Texaco), SB-19 (near Willette's Fuel Oil), and SB-23 (Susannes Service). Detectable concentrations of toluene, ethylbenzene, and xylenes are substantially below the Method A cleanup levels for soil. Benzene was detected in SB-7 (0.11 mg/kg) and SB-23 (0.34 mg/kg). These concentrations are below the benzene Method A cleanup level of 0.5 mg/kg. The laboratory detection limits range from 0.062 to 0.13 mg/kg for benzene, toluene, and ethylbenzene; and 0.19 to 0.39 mg/kg for xylenes.

WTPH-Gasoline

Gasoline-range hydrocarbons, measured as WTPH-G, were found in six soil samples: SB-5 (near Timber Lodge Motel), SB-7 (Simpson's Texaco), SB-12 (near Dairy Queen), SB-17 (near Willette's Shell), SB-19 (near Willette's Fuel Oil), and SB-23 (Susannes Service). The gasoline-range compounds in SB-12 (36 mg/kg) and SB-17 (17 mg/kg) are substantially below the Method A cleanup level of 100.0 mg/kg. Soil samples from SB-5 (270 mg/kg), SB-7 (190 mg/kg), SB-19 (400 mg/kg), and SB-23 (730 mg/kg) were found to contain gasoline-range compounds exceeding the cleanup level. The laboratory detection limit ranges from 9.8 to 15 mg/kg.

WTPH-Diesel

Diesel-range hydrocarbons, measured as WTPH-D, were detected in three soil samples: SB-9 (near Kittitas Glass), SB-19 (near Willette's Fuel Oil), and SB-23 (Susannes Service). Soil samples SB-19 (1300 mg/kg) and SB-23 (610 mg/kg) contain hydrocarbons exceeding the Method A cleanup level of 200.0 mg/kg. The laboratory reported the hydrocarbons in SB-9 and SB-19 may be kerosene, #1 diesel, or stove oil although the samples were quantitated against a #2 diesel standard. The laboratory detection limit ranges from 54 to 180 mg/kg.

WTPH-Lube Oil

The laboratory reported a substance eluted in the lube oil range in soil samples SB-7 (Simpson's Texaco), SB-9 (near Kittitas Glass), and SB-13 (near Golden Ocean Restaurant). The hydrocarbons were quantitated against motor oil and are reported as lube oil. Estimated lube oil-range values for SB-7 and SB-9 are higher than the Method A cleanup level of 200.0 mg/kg for heavy petroleum oil TPH.

Total Lead

The total lead concentrations in the soil samples range from 4.80 to 63.0 mg/kg. No relationship between total lead and other contaminants was apparent. All total lead values are substantially less than the MTCA Method A cleanup level of 250.0 mg/kg.

7.0 GROUND WATER MONITORING PROGRAM

Ground water conditions at the study area were investigated by constructing a monitoring well in each of the twenty soil borings. The depth of the wells ranges from 12 to 16 feet (3.7 to 4.9 meters) below surface grade. Five wells are constructed with a 10-foot (3-meter) well screen and the remaining 15 wells are constructed with a 5-foot (1.5-meter) well screen. The five monitoring wells with the 10-foot screen are: MW-1, MW-2, MW-5, MW-24, and MW-25.

Two separate rounds of ground water sampling were implemented to identify ground water contamination in the study area. The first round was conducted on 24 - 26 June 1996 where a ground water sample was collected from each of the twenty monitoring wells. For this sampling event, field screening including volatile organic vapor measurements were also conducted. An abbreviated confirmational sampling consisting only of ground water sample collection without field screening was conducted on 27 September 1996 for six selected monitoring wells. These wells are: MW-1, MW-5, MW-7, MW-19, MW-23, and MW-24. With the exception of the background monitoring well MW-1, soil and ground water samples from these borehole/well locations were found by previous sampling efforts to contain petroleum contaminants above the MTCA Method A cleanup levels.

7.1 Monitoring Well Construction

Geoboring & Development, Inc. of Puyallup, Washington completed the installation of the ground water monitoring wells. The wells are constructed of 2-in (5-cm) Schedule 40 PVC casing and with either a 5-foot (1.5-meter) or 10-foot (3-meter) 0.020 slot size well screen. Clean Colorado Silica Sand (20/10 size) is used as filter packing and is placed in the borehole annulus to within approximately two feet (0.6 meter) above the top of the screen. A two-foot (0.6-meter) thick layer of Bentonite was placed on top of the filter pack. The completed well is protected by a traffic-rated flush-grade monument encased in cement. The as-built diagrams for the ground water monitoring wells are shown on the attached soil boring/monitoring well logs presented in Appendix A.

The monitoring wells were developed by Geoboring & Development on 31 May to 14 June 1996 using the surge and bail method. A surge block was used to force water to flow into and out of the screen by moving it up and down in the casing. A clean bailer was used to remove ground water from the well. The bailer was decontaminated before reuse. Ground water bailing continued for each well until the discharge appeared free of suspended sediment material.

An as-built survey of the ground water monitoring wells was completed by unlicensed Ecology surveyors. The monitoring well elevations (monument rims) were surveyed to the nearest 0.01 foot (0.003 meter) with an Engineer's level. A US Coast & Geodetic Survey Benchmark M17 (1931) was used for vertical control. This bench mark is located at the northeast corner of the intersection of Harris Avenue and 2nd Street, in the east balustrade of the southwest entrance to the former Cle Elum Elementary School. According to the National Geodetic Survey data sheet, the elevation of this bench mark is 1912.01 feet (582.78 meters) above mean sea level.

Horizontal measurements were made with a fiberglass tape referencing to street corners, centerlines, and if applicable, adjacent monuments. The monument elevations are included in the soil boring/monitoring well logs presented in Appendix A.

7.2 Ground Water Sampling

Ground water sampling consisted of several ancillary tasks/measurements in addition to the collection of ground water samples. The listing of tasks/measurements are:

- Monitoring Well Vapor Measurement
- Ground Water Level Measurement
- Ground Water Sample Collection
- Ground Water Sample Headspace Measurement.

Monitoring Well Vapor Measurement

After opening the monument cover and the PVC well casing cap, organic vapors in the monitoring well casing were measured using a portable organic vapor analyzer. The instrument was calibrated with a commercial standard 95 ppm methane gas prior to each measurement. For each monitoring well casing measurement, the highest meter response was recorded. The results are summarized in the soil boring/monitoring well logs presented in Appendix A.

Ground Water Level Measurement

The depth to ground water level was measured prior to ground water sampling. An electric static water level indicator was used to measure the ground water depth, relative to the monitoring well monument rim, to the nearest 0.01 foot (0.003 meter). The ground water elevation was determined by subtracting the ground water level from the monument rim elevation.

Ground water monitoring wells were measured on three separate occasions to determine ground water elevations, flow directions, and hydraulic gradients. The first measurement was conducted during the ground water sampling event of 24 - 26 June 1996. On 24 June 1996, monitoring wells MW-1 through MW-4 were sampled. On 25 June 1996, nine monitoring wells MW-5 through MW-13 were sampled. The remaining seven monitoring wells MW-15 through MW-25 were sampled on 26 June 1996. This first ground water level measurement was preceded by a 23 June 1996 rainfall event.

To minimize the influence of precipitation on ground water flow, two additional rounds of elevation measurement for all 20 wells were conducted on 19 August and 27 September 1996. The results from these two sets of measurements were used for determining ground water flow directions and hydraulic gradients.

Table 7.1 presents a summary of the monument elevations and the three sets of ground water elevation measurements. The general site and localized ground water flow directions plotted for the latter two elevation measurements are presented in Figure 7.1.

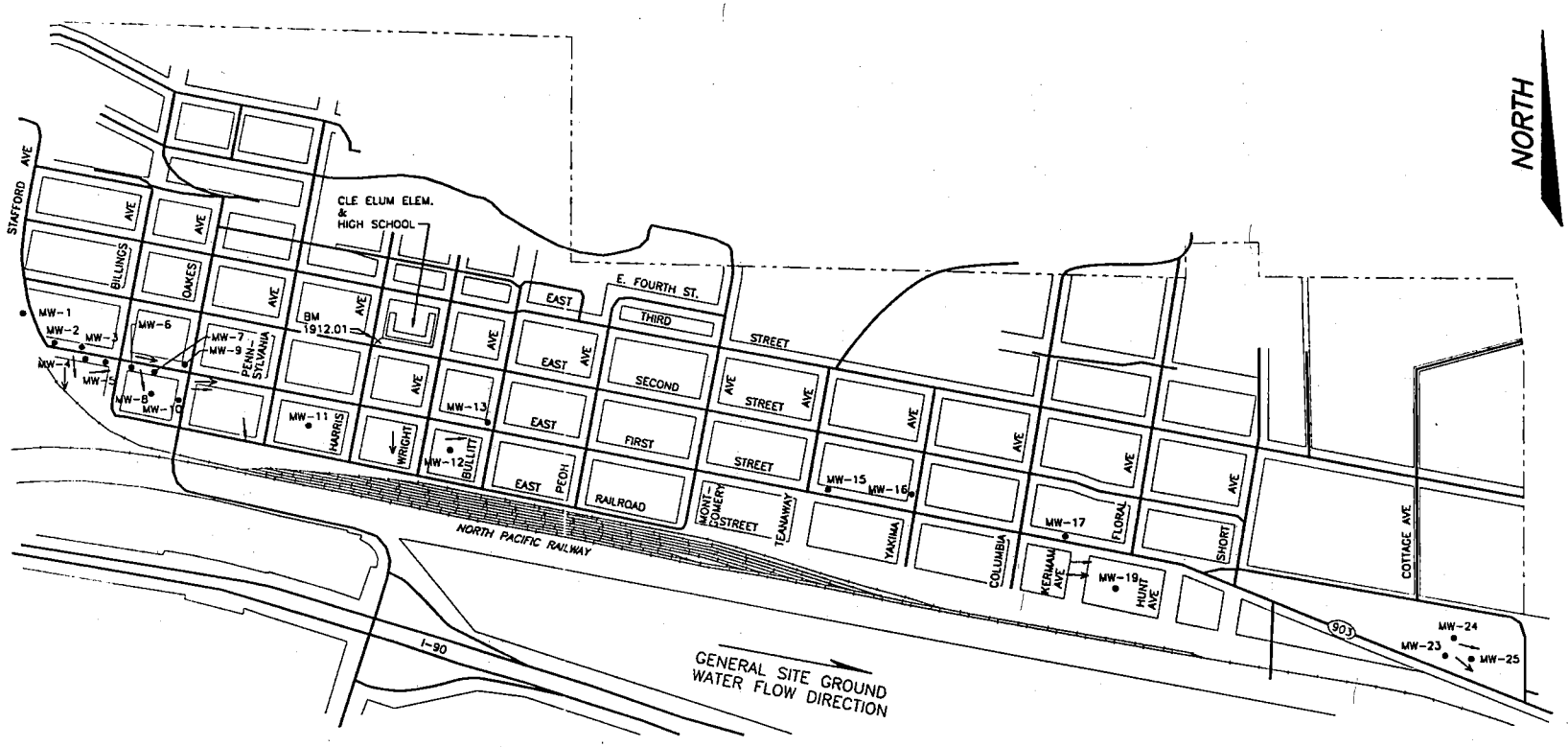
Table 7.1 - Summary of Monitoring Well and Ground Water Elevations						
Monitoring Well	Well Monument Elevation (feet msl)	Ground Water Elevation (feet msl)	Ground Water Elevation (feet msl)	Ground Water Elevation (feet msl)	Ground Water Elevation (feet msl)	Ground Water Elevation (feet msl)
		6/24/96	6/25/96	6/26/96	8/19/96	9/27/96
MW-1	1923.83	1920.15			1920.83	1920.53
MW-2	1916.06	1909.18			1908.94	1908.11
MW-3	1913.86	1906.65			1906.77	N/M
MW-4	1913.46	1906.22			1906.52	1904.86
MW-5	1912.14		1905.77		1906.25	1904.21
MW-6	1911.82		1905.22		1905.64	1903.69
MW-7	1912.51		1905.29		1905.67	1903.80
MW-8	1910.52		1902.81		1903.21	1901.36
MW-9	1910.73		1904.81		1905.19	1903.45
MW-10	1911.17		1904.82		1905.25	1903.41
MW-11	1908.87		1901.17		1901.47	1899.83
MW-12	1905.43		1899.65		1899.88	1895.53
MW-13	1906.70		1899.07		1899.28	1898.15
MW-15	1899.64			1892.89	1892.99	1891.98
MW-16	1897.33			1891.84	1891.92	1891.02
MW-17	1892.85			1888.42	1888.53	1887.32
MW-19	1893.41			1887.53	1887.61	1886.27
MW-23	1888.10			1881.34	1880.03	1878.86
MW-24	1888.14			1881.24	1879.95	1878.79
MW-25	1887.41			1881.17	1879.84	1878.61

Note: All elevations are based on a US Coast & Geodetic Survey Benchmark M17 (1931) - 1912.01 feet mean sea level (msl)
N/M - Not Measured, could not remove monitoring well casing cap

Ground water elevations, for the 19 August 1996 monitoring event, range from 1920.83 to 1899.28 feet (585.47 to 578.90 meters) for wells located within the business district. For the three monitoring wells at Susannes Service, the elevations range from 1880.03 to 1879.84 feet (573.03 to 572.98 meters). An approximate ground water gradient of 0.0048 ft/ft (40.99 feet vertical fall in 8500 feet horizontal) was calculated based on elevation measurements obtained for MW-1 and MW-25.

The results from the 27 September 1996 monitoring event show ground water elevations range from 1920.53 to 1898.15 feet (585.38 to 578.56 meters) at business district and from 1878.86 to 1878.61 feet (572.68 to 572.60 meters) at Susannes Service.

Because most of the wells located on 1st Street lie on a straight line, it is not possible to determine the overall ground water flow direction via triangulation with a high degree of certainty. In general, the data show the ground water for the study area appears to flow in an easterly direction.



0ft 500ft 1000ft 1500ft 2000ft 2500ft 3000ft

LEGEND

- • MONITORING WELL
- MW-1 MONITORING WELL POINT NUMBER
- — LOCAL GROUND WATER FLOW DIRECTION (8/19/96)
- → LOCAL GROUND WATER FLOW DIRECTION (9/27/96)

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FIGURE 7.1 – GROUND WATER FLOW DIRECTIONS

SITE NAME: CLE ELUM PETROLEUM CONTAMINATION

TCP ID: C-19-2007-000

Localized ground water flow directions were determined for several monitoring well groupings. The flow directions for wells in the far western portion of the study area vary from east to southeast. The southerly ground water flow in this region may be influenced by the surface flow in Roslyn Creek located adjacent to Stafford Avenue. Ground water flow in the center and eastern portions of the study area generally flows towards the east.

The localized flow directions for selected monitoring well groupings and ground water elevations for 19 August and 27 September 1996 are shown in Figure 7.1.

Ground Water Sample Collection

For the first sampling event, ground water samples were collected using a YSI sampling system. The sampling system consists of a YSI 3500 Water Quality Monitor, a YSI 3510 Temperature Probe, a YSI 3520 Flow Flow-Through Conductivity Cell, a YSI 3530 pH Electrode, and a YSI 3550 Sample Chamber Assembly. The sample chamber has clear acrylic sides allowing visual inspection of the fluid flowing through the chamber. A separate flow chamber constructed of polyethylene pipe fittings was constructed to house the YSI 58 Dissolved Oxygen Meter. A Grundfos MP1 Redi-Flo2 Environmental Sampling Pump was used to pump ground water through the flow cells. For all sampling runs, the sampling rates ranged from 0.53 gal/min (2 L/min) to 0.66 gal/min (2.5 L/min).

During each sampling run, the water quality parameters, turbidity (visual), temperature, conductivity, pH, and dissolved oxygen were constantly monitored to determine when a representative sample of the aquifer has been obtained. Generally, stable readings were attained after purging of approximately 8 to 10 gallons (30 to 40 liters), representing 6 to 12 well casing volumes, from each monitoring well. After purging, ground water samples were collected following proper sampling and preservation procedures. All sample bottles were placed in iced coolers and transported to the Ecology Manchester Environmental Laboratory for chemical analysis following Ecology chain of custody procedures. Ground water samples were analyzed for the petroleum contaminants presented in Table 6.2.

For the confirmation sampling event, ground water samples were collected directly from the Grundfos pump discharge after proper purging of the wells.

Ground Water Sample Headspace Measurement

Headspace measurements of ground water samples were conducted using a portable organic vapor analyzer. A glass sample bottle was three-fourths filled with the ground water sample and sealed with aluminum foil. The sample was then allowed to equilibrate for 15 minutes for vapor development before vapor analysis. Prior to each measurement, the instrument was calibrated with a 95 ppm methane gas standard. For each monitoring well casing measurement, the highest meter response was recorded.

Ground Water Sampling Field Data

Table 7.2 presents a summary of the field data collected for ground water sampling.

Table 7.2 - Summary of Ground Water Sampling Field Data (Collected on 24 - 26 June 1996)

Monitoring Well	pH	Conductivity (mmhos/cm)	Dissolved O_2 (mg/L)	Well VOC[1/] (ppm CH_4)	Sample VOC (ppm CH_4)
MW-1	6.46	0.208	0.2	6.5	0
MW-2	6.29	0.447	2.1	>1000	120
MW-3	6.33	0.222	0.4	120	6
MW-4	6.52	0.328	0.1	100	6
MW-5	6.49	0.246	0.2	42	14
MW-6	6.50	0.317	0.1	14	0
MW-7	6.52	0.287	0.1	>1000	180
MW-8	6.63	0.241	3.7	2	2
MW-9	6.80	0.063	6.0	2	0
MW-10	6.67	0.253	1.5	20	10
MW-11	6.66	0.164	4.7	2	0
MW-12	6.64	0.087	3.3	0	0
MW-13	6.72	0.126	3.9	2	0
MW-15	6.33	0.117	5.9	0	0
MW-16	6.39	0.101	3.7	NA	NA
MW-17	6.47	0.156	0.6	16	20
MW-19	6.47	0.123	1.9	14	12
MW-23	6.47	0.140	3.4	NA	NA
MW-24	6.43	0.225	0.1	NA	NA
MW-25	6.46	0.174	1.0	NA	NA

Note: [1/] Highest vapor reading
VOC Volatile Organic Compounds
>1000 Greater than the range of the instrument
ND Not Analyzed due to OVA instrument problem

For the study area, the pH of the ground water ranges from 6.29 to 6.80, conductivity ranges from 0.063 to 0.447 mmhos/cm, and dissolved oxygen ranges from a low of 0.1 to a high of 6.0 mg/L. The ground water pH varies throughout the study area with no discernible pattern. Conductivity is generally higher whereas dissolved oxygen is generally lower in monitoring wells located in the western section of the study area.

With the exception of MW-2, monitoring well borehole and ground water sample headspace volatile organic compounds generally correspond to the higher contaminant concentrations in the soil boring samples.

7.3 Ground Water Sample Analytical Results

Ground water samples were collected on two separate occasions. The first round of sampling was conducted on 24 - 26 June 1996. To confirm ground water contamination identified from the initial sampling event, a second series of ground water samples was collected on 27

September 1996 from six selected monitoring wells. Aside from MW-1 which is the back ground well, the remaining five wells sampled were MW-5, MW-7, MW-19, MW-23, and MW-24. Field tests were not performed for these ground water samples.

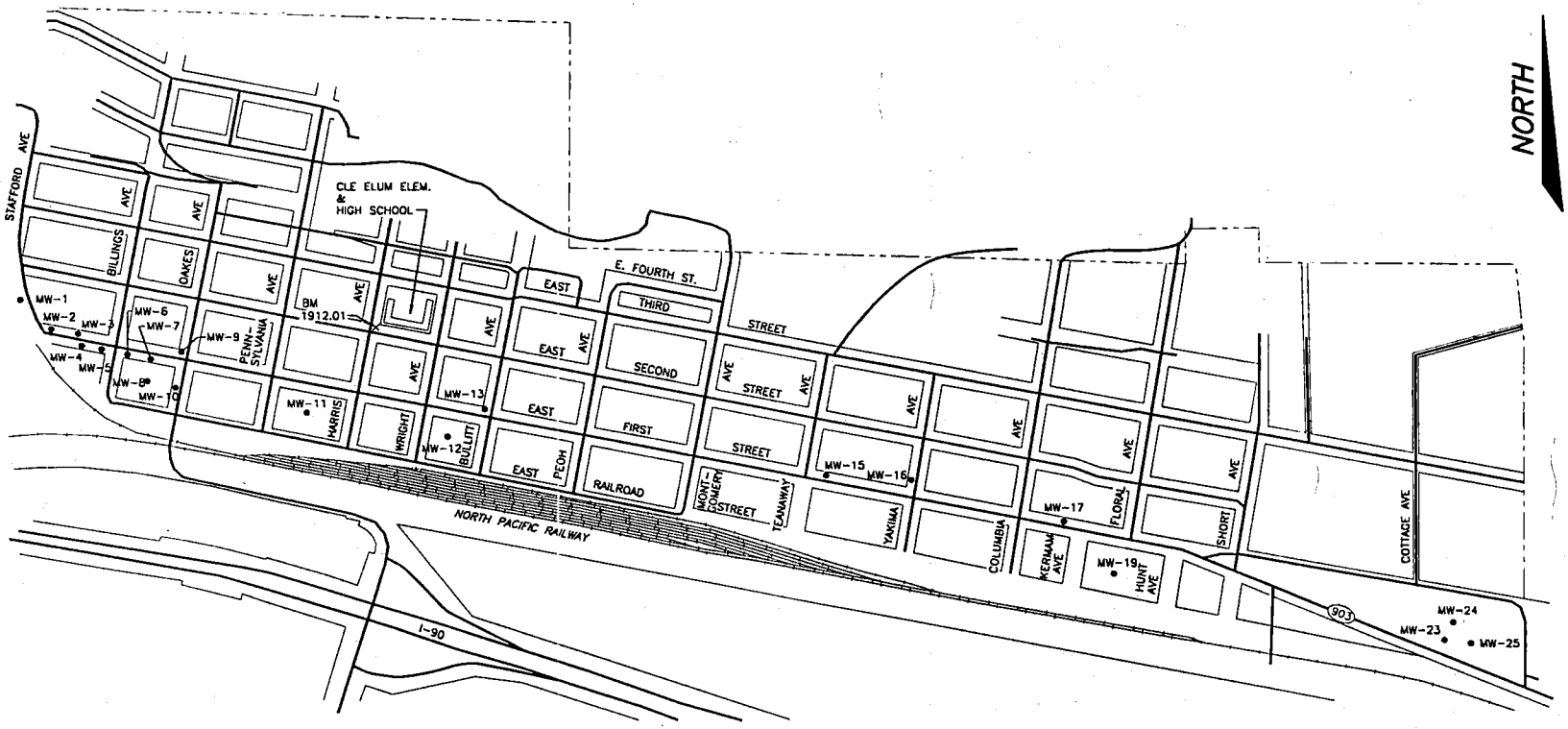
Table 7.3 presents a summary of the ground water sample analytical results. The MTCA Method A cleanup levels are presented at the bottom of the table. Within the table, contaminant concentrations exceeding the Method A cleanup levels are shown in bolded text. Presented in Figure 7.2 are the monitoring well locations along with selected laboratory results for monitoring wells with petroleum contaminants exceeding Method A cleanup levels.

The Ecology Manchester Laboratory reports for the ground water samples are presented in Appendix B.

Table 7.3 - Summary of Ground Water Sampling Analytical Results

Monitoring Well	Sampling Date	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Xylenes (ug/L)	WTPH Gasoline (ug/L)	WTPH Diesel[1/] (ug/L)	Total Lead (ug/L)
MW-1	6/24/96	--	--	--	--	--	--	1.6
	9/27/96	--	--	--	--	--	--	
MW-2	6/24/96	--	--	--	--	--	--	1.8
MW-3	6/24/96	--	--	--	--	--	--	1.2
MW-4	6/24/96	--	--	--	--	--	--	1.8
MW-5	6/25/96	--	--	--	--	240[NJ]	--	3.4
	9/27/96	--	--	--	--	100[J]	--	
MW-6	6/25/96	--	--	--	--	--	--	1.6
MW-7	6/25/96	**240**	**430**	**460[J]**	**3200[J]**	**21000**	--	2.8
	9/27/96	**140**	**98**	**460**	**2480**	18	--	
MW-8	6/25/96	--	3.0	4.0[J]	28[J]	--	--	1.6
MW-9	6/25/96	--	--	1.6[J]	12[J]	--	--	1.6
MW-10	6/25/96	--	--	2.4[J]	17[J]	--	--	1.4
MW-11	6/25/96	--	--	1.1[J]	8.2[J]	--	--	1.1
MW-12	6/25/96	--	--	--	3.2[J]	--	--	--
MW-13	6/25/96	--	--	--	--	--	--	1.2
MW-15	6/26/96	--	--	--	--	--	--	3.5
MW-16	6/26/96	--	1.1	--	--	--	--	2.1
MW-17	6/26/96	--	--	--	--	--	--	1.7
MW-19	6/26/96	--	--	--	--	--	460[J]	1.3
	9/27/96	0.54	0.40	1.5	7.3	--	--	
MW-23	6/26/96	--	--	--	--	--	Lost	3.6
	9/27/96	**35**	4.5	19	**55**	970	--	
MW-24	6/26/96	**320**	**400**	**79[J]**	**500[J]**	**1000**	260[J]	1.7
	9/27/96	**410**	**100**	**31[J]**	**75[J]**	**1600**	--	
MW-25	6/26/96	--	--	--	--	--	--	1.5
Method A		5	40	30	20		1000	5

Note:
-- Value is below detection limit
1/ Samples quantified against a #2 diesel standard
NJ Evidence the analyte is present, estimated value
J Positively identified, estimated value
Method A Method A Cleanup Levels - Ground Water



0ft 500ft 1000ft 1500ft 2000ft 2500ft 3000ft

MONITORING WELL	SAMPLING DATE	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL-BENZENE (ug/L)	XYLENES (ug/L)	WTPH GASOLINE (ug/L)	WTPH DIESEL (ug/L)
MW-7	6/25/96	240	430	460	3200	21000	-
	9/27/96	140	98	460	2480	18	-
MW-23	6/26/96	-	-	-	-	-	-
	9/27/96	35	4.5	19	55	970	-
MW-24	6/26/96	320	400	79	500	1000	260
	9/27/96	410	100	31	75	1600	-

LEGEND	
•	MONITORING WELL
MW-1	MONITORING WELL NUMBER

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FIGURE 7.2 – MONITORING WELL LOCATIONS & SELECTED LABORATORY RESULTS

SITE NAME: CLE ELUM PETROLEUM CONTAMINATION

TCP ID: C-19-2007-000

BTEX

Initial Sampling

Detectable concentrations of BTEX were found in eight ground water samples: MW-7 (Simpson's Texaco), MW-8 (Simpson's Texaco), MW-9 (near Kittitas Glass Shop), MW-10 (near D & J Mini-Mart), MW-11 (near Brad's Cle Elum Conoco), MW-12 (near Dairy Queen), MW-16 (near Gerth's Garage), and MW-24 (Susannes Service). Detectable concentrations of toluene, ethylbenzene and xylenes are substantially above the ground water Method A cleanup levels for MW-7 (BTEX: 240/430/460/3200 ug/L), and MW-24 (BTEX: 320/400/790/500 ug/L). Total xylenes was detected at MW-8 at 28 ug/L, just above the Method A cleanup standard of 20 ug/L. All other detectable concentrations are below the Method A cleanup levels.

Confirmational Sampling

The second round of ground water samples confirms the high concentrations of BTEX in MW-7 and MW-24 identified during the initial sampling event. For this second round of ground water samples, BTEX concentrations in MW-7 are 140/98/460/2480 ug/L and in MW-24 are 410/100/31/75 ug/L. Both of these ground water samples are substantially greater than the ground water Method A cleanup levels. For MW-23, benzene was detected at 35 ug/L and total xylenes was detected at 55 ug/L. These values are above the Method A cleanup levels and are also higher than the non-detect values previously found for the ground water sample collected on 26 June 1996.

TPH

Initial Sampling

Gasoline-range hydrocarbons, measured as WTPH-G, were found in three ground water samples: MW-5 (near Timber Lodge Motel), MW-7 (Simpson's Texaco), and MW-24 (Susannes Service). Diesel-range hydrocarbons, measured as WTPH-D, were found in two ground water samples: MW-19 (near Willette's Fuel Oil) and MW-24 (Susannes Service).

The total petroleum hydrocarbons (WTPH-G + WTPH-D) in MW-7 (21000 ug/L) and MW-24 (1270 ug/L) are higher than the ground water Method A cleanup standard of 1000 ug/L.

Confirmational Sampling

Gasoline-range hydrocarbons were found in MW-5, MW-7, MW-23, and MW-24. There were differences between the two sampling events. Gasoline-range hydrocarbons for MW-7 decreased from 21000 ug/L to 18 ug/L, whereas these compounds for MW-23 increased from below detection to 970 ug/L. For MW-24, the reported value of 1600 ug/L is above the Method A cleanup levels.

No detectable concentration of diesel-range hydrocarbons was found in any of the six ground water monitoring wells sampled during this sampling event.

Total Lead

The total lead concentrations in the ground water samples range from ND (1) to 3.6 ug/L. No relationship can be established between total lead and other contaminants. All total lead values are less than the MTCA Method A cleanup level of 5 ug/L.

8.0 CONCLUSIONS

The site is generally flat with a topographic relief of approximately 40 feet (12 meters) across the study area. Native soils at the study area consist of silty sandy clay underlain by dense gravel with cobbles.

Historical review identified twenty-four sites located along 1st Street where petroleum products are/were stored and sold. Many of the sites have terminated petroleum products related operations for many years. The results of the field investigation: soil vapor survey, soil boring sampling, and ground water sampling indicate inactive sites generally do not pose as potential sources of subsurface petroleum contamination. Only two inactive sites, inferred by adjacent soil boring samples, may contain petroleum contaminants above the MTCA Method A cleanup levels. Ground water samples, however, are below the MTCA Method A cleanup levels for petroleum contaminants. These two inactive sites are:

- Timber Lodge Motel
- Kittitas County Glass.

For MW-5 located near the Timber Lodge Motel, gasoline-range hydrocarbons were found in the soil and ground water samples. The contaminants are in the general range of the MTCA Method A cleanup levels. The former Preston Phillips 66 station has been closed since 1977. The residual subsurface contamination may be due to releases from the USTs and/or from past housekeeping practices such as washdown of paved areas with gasoline.

Diesel and lube oil-range hydrocarbons were found in the soil sample from SB-9 adjacent to Kittitas County Glass, the site of a former service station. According to the historical review, the service station may have been closed in the late 50's. As such, the residual hydrocarbons identified in the soil sample are very likely due to releases which occurred some 40 years ago. The presence of the subsurface contamination provides some indications of the slow natural biodegradation rates of diesel and longer-chained hydrocarbons in this study area.

Petroleum contaminants, above the MTCA Method A cleanup levels, have been found in soil and ground water samples from soil borings and monitoring wells adjacent to or within three operating facilities. These three operating facilities are:

- Simpson's Texaco
- Willette's Fuel Oil
- Susannes Service.

A soil sample from Simpson's Texaco (SB-7) was found to be contaminated with gasoline and lube oil-range hydrocarbons in the range of MTCA Method A cleanup levels. Benzene, toluene, ethylbenzene, xylenes, and gasoline-range hydrocarbons in the ground water sample (MW-7) were substantially higher than the MTCA Method A cleanup levels. In view of the absence of BTEX contaminants in the ground water from MW-5 and MW-6, which are up-gradient of MW-7, the contamination at this location with high BTEX concentrations most

likely is not related to the reported release of petroleum products at the Timber Lodge Motel (former Preston Phillips 66).

Concentrations of gasoline and diesel-range hydrocarbons, at higher than MTCA Method A cleanup levels, were found in a soil sample from SB-19. This soil boring is located down gradient of Willette's Fuel Oil. For the ground water sample, BTEX contaminants were not detected; and diesel-range hydrocarbons was found below the MTCA Method A cleanup level. The source of the subsurface contamination is most likely due to the historical rail tankcar unloading activity rather than releases from the above-ground storage tanks.

A soil sample from Susannes Service (SB-23) was found to be contaminated with gasoline and diesel-range hydrocarbons above the MTCA Method A cleanup levels. Benzene, toluene, ethylbenzene, xylenes, gasoline-range and diesel-range hydrocarbons in ground water samples from MW-24 were substantially higher than the MTCA Method A cleanup levels. Benzene and xylenes were also above the Method A cleanup levels for one ground water sample from MW-23. Product released from the underground piping may account for the high level of soil contamination in the vicinity of MW-23. The petroleum contamination in the vicinity of MW-24 (the unpaved tank farm area), is most likely due to releases from product off-loading and storage tank cleaning activities.

9.0 RECOMMENDATIONS

This limited Phase 1 and Phase 2 Environmental Site Assessment identified three sites with petroleum products impacted soils and/or ground water. These three sites are: Simpson's Texaco, Willette's Fuel Oil, and Susannes Service. Two other sites, the former Unocal Bulk Plant 0095 and De Vere and Sons Distributing/Mini Mart, are being investigated via the independent remedial action process.

9.1 Simpson's Texaco

Subsurface soil and ground water in this site were found to be contaminated with gasoline and diesel-range petroleum products exceeding MTCA Method A cleanup levels. The impacted zone, inferred by non-detected results in monitoring well MW-8, may be limited to the vicinity of monitoring well MW-7.

A preliminary site hazard assessment (SHA) has been completed based on the ground water to human health exposure pathway. Based on Simpson Texaco's site-specific conditions, non-applicable exposure pathways relating to surface water, air, and marine sediment were not used for the ranking analysis. For the case where the ground water is not being used for irrigation, the Washington Ranking Method (WARM) derived a ranking of 5 for this site. A score of 1 represents the highest level of concern relative to other sites, and a score of 5 the lowest.

In view of the preliminary ranking of 5 where cleanup priority is the lowest, site remediation activities are not warranted at this site. To assess the viability of natural biodegradation to effect site cleanup, an annual ground water sampling program should be implemented.

9.2 Willette's Fuel Oil

At this site, fuel oil contamination is limited to the subsurface soil. Gasoline and diesel-range hydrocarbons in the ground water are below the Method A cleanup levels. Given the low levels of contamination identified, no further action is recommended for this site.

9.3 Susannes Service

Subsurface soil and ground water in this site were found to be contaminated with gasoline and diesel-range petroleum products exceeding MTCA Method A cleanup levels. The impacted zone, as inferred by contaminants in monitoring wells MW-23 and MW-24, may encompass an area underlying the below-ground storage tanks and the above-ground tank farm.

This site is listed in the Site Register and has been assigned a ranking of 1. This score represents the highest level of concern.

In view of the WARM ranking of 1, site remediation activities are warranted to eliminate or minimize environmental risks posed by the contaminated soil and ground water. To assess the extent of the contamination and to identify appropriate cleanup measures, Susannes Service

will need to initiate a remedial investigation and feasibility study (RI/FS). In addition to the RI/FS, Susannes Service will also need to evaluate housekeeping measures and facility modification requirements so as to eliminate site contamination from future releases of petroleum products from fueling activities.

Susannes Service is under an order issued by the Kittitas County Public Services Department, Building & Fire Safety Division to correct violations of the Uniform Fire Code on motor vehicle fuel dispensing stations and flammable and combustible liquids. Compliance with the corrective measures as specified in the order should eliminate future releases of petroleum products to the environment from storage and fueling activities.

REFERENCES

Porter, Stephen C. "Pleistocene glaciation in the southern part of the North Cascade Range, Washington," Geological Society of American Bulletin, Vol. 87, January 1976, pp. 61-75.

Tabor, R. W., R. B. Waitt, Jr., V. A. Frizzell, Jr., D. A. Swanson, G. R. Byerly, and R. D. Bentley, USGS Miscellaneous Investigations Map I-1311, 1982.

APPENDIX A

Soil Boring Log/Monitoring Well As-Builts

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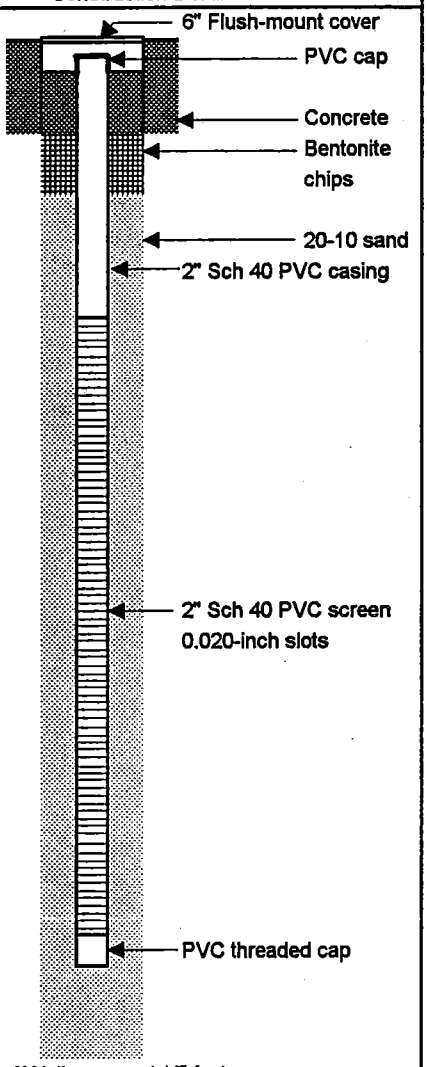
Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description (Based on return cuttings)
0		Silty clay
5		
▼	GS	7.5 feet - Moist Sandy silt (brown)
10		Gravels/cobbles
15		GS: Grab sample off auger flights ▼ Observed ground water level at time of drilling Total Borehole Depth: 16.5 feet Borehole Vapor Conc: 0 ppm as CH_4 (measured on): May 21, 1996

Monitoring Well Construction Details



Total Depth of Well: 14.7 feet
Length of Screen 10 feet
Stabilized Water Level: 3.68 feet
(measured on): June 24, 1996
MW Vapor Conc: 6.5 ppm as CH_4
(measured on): June 24, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 21, 1996
Developed: June 12, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 1
Street: Stafford Ave. between 1st and 2nd Street
Location: NE1/4SE1/4Sec27T20NR15E
Lat/Long: 47°11'46"N, 120°56'35"W
Monument Elev: 1923.83 feet

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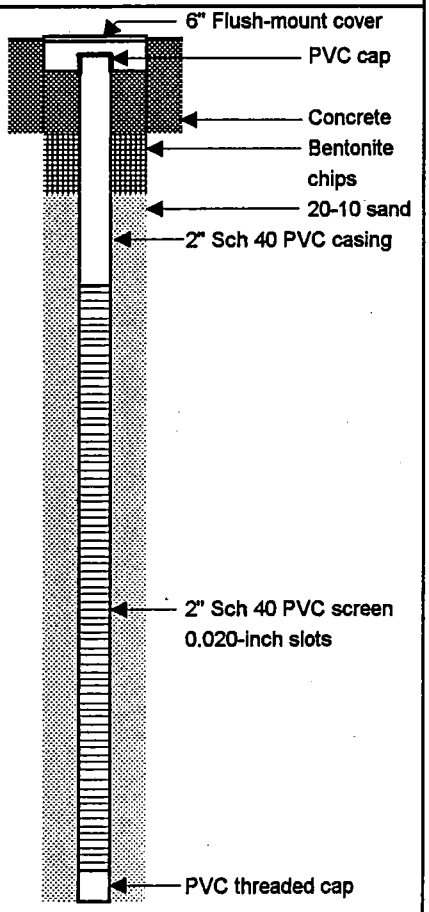
Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		Roadfill material
		Clay (blue)
		Heavy petroleum odor
5		
		Moist sandy clay (blue)
		Petroleum odor
		Cobbles
▼ 10	GS	
		Total Borehole Depth: 14 feet
15		GS: Grab sample off auger flights
		▼ Observed ground water level at time of drilling
		Borehole Vapor Conc: 200 ppm as CH_4
		(measured on): May 21 1996

Monitoring Well Construction Details



Total Depth of Well: 14.04 feet
Length of Screen 10 feet
Stabilized Water Level: 6.88 feet
(measured on): June 24, 1996
MW Vapor Conc: >1000 ppm as CH_4
(measured on): June 24, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 21, 1996
Developed: June 12, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 2
Street: 1st Street and Stafford Avenue
Location: NE1/4SE1/4Sec27T20NR15E
Lat/Long: 47°11'45"N, 120°56'32"W
Monument Elev: 1916.06 feet

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Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

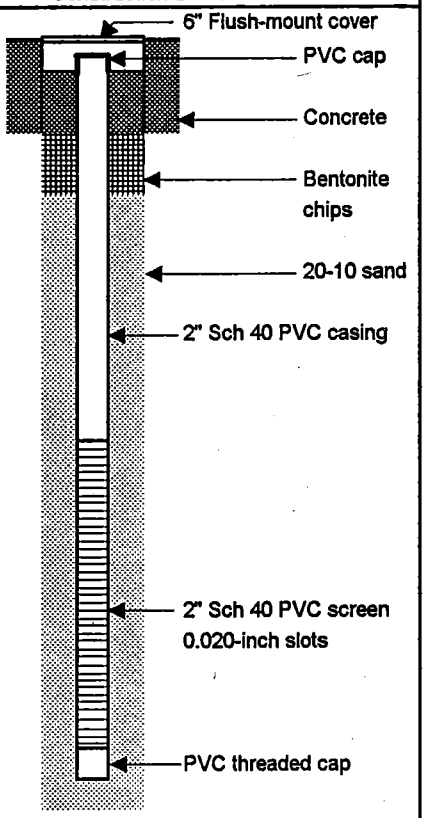
Depth (feet)	Sample Type	Soil Boring Geological Description (Based on return cuttings)
0		Roadfill material
		Silty sandy clay
		Gravel
		Sandy silts
5		
▼	GS	
10		
15		

Total Borehole Depth: 12.5 feet

GS: Grab sample off auger flights
▼ Observed ground water level at time of drilling

Borehole Vapor Conc: 0 ppm
(measured on): May 21, 1996

Monitoring Well Construction Details



Total Depth of Well: 11.7 feet
Length of Screen 5 feet
Stabilized Water Level: 7.21 feet
(measured on): June 24, 1996
MW Vapor Conc: 120 ppm as CH_4
(measured on): June 24, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 21, 1996
Developed: June 12, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 3
Street: 1st Street between Billings and Oakes
Location: NE1/4SE1/4Sec27T20NR15E
Lat/Long: 47°11'45"N, 120°56'30"W
Monument Elev: 1913.86 feet

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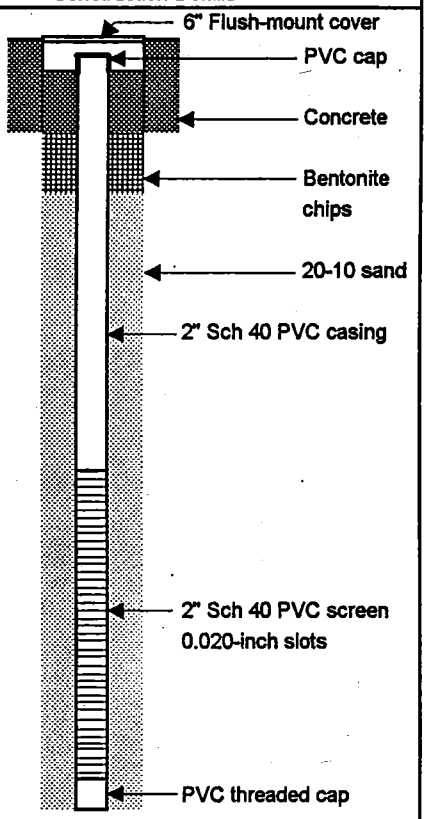
Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description	Monitoring Well Construction Details
0		(Based on return cuttings)	6" Flush-mount cover
		Roadfill material	PVC cap
		Gravels & cobbles	Concrete
			Bentonite chips
			20-10 sand
5			2" Sch 40 PVC casing
▼	GS		
		Sand	
		Cobbles	2" Sch 40 PVC screen 0.020-inch slots
10			
		Total Borehole Depth: 12.5 feet	
		GS: Grab sample off auger flights	
		▼ Observed ground water level at time of drilling	
15			
		Borehole Vapor Conc: 30 ppm as CH_4	Total Depth of Well: 12.4 feet
		(measured on): May 21, 1996	Length of Screen 5 feet
			Stabilized Water Level: 7.24 feet
			(measured on): June 24, 1996
			MW Vapor Conc: 100 ppm as CH_4
			(measured on): June 24, 1996



Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 21, 1996
Developed: June 12, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 4
Street: 1st Street between Billings and Oakes
Location: NE1/4SE1/4Sec27T20NR15E
Lat/Long: 47°11'43"N, 120°56'30"W
Monument Elev: 1913.46 feet

CRO - TOXICS CLEANUP PROGRAM

Washington Department of Ecology

Soil Boring/Monitoring Well Log

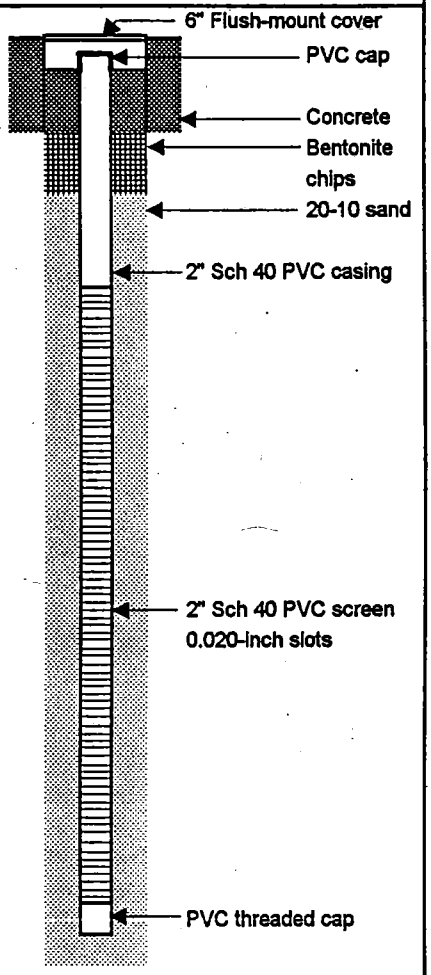
Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		Roadfill material
		Gravels
5		
▼	#5	Clay (blue), petroleum odor
		Gravels & cobbles No returns
10		
15	GS #5A	Total Borehole Depth: 15 feet

GS: Grab sample off auger flights
▼ Observed ground water level at time of drilling

Borehole Vapor Conc: 44 ppm as CH_4
(measured on): May 28, 1996

Monitoring Well Construction Details



Total Depth of Well: 14.16 feet
Length of Screen 10 feet
Stabilized Water Level: 6.37 feet
(measured on): June 25, 1996
MW Vapor Conc: 42 ppm as CH_4
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 28, 1996
Developed: June 12, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 5
Street: 1st Street and Billings Avenue
Location: NW1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'43"N, 120°56'28"W
Monument Elev: 1912.14 feet

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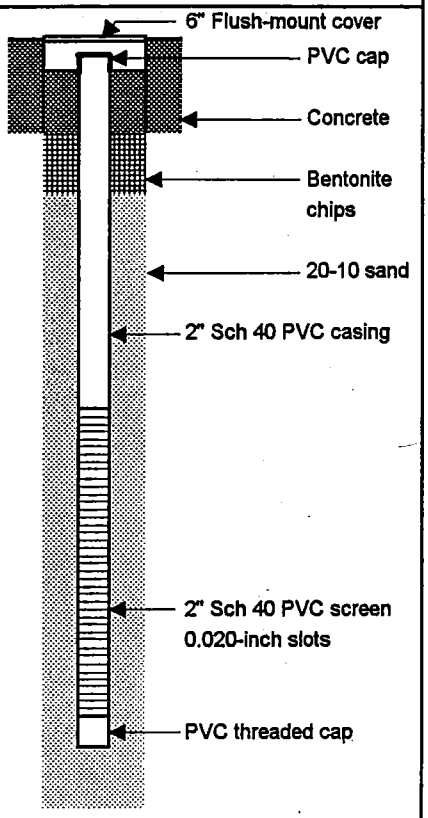
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		4" Asphalt
		Roadfill material
		Gravels
		Silty gravels, petroleum odor
5		Clay in returns
▼	GS	Cobbles, returns up to 4"
10		
		Total Borehole Depth: 12.5 feet
		GS: Grab sample off auger flights
		▼ Observed ground water level at time of drilling
15		
		Borehole Vapor Conc: 10 ppm as CH_4
		(measured on): May 29, 1996

Monitoring Well Construction Details



Total Depth of Well: 11.55 feet
Length of Screen 5 feet
Stabilized Water Level: 6.60 feet
(measured on): June 25, 1996
MW Vapor Conc: 14 ppm as CH_4
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 29, 1996
Developed: June 13, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 6
Street: Billings Avenue and 1st Street
Location: NW1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'43"N, 120°56'27"W
Monument Elev: 1911.82 feet

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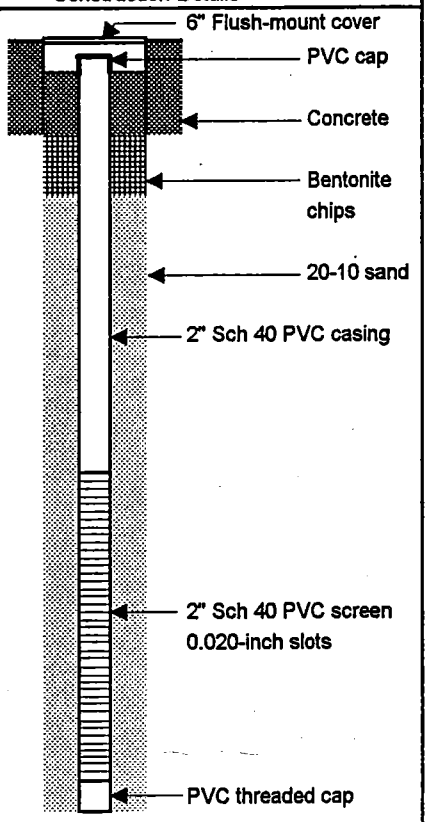
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		4" Asphalt
		Gravels & cobbles
		Gravels & cobbles
		No returns
5		
	GS	
		Gravels
		Hard drilling
10		
		Total Borehole Depth: 12.5 feet
		GS: Grab sample off auger flights
		▼ Observed ground water level at time of drilling
15		
		Borehole Vapor Conc: >1000 ppm CH_4
		(measured on): May 20, 1996

Monitoring Well Construction Details



Total Depth of Well: 12.5 feet
Length of Screen 5 feet
Stabilized Water Level: 7.22 feet
(measured on): June 25, 1996
MW Vapor Conc: >1000 ppm CH_4
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 20, 1996
Developed: June 13, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 7
Street: NE corner of Simpson Texaco property
Location: NW1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'43"N, 120°56'24"W
Monument Elev: 1912.51 feet

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Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description	Monitoring Well Construction Details
0		(Based on return cuttings) 4" Asphalt Roadfill material	6" Flush-mount cover PVC cap Concrete
		Silty soil	Bentonite chips
		Cobbles	20-10 sand
5			2" Sch 40 PVC casing
▼	GS		
		Sandy silty gravels	
10			2" Sch 40 PVC screen 0.020-inch slots
			PVC threaded cap
		Total Borehole Depth: 12.5 feet	
		GS: Grab sample off auger flights ▼ Observed ground water level at time of drilling	
15			
		Borehole Vapor Conc: 0 ppm (measured on): May 20, 1996	Total Depth of Well: 11.27 feet Length of Screen 5 feet Stabilized Water Level: 7.71 feet (measured on): June 25, 1996 MW Vapor Conc: 2 ppm as CH_4 (measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 20, 1996
Developed: May 30, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 8
Street: SE corner of Simpson Texaco property
Location: NW1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'42"N, 120°56'24"W
Monument Elev: 1910.52 feet

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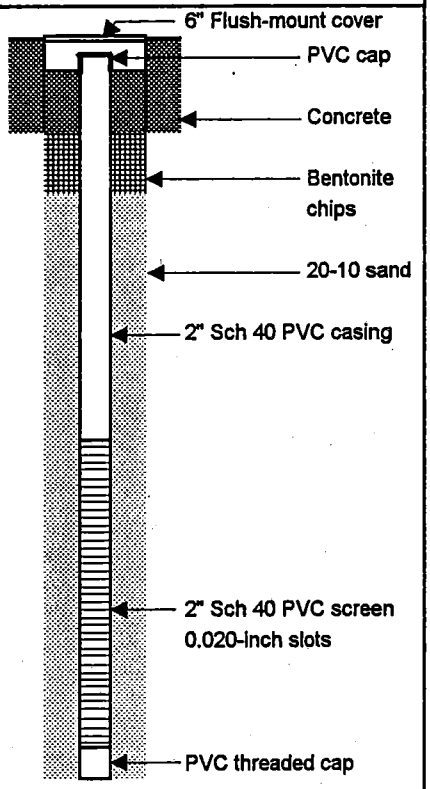
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description	Monitoring Well Construction Details
0		(Based on return cuttings)	
		Roadfill material	
		Brown gravely silt	
5 ▼	GS	Gravels, slight petroleum odor	
		Gravels, hard drilling	
10			
15			



Total Borehole Depth: 12 feet

GS: Grab sample off auger flights
▼ Observed ground water level at time of drilling

Borehole Vapor Conc: 32 ppm as CH_4
(measured on): May 22, 1996

Total Depth of Well: 11.98 feet
Length of Screen 5 feet
Stabilized Water Level: 5.92 feet
(measured on): June 25, 1996
MW Vapor Conc: 2 ppm as CH_4
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 22, 1996
Developed: June 13, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 9
Street: Oakes Avenue and 1st Street
Location: NW1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'43"N, 120°56'21"W
Monument Elev: 1910.73 feet

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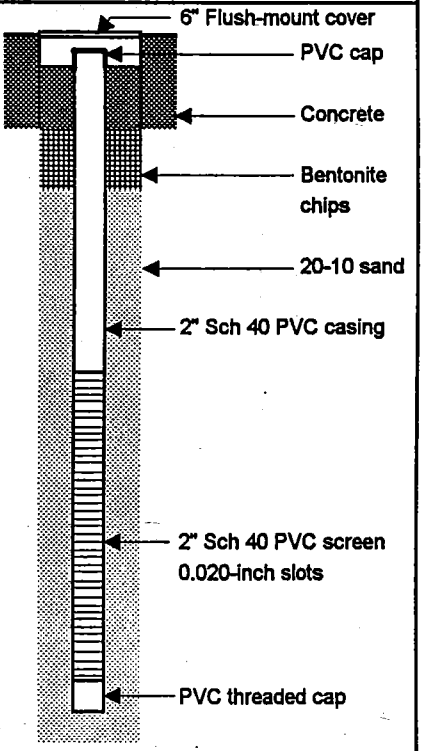
Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		Roadfill material
		Brown gravelly silt
		Gravels
5		
▼	GS	Gravels, hard drilling
10		Clay (brown), gravels & cobbles
		Total Borehole Depth: 11.3 feet
		GS: Grab sample off auger flights
		▼ Observed ground water level at time of drilling
15		
		Borehole Vapor Conc: 24 ppm as CH_4
		(measured on): May 22, 1996

Monitoring Well Construction Details



Total Depth of Well: 11.29 feet
Length of Screen 5 feet
Stabilized Water Level: 6.35 feet
(measured on): June 25, 1996
MW Vapor Conc: 20 ppm as CH_4
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 22, 1996
Developed: June 13, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 10
Street: Oakes Avenue and 1st Street
Location: NW1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'42"N, 120°56'22"W
Monument Elev: 1911.17 feet

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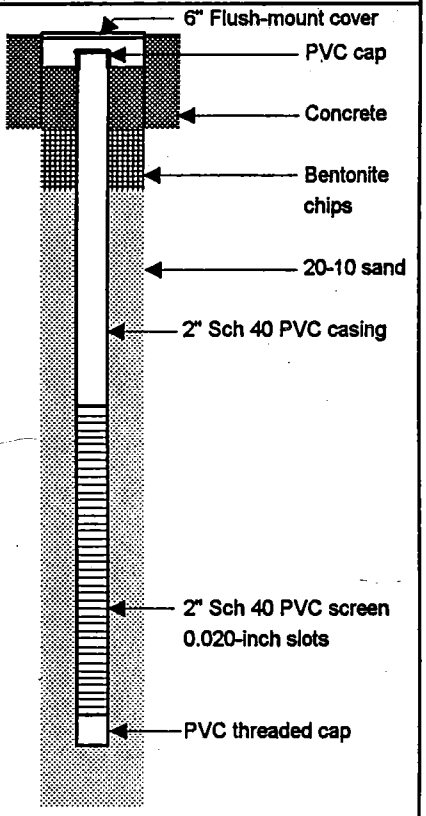
Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		Asphalt
		Gravelly sand
		Gravels & cobbles, hard drilling
5		
	GS	
10		Large boulder
		Coarse sand, boulder
		Total Borehole Depth: 12.5 feet
		GS: Grab sample off auger flights
		▼ Observed ground water level at time of drilling
15		

Borehole Vapor Conc: 150 ppm as CH_4
(measured on): May 20, 1996

Monitoring Well Construction Details



Total Depth of Well: 11.54 feet
Length of Screen 5 feet
Stabilized Water Level: 7.70 feet
(measured on): June 25, 1996
MW Vapor Conc: 2 ppm as CH_4
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 20, 1996
Developed: June 13, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 11
Street: Cavallini's Pharmacy parking lot
Location: NW1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'40"N, 120°56'10"W
Monument Elev: 1908.87 feet

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Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		4" Asphalt
		Coal mine tailing (black)
		Sandy silt (brown)
5	GS	Gravels & cobbles
10		
15		

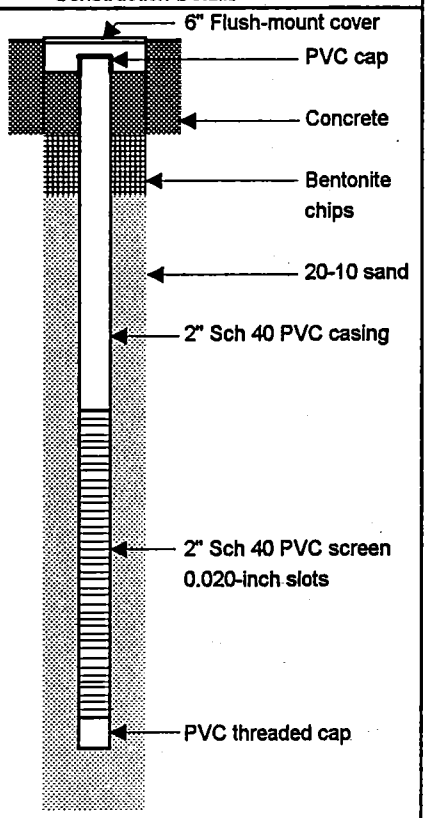
Total Borehole Depth: 12.5 feet

GS: Grab sample off auger flights

▼ Observed ground water level at time of drilling

Borehole Vapor Conc: 160 ppm as CH_4
(measured on): May 22, 1996

Monitoring Well Construction Details



Total Depth of Well: 10.77 feet
Length of Screen 5 feet
Stabilized Water Level: 5.78 feet
(measured on): June 25, 1996
MW Vapor Conc: 0 ppm
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 22, 1996
Developed: June 13, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 12
Street: Dairy Queen Alley
Location: NE1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'39"N, 120°55'59"W
Monument Elev: 1905.43 feet

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Washington Department of Ecology

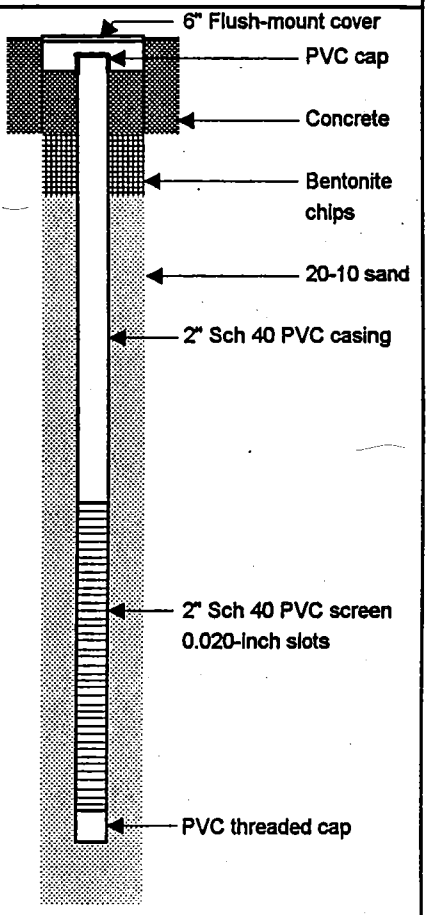
Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		4" Asphalt
		Gravels and cobbles
		Clean coarse sand
5		
▼	GS	
		Clean sand, few rocks Slight petroleum odor
10		
		Gravels & cobbles No returns
		Sand & gravels
		Total Borehole Depth: 13.7 feet
15		GS: Grab sample off auger flights ▼ Observed ground water level at time of drilling

Borehole Vapor Conc: 0 ppm
(measured on): May 22, 1996

Monitoring Well Construction Details



Total Depth of Well: 12.82 feet
Length of Screen 5 feet
Stabilized Water Level: 7.63 feet
(measured on): June 25, 1996
MW Vapor Conc: 2 ppm as CH_4
(measured on): June 25, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 22, 1996
Developed: June 14, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 13
Street: Bullitt Avenue and 1st Street
Location: NE1/4SW1/4Sec26T20NR15E
Lat/Long: 47°11'41"N, 120°55'56"W
Monument Elev: 1906.70 feet

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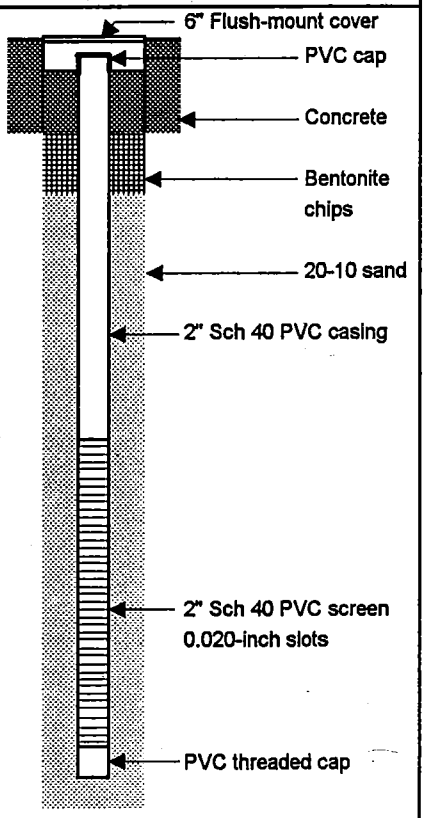
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description	Monitoring Well Construction Details
0		(Based on return cuttings)	
		Roadfill material	
		Sand	
		Gravels	
5		Gravels (6")	
	GS		
10			
15			

Total Borehole Depth: 12.5 feet

GS: Grab sample off auger flights
▼ Observed ground water level at time of drilling

Borehole Vapor Conc: trace
(measured on): May 23, 1996

Total Depth of Well: 12.17 feet
Length of Screen 5 feet
Stabilized Water Level: 6.75 feet
(measured on): June 26, 1996
MW Vapor Conc: 0 ppm
(measured on): June 26, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 23, 1996
Developed: June 14, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 15
Street: 1st Street and Teanaway
Location: NE1/4SE1/4Sec26T20NR15E
Lat/Long: 47°11'36"N, 120°55'27"W
Monument Elev: 1899.64 feet

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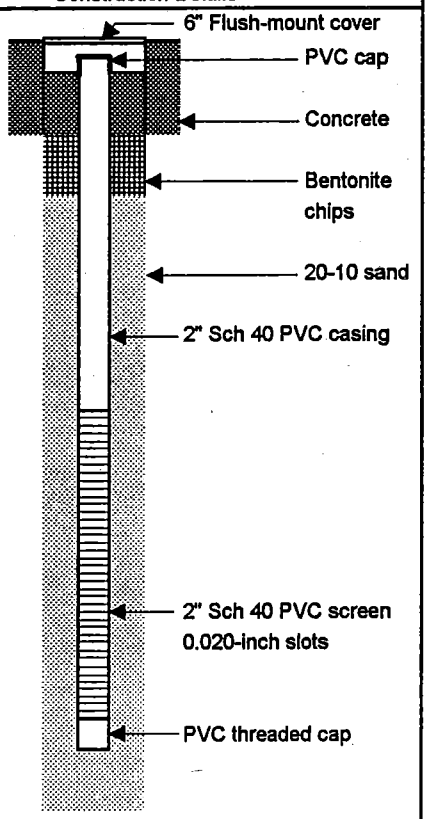
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description	Monitoring Well Construction Details
0		(Based on return cuttings)	
		4" Asphalt	
		Roadfill material	
		Silt sand	
		Gravels	
5			
▼	GS		
10		Gravels Hard drilling	
		Total Borehole Depth: 12.5 feet	
		GS: Grab sample off auger flights ▼ Observed ground water level at time of drilling	
15			
		Borehole Vapor Conc: 78 ppm as CH_4 (measured on): May 23, 1996	Total Depth of Well: 11.48 feet Length of Screen 5 feet Stabilized Water Level: 5.49 feet (measured on): June 26, 1996 MW Vapor Conc: 0 ppm (measured on): June 26, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 23, 1996
Developed: June 14, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 16
Street: Yakima Avenue and 1st Street
Location: NE1/4SE1/4Sec26T20NR15E
Lat/Long: 47°11'37"N, 120°55'22"W
Monument Elev: 1897.33 feet

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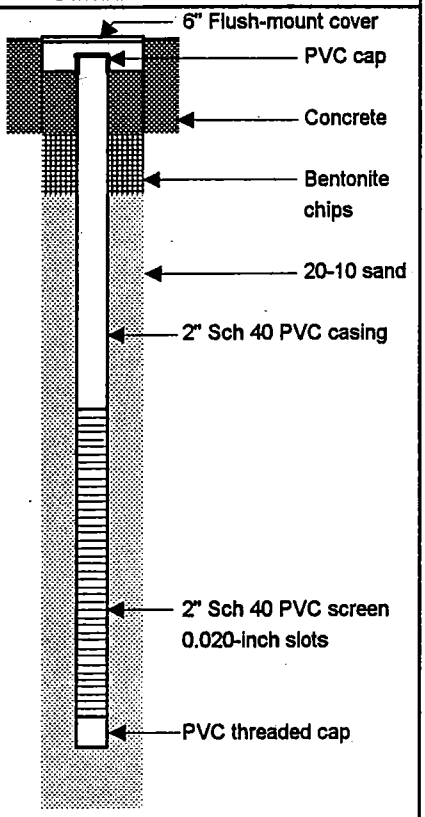
Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		Asphalt
		Roadfill material
		Silts (blue), strong petroleum odor
▼ 5	GS	Gravels, no returns Very strong petroleum odor
10		
		Total Borehole Depth: 12.5 feet
		GS: Grab sample off auger flights
		▼ Observed ground water level at time of drilling
15		
		Borehole Vapor Conc: 88 ppm as CH_4
		(measured on): May 28, 1996

Monitoring Well Construction Details



Total Depth of Well: 11.48 feet
Length of Screen 5 feet
Stabilized Water Level: 4.43 feet
(measured on): June 26, 1996
MW Vapor Conc: 16 ppm as CH_4
(measured on): June 26, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 28, 1996
Developed: June 14, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 17
Street: 1st Street between Yakima and Floral
Location: SW1/4SW1/4Sec25T20NR15E
Lat/Long: 47°11'35"N, 120°55'09"W
Monument Elev: 1892.85 feet

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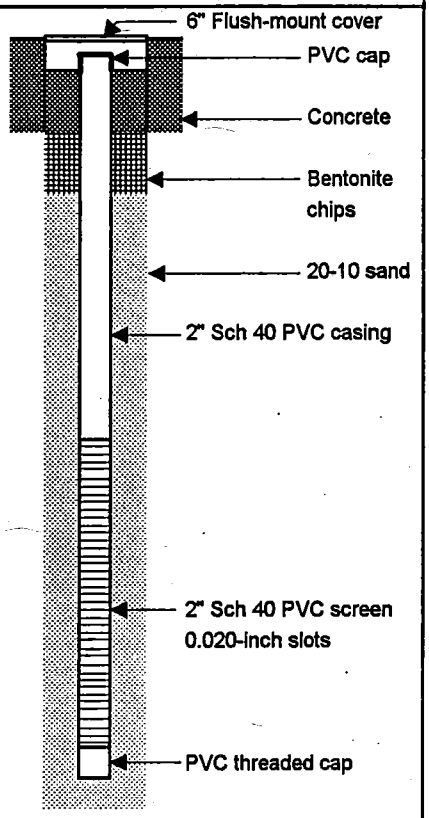
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description	Monitoring Well Construction Details
0		(Based on return cuttings)	
		Top soil	
		Sandy silt	
5		Gravels	
▼	GS	Gravels & cobbles	
10			
		Total Borehole Depth: 12.5 feet	
		GS: Grab sample off auger flights	
		▼ Observed ground water level at time of drilling	
15			
		Borehole Vapor Conc: 115 ppm as CH_4	Total Depth of Well: 11.97 feet
		(measured on): May 29, 1996	Length of Screen 5 feet
			Stabilized Water Level: 5.88 feet
			(measured on): June 26, 1996
			MW Vapor Conc: 14 ppm as CH_4
			(measured on): June 26, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 29, 1996
Developed: June 14, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 19
Street: Kerman Avenue and 1st Street
Location: SW1/4SW1/4Sec25T20NR15E
Lat/Long: 47°11'32"N, 120°55'08"W
Monument Elev: 1893.41 feet

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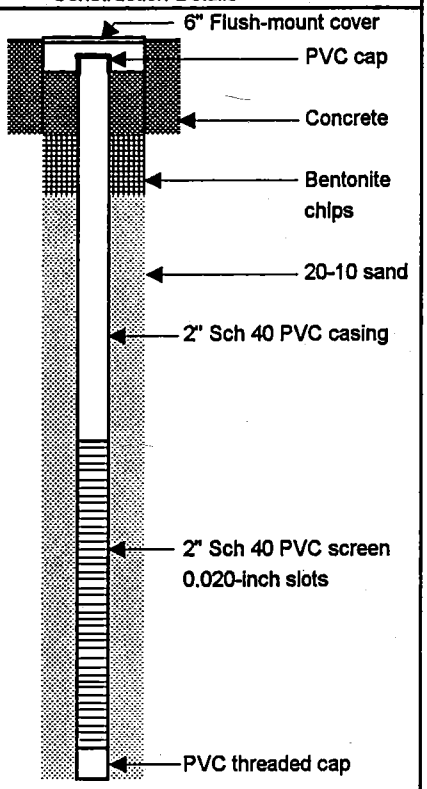
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description	Monitoring Well Construction Details
0		(Based on return cuttings)	
		Fill material	
		Gravels	
		Clay (blue), petroleum odor	
5			
▼	GS	Clay (blue), strong petroleum odor	
10			
		Total Borehole Depth: 12.5 feet	
		GS: Grab sample off auger flights	
		▼ Observed ground water level at time of drilling	
15			
		Borehole Vapor Conc: OVA dead	Total Depth of Well: 12.23 feet
		(measured on): May 22, 1996	Length of Screen 5 feet
			Stabilized Water Level: 6.76 feet
			(measured on): June 26, 1996
			MW Vapor Conc: 8 ppm as CH_4
			(measured on): June 26, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 22, 1996
Developed: June 13, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 23
Street: Storey Station, east of USTs
Location: SE1/4SW1/4Sec25T20NR15E
Lat/Long: 47°11'23"N, 120°54'36"W
Monument Elev: 1888.10 feet

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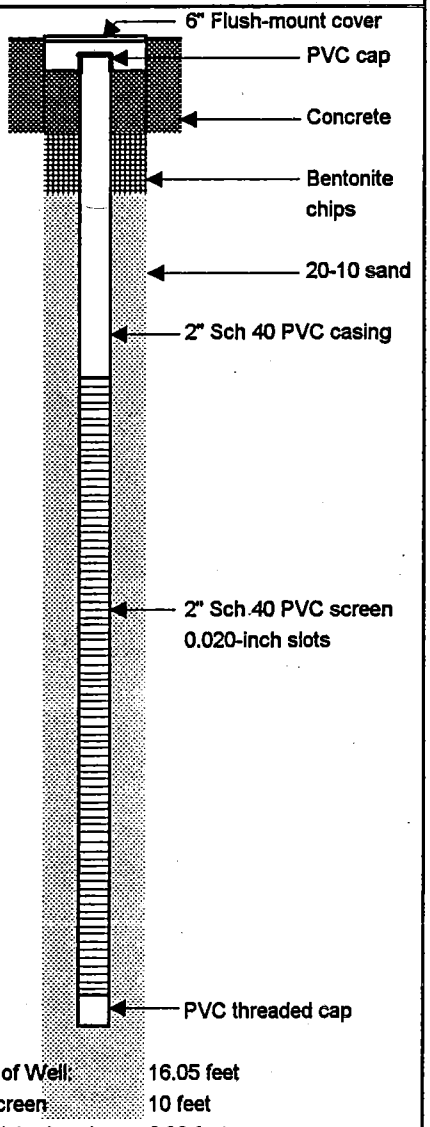
Washington Department of Ecology

Soil Boring/Monitoring Well Log

Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		Top soil fill
		Silty sand (brown)
5		
	GS	Gravels
10		
		GS: Grab sample off auger flights
		▼ Observed ground water level at time of drilling
15		
		Clay (blue)
		Total Borehole Depth: 17.5 feet
		Borehole Vapor Conc: 0 ppm
		(measured on): May 22, 1996

Monitoring Well Construction Details



Total Depth of Well: 16.05 feet
Length of Screen: 10 feet
Stabilized Water Level: 6.90 feet
(measured on): June 26, 1996
MW Vapor Conc: OVA dead
(measured on): June 26, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 22, 1996
Developed: June 14, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

MW No: 24
Street: Storey Station, east of aboveground tanks
Location: SE1/4SW1/4Sec25T20NR15E
Lat/Long: 47°11'33"N, 120°54'35"W
Monument Elev: 1888.14 feet

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Washington Department of Ecology

Soil Boring/Monitoring Well Log

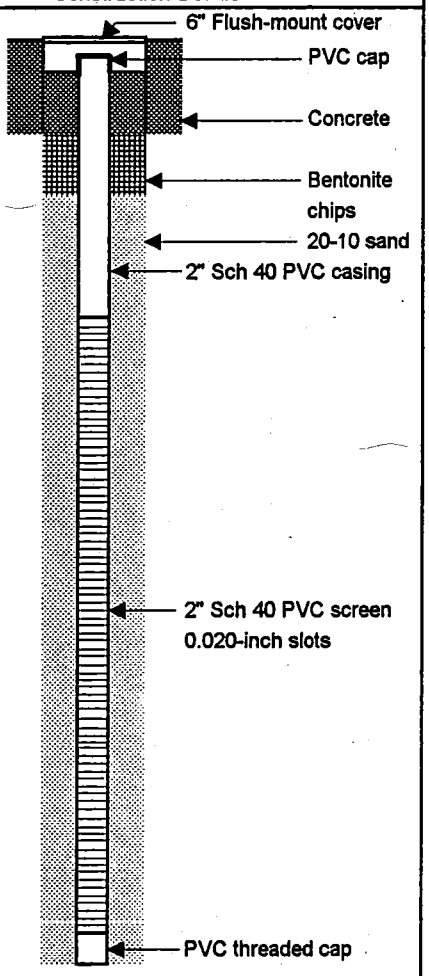
Site Name: Cle Elum Petroleum Contamination
TCP ID: C-19-2007-000

Depth (feet)	Sample Type	Soil Boring Geological Description
0		(Based on return cuttings)
		Gravels
		Gravels & cobbles
5		
	GS	
10		
15		

GS: Grab sample off auger flights
▼ Observed ground water level at time of drilling
Total Borehole Depth: 15 feet

Borehole Vapor Conc: 6 ppm as CH_4
(measured on): May 22, 1996

Monitoring Well Construction Details



Total Depth of Well: 15.02 feet
Length of Screen 10 feet
Stabilized Water Level: 6.24 feet
(measured on): June 26, 1996
MW Vapor Conc: OVA dead
(measured on): June 26, 1996

Drilling Method: Hollow-stem Auger
Drilling Contractor: Geoboring & Development, Puyallup
Installed: May 22, 1996
Developed: June 14, 1996
Hydrogeologist: Don Abbott, Ecology CRO-TCP

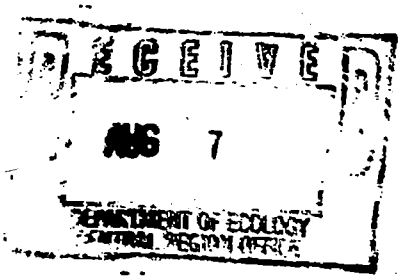
MW No: 25
Street: Storey Station, SE of USTs
Location: SE1/4SW1/4Sec25T20NR15E
Lat/Long: 47°11'33"N, 120°54'35"W
Monument Elev: 1887.41 feet

APPENDIX B

Soil Sample Laboratory Reports

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366



CASE NARRATIVE

August 1, 1996

Subject:	City of Cle Elum, Sediment Project
Samples:	96218130 - 96218146, 96228155 - 96228159
Case No.	134296
Officer:	Chung Ki Yee
By:	Myrna McIntosh, mm Organics Analysis Unit

BTEX and WTPH-G Analysis

SUMMARY:

Samples 96218130 - 96218146, 96228155 - 96228159 were analyzed for BTEX and Gasoline by GC-PID and GC-FID.

Sample 96218143 was analyzed after the holding time and is qualified "UJ", estimated detection limit.

BLANKS:

No analytes were detected in the blanks.

SURROGATES:

All surrogate recoveries are within the control limits of 50 - 150%.

HOLDING TIMES:

All samples were extracted and analyzed within the established holding times with the exception of sample 96218143. The result for this sample is qualified as an estimate. Due to the volatility of gasoline, exceeding the holding time may lead to loss of this compound.

DUPLICATE SAMPLES:

Duplicate samples and spikes were not requested with this project.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96218130 **Date Received:** 05/22/96 **Method:** SW8020
Field ID: CE01S **Date Prepared:** 05/23/96 **Matrix:** Sediment/Soil
Project Officer: Chung Ki Yee **Date Analyzed:** 05/28/96 **Units:** ug/Kg Dry Wt.

Analyte	Result	Qualifier
Benzene	120	U
Toluene	120	U
Ethylbenzene	120	U
Total Xylenes	370	U

Surrogate Recoveries

1,4-Difluorobenzene	**90**	**%**

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

oject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218131 — Date Received: 05/22/96 — Method: SW8020
eld ID: CE02S — Date Prepared: 05/23/96 — Matrix: Sediment/Soil
oject Officer: Chung Ki Yee — Date Analyzed: 05/28/96 — Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	130	U
luene	130	U
hylbenzene	130	U
Total Xylenes	380	U

rrogate Recoveries

4-Difluorobenzene	90	%

uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96218132 **Date Received:** 05/22/96 **Method:** SW8020
ield ID: CE03S **Date Prepared:** 05/23/96 **Matrix:** Sediment/Soil
roject Officer: Chung Ki Yee **Date Analyzed:** 05/28/96 **Units:** ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	120	U
oluene	120	U
thylbenzene	120	U
Total Xylenes	350	U

urrogate Recoveries

4-Difluorobenzene	90	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218133 — Date Received: 05/22/96 — Method: SW8020
eld ID: CE04S — Date Prepared: 05/23/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 05/28/96 — Units: ug/Kg Dry Wt.

alyte	Result	Qualifier
zene	100	U
uene	100	U
ylbenzene	100	U
otal Xylenes	310	U

urrogate Recoveries

4-Difluorobenzene	91	%

uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218134 — Date Received: 05/22/96 — Method: SW8020
ield ID: CE07S — Date Prepared: 05/23/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 05/28/96 — Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	110	
oluene	270	
thylbenzene	200	
Total Xylenes	330	U

urrogate Recoveries

4-Difluorobenzene	70	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218135
eld ID: CE08S
roject Officer: Chung Ki Yee

Date Received: 05/22/96
Date Prepared: 05/23/96
Date Analyzed: 05/28/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	110	U
oluene	110	U
hylbenzene	110	U
Total Xylenes	340	U

irrogate Recoveries

4-Difluorobenzene	93	%

Authorized By: Kari Fedde — Release Date: 8/2/96 — Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218136 — Date Received: 05/22/96 — Method: SW8020
ield ID: CE11S — Date Prepared: 05/23/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 05/28/96 — Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	100	U
oluene	100	U
thylbenzene	100	U
Total Xylenes	310	U

urrogate Recoveries

4-Difluorobenzene	92	%

Authorized By: Kari Todd — Release Date: 8/12/96 — Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

'oject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218137 — Date Received: 05/22/96 — Method: SW8020
'eld ID: CE23S — Date Prepared: 05/23/96 — Matrix: Sediment/Soil
'oject Officer: Chung Ki Yee — Date Analyzed: 05/29/96 — Units: ug/Kg Dry Wt.

ıalyte	Result	Qualifier
3enzene	340	
ıluene	200	
hylbenzene	200	
otal Xylenes	390	U

ırrogate Recoveries

4-Difluorobenzene	90	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218138
ield ID: CE09S1
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 06/03/96
Date Analyzed: 06/04/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	110	U
oluene	110	U
hylbenzene	110	U
Total Xylenes	340	U

irrogate Recoveries

4-Difluorobenzene	149	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

:oject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96218139 **Date Received:** 05/24/96 **Method:** SW8020
eld ID: CE10S1 **Date Prepared:** 05/24/96 **Matrix:** Sediment/Soil
:oject Officer: Chung Ki Yee **Date Analyzed:** 05/29/96 **Units:** ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	100	U
)luene	100	U
..hylbenzene	100	U
Total Xylenes	310	U

irrogate Recoveries

4-Difluorobenzene	**91**	**%**

Authorized By: _[signature]_ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218140 — Date Received: 05/24/96 — Method: SW8020
ield ID: CE12S1 — Date Prepared: 06/03/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/04/96 — Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	82	U
oluene	82	U
thylbenzene	82	U
Total Xylenes	250	U

urrogate Recoveries

,4-Difluorobenzene	150	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

oject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218141
eld ID: CE13S1
oject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 05/24/96
Date Analyzed: 05/29/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

alyte	Result	Qualifier
Benzene	100	U
luene	100	U
ylbenzene	100	U
Total Xylenes	310	U

rrogate Recoveries

4-Difluorobenzene	93	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96218142
ield ID: CE24S1
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 05/24/96
Date Analyzed: 05/29/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	120	U
oluene	120	U
thylbenzene	120	U
Total Xylenes	370	U

urrogate Recoveries

1 4-Difluorobenzene	92	%

Authorized By: Kari Fedde Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218144
Field ID: CE25S1
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 05/24/96
Date Analyzed: 05/29/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	110	U
oluene	110	U
hylbenzene	110	U
Total Xylenes	320	U

irrogate Recoveries

1 4-Difluorobenzene	93	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96218145 **Date Received:** 05/24/96 **Method:** SW8020
ield ID: CE16S1 **Date Prepared:** 05/24/96 **Matrix:** Sediment/Soil
roject Officer: Chung Ki Yee **Date Analyzed:** 05/29/96 **Units:** ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	99	U
oluene	99	U
thylbenzene	99	U
Total Xylenes	300	U

urrogate Recoveries

4-Difluorobenzene	**92**	**%**

Authorized By: _____ Release Date: 6/12/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample: 96218146		Date Received: 05/24/96	Method: SW8020
eld ID: CE15S1		Date Prepared: 05/24/96	Matrix: Sediment/Soil
roject Officer:	Chung Ki Yee	Date Analyzed: 05/31/96	Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	84	U
oluene	84	U
hylbenzene	84	U
Total Xylenes	250	U

rrogate Recoveries

4-Difluorobenzene	88	%

uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228155 — Date Received: 05/30/96 — Method: SW8020
ield ID: CE05S — Date Prepared: 05/30/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 05/31/96 — Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	68	U
oluene	160	
thylbenzene	290	
Total Xylenes	210	U

irrogate Recoveries

4-Difluorobenzene	92	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

oject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228156 — Date Received: 05/30/96 — Method: SW8020
eld ID: CE17S — Date Prepared: 05/30/96 — Matrix: Sediment/Soil
oject Officer: Chung Ki Yee — Date Analyzed: 05/31/96 — Units: ug/Kg Dry Wt.

ıalyte	Result	Qualifier
enzene	120	U
luene	120	U
ıylbenzene	120	U
otal Xylenes	360	U

rrogate Recoveries

4-Difluorobenzene	94	%

uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96228157 **Date Received:** 05/30/96 **Method:** SW8020
ield ID: CE19S **Date Prepared:** 05/30/96 **Matrix:** Sediment/Soil
roject Officer: Chung Ki Yee **Date Analyzed:** 05/31/96 **Units:** ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	86	U
oluene	86	U
thylbenzene	160	
Total Xylenes	300	

urrogate Recoveries

,4-Difluorobenzene	94	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

oject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96228158 **Date Received:** 05/30/96 **Method:** SW8020
eld ID: CE06S **Date Prepared:** 05/30/96 **Matrix:** Sediment/Soil
oject Officer: Chung Ki Yee **Date Analyzed:** 05/31/96 **Units:** ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	62	U
oluene	62	U
hylbenzene	62	U
Total Xylenes	190	U

rrogate Recoveries

4-Difluorobenzene	92	%

orized By: _____ **Release Date:** 6/2/96 **Page:** 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN61959
Blank ID: BS6144A
Project Officer: Chung Ki Yee

Date Prepared: 05/23/96
Date Analyzed: 05/28/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

Analyte	Result	Qualifier
Benzene	120	U
Toluene	120	U
Ethylbenzene	120	U
Total Xylenes	350	U

Surrogate Recoveries

1,4-Difluorobenzene	90	%

Authorized By: _____ Release Date: 8/2/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

oject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN61960

ank ID: BS6145A

oject Officer: Chung Ki Yee

Date Prepared: 05/23/96

Date Analyzed: 05/28/96

Method: SW8020

Matrix: Sediment/Soil

Units: ug/Kg Dry Wt.

alyte	Result	Qualifier
Benzene	100	U
luene	100	U
ylbenzene	100	U
Total Xylenes	300	U

rrogate Recoveries

4-Difluorobenzene	93	%

uthorized By: _____ Release Date: 6/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: BLN61961
lank ID: BS6152A
roject Officer: Chung Ki Yee

Date Prepared: 05/23/96
Date Analyzed: 05/31/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	81	U
oluene	81	U
thylbenzene	81	U
Total Xylenes	240	U

urrogate Recoveries

4-Difluorobenzene	99	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN62215
lank ID: BS6156A
roject Officer: Chung Ki Yee

Date Prepared: 06/03/96
Date Analyzed: 06/04/96

Method: SW8020
Matrix: Sediment/Soil
Units: ug/Kg Dry Wt.

nalyte	Result	Qualifier
Benzene	100	U
oluene	100	U
hylbenzene	100	U
Total Xylenes	300	U

irrogate Recoveries

4-Difluorobenzene	75	%

uthorized By: _____ Release Date: 8/2/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN62164
lank ID: BS6144A
roject Officer: Chung Ki Yee

Date Prepared: 05/23/96
Date Analyzed: 05/28/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	14	U
urrogate Recoveries		
4-Difluorobenzene	83	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

oject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN62165
ank ID: BS6145A
oject Officer: Chung Ki Yee

Date Prepared: 05/23/96
Date Analyzed: 05/28/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

ıalyte	Result	Qualifier
Gasoline	12	U

rrogate Recoveries

l-Difluorobenzene	84	%

uthorized By: Ken Zahl Release Date: 6/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN62166
lank ID: BS6152A
roject Officer: Chung Ki Yee

Date Prepared: 05/30/96
Date Analyzed: 05/31/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	9.7	U
urrogate Recoveries		
4-Difluorobenzene	**82**	**%**

Authorized By: _____ Release Date: 8/2/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

oject Name: City of Cle Elum			LIMS Project ID: 1342-96
Sample: BLN62167			Method: WTPH-G
ank ID: BS6155A	Date Prepared: 06/03/96		Matrix: Sediment/Soil
oject Officer: Chung Ki Yee	Date Analyzed: 06/04/96		Units: mg/Kg

nalyte	Result	Qualifier
asoline	11	U
rrogate Recoveries		
4-Difluorobenzene	**82**	**%**

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name:	City of Cle Elum			LIMS Project ID:	1342-96
Sample:	96218130	Date Received:	05/22/96	Method:	WTPH-G
eld ID:	CE01S	Date Prepared:	05/23/96	Matrix:	Sediment/Soil
roject Officer:	Chung Ki Yee	Date Analyzed:	05/28/96	Units:	mg/Kg

nalyte	Result	Qualifier
Gasoline	15	U

Surrogate Recoveries

4-Difluorobenzene	83	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218131 — Date Received: 05/22/96 — Method: WTPH-G
eld ID: CE02S — Date Prepared: 05/23/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 05/28/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	15	U
urrogate Recoveries		
4-Difluorobenzene	84	%

Authorized By: Ken Todd — Release Date: 8/2/96 — Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name:	**City of Cle Elum**		**LIMS Project ID:** 1342-96
Sample: 96218132		**Date Received:** 05/22/96	**Method:** WTPH-G
ield ID: CE03S		**Date Prepared:** 05/23/96	**Matrix:** Sediment/Soil
roject Officer:	Chung Ki Yee	**Date Analyzed:** 05/28/96	**Units:** mg/Kg

nalyte	**Result**	**Qualifier**
Gasoline	14	U
Surrogate Recoveries		
,4-Difluorobenzene	**83**	**%**

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

'oject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218133
eld ID: CE04S
'oject Officer: Chung Ki Yee

Date Received: 05/22/96
Date Prepared: 05/23/96
Date Analyzed: 05/28/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

ıalyte	Result	Qualifier
Gasoline	12	U
..rrogate Recoveries		
4-Difluorobenzene	84	%

uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218134 — Date Received: 05/22/96 — Method: WTPH-G
ield ID: CE07S — Date Prepared: 06/03/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/04/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	190	
urrogate Recoveries		
4-Difluorobenzene	84	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

oject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96218135 **Date Received:** 05/22/96 **Method:** WTPH-G
eld ID: CE08S **Date Prepared:** 06/03/96 **Matrix:** Sediment/Soil
oject Officer: Chung Ki Yee **Date Analyzed:** 06/04/96 **Units:** mg/Kg

nalyte	Result	Qualifier
Gasoline	14	U
rrogate Recoveries		
1-Difluorobenzene	83	%

uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218136
ield ID: CE11S
roject Officer: Chung Ki Yee

Date Received: 05/22/96
Date Prepared: 05/23/96
Date Analyzed: 05/28/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	13	U
Surrogate Recoveries		
4-Difluorobenzene	83	%

Authorized By: Kevin Fitzpatrick Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

'oject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218137 — Date Received: 05/22/96 — Method: WTPH-G
eld ID: CE23S — Date Prepared: 05/23/96 — Matrix: Sediment/Soil
'oject Officer: Chung Ki Yee — Date Analyzed: 05/24/96 — Units: mg/Kg

ıalyte	Result	Qualifier
Gasoline	730	
Surrogate Recoveries		
4-Difluorobenzene	83	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample:	96218138	Date Received: 05/24/96	Method: WTPH-G
eld ID:	CE09S1	Date Prepared: 06/03/96	Matrix: Sediment/Soil
roject Officer:	Chung Ki Yee	Date Analyzed: 06/04/96	Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	9.8	U
Surrogate Recoveries		
4-Difluorobenzene	83	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218139 — Date Received: 05/24/96 — Method: WTPH-G
eld ID: CE10S1 — Date Prepared: 05/24/96 — Matrix: Sediment/Soil
oject Officer: Chung Ki Yee — Date Analyzed: 05/29/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	13	U
ırrogate Recoveries		
4-Difluorobenzene	**81**	**%**

Authorized By: Kim Todd — Release Date: 8/2/96 — Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218140 — Date Received: 05/24/96 — Method: WTPH-G
ield ID: CE12S1 — Date Prepared: 05/24/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 05/29/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	36	
urrogate Recoveries		
4-Difluorobenzene	82	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218141 — Date Received: 05/24/96 — Method: WTPH-G
eld ID: CE13S1 — Date Prepared: 05/24/96 — Matrix: Sediment/Soil
oject Officer: Chung Ki Yee — Date Analyzed: 05/29/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	13	U
ırrogate Recoveries		
4-Difluorobenzene	82	%

uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218142
ield ID: CE24S1
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 05/24/96
Date Analyzed: 05/29/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	15	U
urrogate Recoveries		
4-Difluorobenzene	**82**	**%**

Authorized By: Ken Fedel

Release Date: 8/2/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum			**LIMS Project ID:** 1342-96
Sample: 96218143	**Date Received:** 05/24/96	**Method:** WTPH-G	
ield ID: CE24S1A	**Date Prepared:** 07/18/96	**Matrix:** Sediment/Soil	
roject Officer: Chung Ki Yee	**Date Analyzed:** 07/18/96	**Units:** mg/Kg	

nalyte	Result	Qualifier
Gasoline	17	UJ
urrogate Recoveries		
4-Difluorobenzene	85	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218144
ield ID: CE25S1
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 05/24/96
Date Analyzed: 05/29/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	13	U
urrogate Recoveries		
4-Difluorobenzene	83	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218145
ield ID: CE16S1
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 05/24/96
Date Analyzed: 05/29/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	12	U
urrogate Recoveries		
4-Difluorobenzene	82	%

uthorized By: _____ Release Date: 8/2/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218146
eld ID: CE15S1
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 05/24/96
Date Analyzed: 05/31/96

Method: WTPH-G
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	10	U
urrogate Recoveries		
4-Difluorobenzene	82	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228155 — Date Received: 05/30/96 — Method: WTPH-G
ield ID: CE05S — Date Prepared: 06/03/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/05/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	270	
ırrogate Recoveries		
4-Difluorobenzene	80	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample:	96228156	Date Received: 05/30/96	Method: WTPH-G
Field ID:	CE17S	Date Prepared: 06/03/96	Matrix: Sediment/Soil
Project Officer:	Chung Ki Yee	Date Analyzed: 06/04/96	Units: mg/Kg

Analyte	Result	Qualifier
Gasoline	17	
Surrogate Recoveries		
4-Difluorobenzene	82	%

Authorized By: Kevin Zobel Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228157 — Date Received: 05/30/96 — Method: WTPH-G
eld ID: CE19S — Date Prepared: 06/03/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/05/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	400	
urrogate Recoveries		
4-Difluorobenzene	80	%

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228158 — Date Received: 05/30/96 — Method: WTPH-G
ield ID: CE06S — Date Prepared: 06/03/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/04/96 — Units: mg/Kg

nalyte	Result	Qualifier
Gasoline	14	U
Surrogate Recoveries		
4-Difluorobenzene	**82**	**%**

Authorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum			LIMS Project ID: 1342-96
Sample: 96228159	Date Received: 05/30/96	Method:	WTPH-G
ield ID: CE05AS	Date Prepared: 05/30/96	Matrix:	Sediment/Soil
roject Officer: Chung Ki Yee	Date Analyzed: 05/31/96	Units:	mg/Kg

nalyte	Result	Qualifier
Gasoline	26	
urrogate Recoveries		
,4-Difluorobenzene	80	%

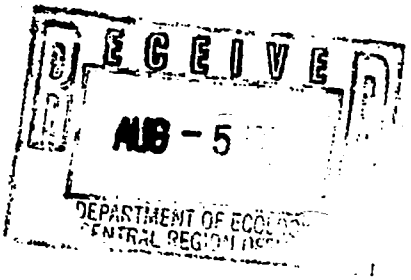
uthorized By: _____ Release Date: 8/2/96 Page: 1

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

August 1, 1996



Subject:	City of Cle Elum, Sediment Project
Samples:	96218130 - 96218146, 96228155 - 96228159
Case No.	134296
Officer:	Chung Ki Yee
By:	Myrna McIntosh Organics Analysis Unit

WTPH-D Analysis

METHOD:

Samples 96218130 - 96218146, 96228155 - 96228159 were analyzed following method WTPH-D, analysis for diesel by GC-FID.

BLANKS:

No analytes were detected in the blanks.

SURROGATES:

All surrogate recoveries are within the control limits of 50 - 150%, with the exception of sample 96218137 which was 198% due to interference from the hydrocarbons present in the sample.

HOLDING TIMES:

All samples were extracted and analyzed within the established holding times.

DUPLICATE SAMPLES:

Duplicate samples and spikes were not requested with this project.

SUMMARY:

Diesel is reported in sample 96218137 and is present below the reporting limit in sample 96218146.

There is a substance eluting in the lube oil range in samples 96218134, 9621838 and 96218141. This substance is quantitated against motor oil and reported as lube oil, although it may be some other type of lubricating oil.

Samples 96218134 and 96228155 contain substances that elute in the gasoline range. These samples were quantitated by WTPH-G.

Samples 96218138 and 96228157 contain lighter range hydrocarbons. The pattern of these samples match kerosene, although it could be #1 diesel, stove oil or jet fuel (all of which are very similar chromatographically). The results are qualified as estimates since the product in the samples was quantitaed against a #2 diesel standard although it was reported as kerosene.

QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN62183
lank ID: BS6166A
roject Officer: Chung Ki Yee

Date Prepared: 06/11/96
Date Analyzed: 07/15/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	100	U
urrogate Recoveries		
entacosane	90	%

Authorized By: _____ Release Date: 8/1/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218130
eld ID: CE01S
oject Officer: Chung Ki Yee

Date Received: 05/22/96
Date Prepared: 06/11/96
Date Analyzed: 07/15/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

alyte	Result	Qualifier
#2 Diesel	180	U

rrogate Recoveries

ntacosane	83	%

Authorized By: M. A. Peterson

Release Date: 8/1/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name:	City of Cle Elum			LIMS Project ID:	1342-96
Sample:	96218131	Date Received:	05/22/96	Method:	WTPH-D
eld ID:	CE02S	Date Prepared:	06/11/96	Matrix:	Sediment/Soil
oject Officer:	Chung Ki Yee	Date Analyzed:	06/17/96	Units:	mg/Kg

nalyte	Result	Qualifier
#2 Diesel	140	U

urrogate Recoveries

ntacosane	69	%

Authorized By: _____ Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218132
ield ID: CE03S
roject Officer: Chung Ki Yee

Date Received: 05/22/96
Date Prepared: 06/11/96
Date Analyzed: 06/17/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	100	U
urrogate Recoveries		
entacosane	99	%

Comments: There is a trace of motor oil present in this sample but it is below the reporting limit.

Authorized By: M. McCarl

Release Date: 8/1/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample: 96218133		Date Received: 05/22/96	Method: WTPH-D
eld ID: CE04S		Date Prepared: 06/11/96	Matrix: Sediment/Soil
roject Officer:	Chung Ki Yee	Date Analyzed: 07/05/96	Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	98	U
Surrogate Recoveries		
ntacosane	93	%

Authorized By: _____ Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218134 — Date Received: 05/22/96 — Method: WTPH-D
ield ID: CE07S — Date Prepared: 06/11/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 07/05/96 — Units: mg/Kg

nalyte	Result	Qualifier
2 Diesel	110	U
ıbe Oil	330	J

urrogate Recoveries

ntacosane	85	%

Authorized By: _____ Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

] oject Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample:	96218135	Date Received: 05/22/96	Method: WTPH-D
] eld ID:	CE08S	Date Prepared: 06/11/96	Matrix: Sediment/Soil
] oject Officer:	Chung Ki Yee	Date Analyzed: 06/17/96	Units: mg/Kg

Analyte	Result	Qualifier
#2 Diesel	100	U
Surrogate Recoveries		
ntacosane	80	%

Authorized By: _____ Release Date: 8/1/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218136
eld ID: CE11S
oject Officer: Chung Ki Yee

Date Received: 05/22/96
Date Prepared: 06/11/96
Date Analyzed: 06/17/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

ıalyte	Result	Qualifier
#2 Diesel	110	U
S_rrogate Recoveries		
ntacosane	83	%

Authorized By: [signature]   Release Date: 8/1/96   Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218137
ield ID: CE23S
roject Officer: Chung Ki Yee

Date Received: 05/22/96
Date Prepared: 06/11/96
Date Analyzed: 07/25/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	610	
Surrogate Recoveries		
entacosane	198	%

Authorized By: _____ Release Date: 8/1/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name:	City of Cle Elum			**LIMS Project ID:**	1342-96
Sample:	**96218138**	**Date Received:**	05/24/96	**Method:**	WTPH-D
ield ID:	CE09S1	**Date Prepared:**	06/11/96	**Matrix:**	Sediment/Soil
roject Officer:	Chung Ki Yee	**Date Analyzed:**	07/15/96	**Units:**	mg/Kg

nalyte	Result	Qualifier
#2 Diesel	110	U
ube Oil	**230**	**J**
erosene	**150**	**J**
urrogate Recoveries		
Pentacosane	99	%

Authorized By: M. McCarthy Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96218139 **Date Received:** 05/24/96 **Method:** WTPH-D
ield ID: CE10S1 **Date Prepared:** 06/11/96 **Matrix:** Sediment/Soil
roject Officer: Chung Ki Yee **Date Analyzed:** 06/18/96 **Units:** mg/Kg

nalyte	Result	Qualifier
#2 Diesel	86	U
Surrogate Recoveries		
entacosane	94	%

Authorized By: M. McIntosh Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218140 — Date Received: 05/24/96 — Method: WTPH-D
ield ID: CE12S1 — Date Prepared: 06/11/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/18/96 — Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	110	U

urrogate Recoveries

entacosane	96	%

Authorized By: M. McCulloch — Release Date: 8/1/96 — Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218141 — Date Received: 05/24/96 — Method: WTPH-D
ield ID: CE13S1 — Date Prepared: 06/11/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 07/05/96 — Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	65	U
ube Oil	68	J

Surrogate Recoveries

entacosane	85	%

Authorized By: _____ Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

'oject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: 96218142
eld ID: CE24S1
'oject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 06/11/96
Date Analyzed: 07/05/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

ıalyte	Result	Qualifier
#2 Diesel	75	U
Surrogate Recoveries		
ntacosane	103	%

Authorized By: M. McCabe

Release Date: 8/1/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96218143
eld ID: CE24S1A
roject Officer: Chung Ki Yee

Date Received: 05/24/96
Date Prepared: 06/12/96
Date Analyzed: 07/05/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	120	U

Surrogate Recoveries

ntacosane	95	%

Authorized By: M. McCabe Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample:	96218144	Date Received: 05/24/96	Method: WTPH-D
eld ID:	CE25S1	Date Prepared: 06/12/96	Matrix: Sediment/Soil
roject Officer:	Chung Ki Yee	Date Analyzed: 06/18/96	Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	97	U

urrogate Recoveries

ntacosane	91	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

:oject Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample: 96218145		Date Received: 05/24/96	Method: WTPH-D
eld ID: CE16S1		Date Prepared: 06/12/96	Matrix: Sediment/Soil
:oject Officer:	Chung Ki Yee	Date Analyzed: 06/18/96	Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	71	U

Surrogate Recoveries

ntacosane	87	%

Authorized By: _____ Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name:	City of Cle Elum		LIMS Project ID: 1342-96
Sample: 96218146		Date Received: 05/24/96	Method: WTPH-D
eld ID: CE15S1		Date Prepared: 06/12/96	Matrix: Sediment/Soil
roject Officer:	Chung Ki Yee	Date Analyzed: 06/18/96	Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	54	U
urrogate Recoveries		
ntacosane	100	%

Authorized By: M. M. Carlson Release Date: 8/1/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228155 — Date Received: 05/30/96 — Method: WTPH-D
ield ID: CE05S — Date Prepared: 06/12/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 07/25/96 — Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	65	U

Surrogate Recoveries

entacosane	57	%

Authorized By: M. M. Carlson — Release Date: 8/1/96 — Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name:	**City of Cle Elum**		**LIMS Project ID:** 1342-96
Sample:	**96228156**	**Date Received:** 05/30/96	**Method:** WTPH-D
eld ID:	CE17S	**Date Prepared:** 06/12/96	**Matrix:** Sediment/Soil
oject Officer:	Chung Ki Yee	**Date Analyzed:** 07/05/96	**Units:** mg/Kg

nalyte	**Result**	**Qualifier**
#2 Diesel	100	U

rrogate Recoveries

ntacosane	**108**	**%**

Authorized By: _____ **Release Date:** 8/1/96 **Page:** 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum **LIMS Project ID:** 1342-96

Sample: 96228157 **Date Received:** 05/30/96 **Method:** WTPH-D
ield ID: CE19S **Date Prepared:** 06/12/96 **Matrix:** Sediment/Soil
roject Officer: Chung Ki Yee **Date Analyzed:** 07/05/96 **Units:** mg/Kg

nalyte	Result	Qualifier
#2 Diesel	1300	U
erosene	1300	J

Surrogate Recoveries

entacosane	82	%

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Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228158 — Date Received: 05/30/96 — Method: WTPH-D
ield ID: CE06S — Date Prepared: 06/12/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/12/96 — Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	95	U
urrogate Recoveries		
entacosane	79	%

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Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1342-96

Sample: 96228159 — Date Received: 05/30/96 — Method: WTPH-D
eld ID: CE05AS — Date Prepared: 06/12/96 — Matrix: Sediment/Soil
roject Officer: Chung Ki Yee — Date Analyzed: 06/18/96 — Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	130	U

Surrogate Recoveries

ntacosane	81	%

Authorized By: M. McClintock Release Date: 8/1/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN62184
ank ID: BS6166B
oject Officer: Chung Ki Yee

Date Prepared: 06/11/96
Date Analyzed: 07/15/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

alyte	Result	Qualifier
Diesel	100	U
rrogate Recoveries		
ntacosane	**89**	**%**

uthorized By:

Release Date: 8/1/96

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum

LIMS Project ID: 1342-96

Sample: BLN62185
lank ID: BS6167A
roject Officer: Chung Ki Yee

Date Prepared: 06/12/96
Date Analyzed: 06/18/96

Method: WTPH-D
Matrix: Sediment/Soil
Units: mg/Kg

nalyte	Result	Qualifier
#2 Diesel	81	U
urrogate Recoveries		
ntacosane	91	%

Authorized By: M. McCluskey Release Date: 8/1/96 Page: 1

June 20, 1996

To: Chung Ki Yee

From: Randy Knox, RK Metals Chemist

Subject: City of Cle Elum Project Sediments

QUALITY ASSURANCE SUMMARY

Data quality for this project is generally good except recovery of lead from the spiked sample but not the duplicate spiked sample is low. No other significant quality assurance issues are noted with the data.

SAMPLE INFORMATION

The samples from the City of Cle Elum Project were received by the Manchester Laboratory on 5/22 and 5/24/96 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant USEPA (CLP) control limits. AA calibration gave a correlation coefficient (r) of 0.995 or greater, also meeting CLP calibration requirements.

PROCEDURAL BLANKS

The procedural blanks associated with these samples show no analytically significant levels of analytes.

SPIKED SAMPLES ANALYSIS

Spiked and duplicate spiked sample analysis were performed on this data set.. Spike recovery from the duplicate spiked sample is within the CLP acceptance limits of +/- 25%. That for the spiked sample is low. The low recovery is likely related to the sample level being 3.9 times the spiking level. This makes small changes in the analysis rather significant when calculating spike recovery. I f the sample level is greater than four times the spike level we do not calculate recovery. Though technically we might qualify the data based on low spike recovery of the one sample, we have not done so since the good recovery on the other sample indicates the problem is due to relative levels and not to poor recovery from the matrix.

PRECISION DATA

The results of the spiked and duplicate spiked samples are used to evaluate precision on this sample set. The relative percent difference (RPD) for lead of 14% is within the 20% CLP acceptance window for duplicate analysis.

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

LCS analyses are within the windows established for each parameter.

Please call Bill Kammin at SCAN 360-871-8801 to further discuss this project.

RLK:rlk

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Lead

Project Name: City of Cle Elum **LIMS Project ID:** 1342-96

Project Officer: Chung Ki Yee
Date Reported: 20-JUN-96

Method: EPA239.2
Matrix: Sediment/Soil
Analyte: Lead

Sample	QC	Field ID	Result	Qualifier	Units	Received	Analyzed
96218130		CE01S	6.36		mg/Kg Dry Wt.	05/22/96	06/14/96
96218131		CE02S	5.33		mg/Kg Dry Wt.	05/22/96	06/14/96
96218132		CE03S	10.8		mg/Kg Dry Wt.	05/22/96	06/14/96
96218133		CE04S	63.0		mg/Kg Dry Wt.	05/22/96	06/07/96
96218134		CE07S	22.5		mg/Kg Dry Wt.	05/22/96	06/07/96
96218135		CE08S	12.2		mg/Kg Dry Wt.	05/22/96	06/07/96
96218136		CE11S	17.2		mg/Kg Dry Wt.	05/22/96	06/07/96
96218137		CE23S	46.7		mg/Kg Dry Wt.	05/22/96	06/07/96
96218138		CE09S1	42.0		mg/Kg Dry Wt.	05/24/96	06/07/96
96218139		CE10S1	5.80		mg/Kg Dry Wt.	05/24/96	06/14/96
96218140		CE12S1	8.26		mg/Kg Dry Wt.	05/24/96	06/14/96
96218141		CE13S1	4.80		mg/Kg Dry Wt.	05/24/96	06/14/96
96218142		CE24S1	15.5		mg/Kg Dry Wt.	05/24/96	06/14/96
96218142	Matrix Spike		54 %			05/24/96	06/14/96
96218142	Matrix Spike		120 %			05/24/96	06/14/96
96218143		CE24S1A	10.2		mg/Kg Dry Wt.	05/24/96	06/14/96
96218144		CE25S1	8.51		mg/Kg Dry Wt.	05/24/96	06/14/96
96218145		CE16S1	5.66		mg/Kg Dry Wt.	05/24/96	06/14/96
96218146		CE15S1	28.4		mg/Kg Dry Wt.	05/24/96	06/07/96
BLN61818		SPB2267	0.2	U	mg/Kg Dry Wt.		06/07/96
LCS61819		SLC2267	90 %				06/07/96

Authorized By: Libby Cull Release Date: 6/24/96

July 25, 1996

To: Chung Ki Yee

From: Randy Knox, Metals Chemist

Subject: City of Cle Elum Project Sediment - samples 96228155
96228156
96228157
96228158

QUALITY ASSURANCE SUMMARY

Data quality for this project is excellent. No significant quality assurance issues are noted with the data.

SAMPLE INFORMATION

The samples from the City of Cle Elum Project were received by the Manchester Laboratory on 5/30/96 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification were within the relevant USEPA (CLP) control limits. AA calibration gave a correlation coefficient (r) of 0.995 or greater, also meeting CLP calibration requirements standards.

PROCEDURAL BLANKS

The procedural blanks associated with these samples show no analytically significant levels of analyte.

SPIKED SAMPLES ANALYSIS

Spiked and duplicate spiked sample analysis were performed on this data set. Spike recoveries are reported as NC, not calculated, since sample levels are greater than four times the spike level.

PRECISION DATA

The results of the spiked and duplicate spiked samples are used to evaluate precision on this sample set. The relative percent difference (RPD) for all analytes is within the 20% CLP acceptance window for duplicate analysis.

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

LCS analyses are within the windows established for each parameter.

Please call Bill Kammin at SCAN 360-871-8801 to further discuss this project.

RLK:rlk

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Lead

Project Name: City of Cle Elum **LIMS Project ID:** 1342-96

Project Officer: Chung Ki Yee
Date Reported: 24-JUL-96

Method: EPA239.2
Matrix: Sediment/Soil
Analyte: Lead

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
96228155		CE05S	14.9		mg/Kg	Dry Wt.	05/30/96	07/24/96
96228155	Matrix Spike			NC			05/30/96	07/24/96
96228155	Matrix Spike			NC			05/30/96	07/24/96
96228156		CE17S	20.5		mg/Kg	Dry Wt.	05/30/96	07/24/96
96228157		CE19S	8.18		mg/Kg	Dry Wt.	05/30/96	07/24/96
96228158		CE06S	17.2		mg/Kg	Dry Wt.	05/30/96	07/24/96
BLN62347		SPB3079	0.2	U	mg/Kg	Dry Wt.		07/24/96
ERA62346		SLC3079	112 %					07/24/96

Authorized By: Sally Cull Release Date: 7/25/96

APPENDIX C

Ground Water Sample Laboratory Reports

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

September 18, 1996

Subject:	City of Cle Elum, waters
Samples:	96258180 - 96258199
Case No.	142696
Officer:	Chung Ki Yee
By:	Myrna McIntosh
	Organics Analysis Unit

BTEX Analysis of City of Cle Elum, waters

SUMMARY:

All data for ethylbenzene and xylenes are qualified as estimates. This is because the low calibration standard (1 ppb level) is slightly out of the control limits of 15% for these compounds. This qualification has little effect on results greater than 2 ppb, but results less than 2 may have a low bias. All results are usable as reported.

METHODS:

These water samples were analyzed by purge and trap GC-PID.

BLANKS:

No analytes of interest were detected in the blanks.

SURROGATES:

All surrogate recoveries were within the control limits of 50 - 150%.

HOLDING TIMES:

Samples were extracted and analyzed within recommended holding times.

DUPLICATE AND SPIKED SAMPLES:

Project officer requested that no duplicates or spiked samples be analyzed in this set.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: BLN62439 **Method:** SW8020
Blank ID: BW6181 **Date Prepared:** 07/01/96 **Matrix:** Water
Project Officer: Chung Ki Yee **Date Analyzed:** 07/01/96 **Units:** ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	U
Ethylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

Surrogate Recoveries

1,4-Difluorobenzene	**93**	**%**

Authorized By: _____ Release Date: 7/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

oject Name: City of Cle Elum - 25		**LIMS Project ID:**	1426-96
Sample: BLN62440		**Method:**	SW8020
ank ID: BW6183A	**Date Prepared:** 07/02/96	**Matrix:**	Water
oject Officer: Chung Ki Yee	**Date Analyzed:** 07/02/96	**Units:**	ug/L

alyte	Result	Qualifier
Benzene	1.0	U
luene	1.0	U
ıylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

rrogate Recoveries

1.4-Difluorobenzene	94	%

uthorized By: Kari Feddersen (signature) Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: BLN62441 Method: SW8020
lank ID: BW6183B Date Prepared: 07/07/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/07/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
thylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

ırrogate Recoveries

4-Difluorobenzene	92	%

Authorized By: Kevin Zeller Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258180 Date Received: 06/25/96 Method: SW8020
eld ID: CE01W Date Prepared: 07/01/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/01/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

rrogate Recoveries

4-Difluorobenzene	99	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258181 Date Received: 06/25/96 Method: SW8020
ield ID: CE02W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

irrogate Recoveries

4-Difluorobenzene	99	%

Authorized By: Kari Fedden Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258182 Date Received: 06/25/96 Method: SW8020
ield ID: CE03W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

irrogate Recoveries

4-Difluorobenzene	100	%

Authorized By: Karin Feddern Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258183 Date Received: 06/25/96 Method: SW8020
ield ID: CE04W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
thylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

irrogate Recoveries

1	4-Difluorobenzene	101	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258184
ield ID: CE05W
roject Officer: Chung Ki Yee

Date Received: 06/26/96
Date Prepared: 07/02/96
Date Analyzed: 07/02/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

irrogate Recoveries

4-Difluorobenzene	101	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258185 Date Received: 06/26/96 Method: SW8020
eld ID: CE06W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

rrogate Recoveries

4-Difluorobenzene	98	%

Authorized By: Ken Fiddler Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

'oject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258186 Date Received: 06/26/96 Method: SW8020
'eld ID: CE07W Date Prepared: 07/03/96 Matrix: Water
'oject Officer: Chung Ki Yee Date Analyzed: 07/03/96 Units: ug/L

ıalyte	Result	Qualifier
Benzene	240	
ıluene	430	
hylbenzene	460	J
Total Xylenes	3200	J

ırrogate Recoveries

4-Difluorobenzene	101	%

ıthorized By: Ken Todd Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258187 Date Received: 06/26/96 Method: SW8020
ield ID: CE08W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	3.0	
thylbenzene	4.0	J
Total Xylenes	28	J

urrogate Recoveries

4-Difluorobenzene	94	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258188
ield ID: CE09W
roject Officer: Chung Ki Yee

Date Received: 06/26/96
Date Prepared: 07/02/96
Date Analyzed: 07/02/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
thylbenzene	1.6	J
Total Xylenes	12	J

urrogate Recoveries

4-Difluorobenzene	108	%

uthorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258189 Date Received: 06/26/96 Method: SW8020
ield ID: CE10W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.5	U
otal Xylenes	17	J
Ethylbenzene	2.4	J

irrogate Recoveries

[1]	4-Difluorobenzene	95	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258190 Date Received: 06/26/96 Method: SW8020
eld ID: CE11W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.1	J
Total Xylenes	8.2	J

irrogate Recoveries

4-Difluorobenzene	95	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258191 Date Received: 06/26/96 Method: SW8020
eld ID: CE12W Date Prepared: 07/03/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/03/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.2	J

irrogate Recoveries

4-Difluorobenzene	113	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258192 Date Received: 06/26/96 Method: SW8020
ield ID: CE13W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

irrogate Recoveries

4-Difluorobenzene	112	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258193 Date Received: 06/27/96 Method: SW8020
eld ID: CE15W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

rrogate Recoveries

4-Difluorobenzene	97	%

Authorized By: Kari Fadden Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

oject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258194 **Date Received:** 06/27/96 **Method:** SW8020
eld ID: CE16W **Date Prepared:** 07/02/96 **Matrix:** Water
oject Officer: Chung Ki Yee **Date Analyzed:** 07/02/96 **Units:** ug/L

alyte	Result	Qualifier
enzene	1.0	U
luene	1.1	
ylbenzene	1.0	UJ
otal Xylenes	3.0	UJ

rrogate Recoveries

4-Difluorobenzene	86	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258195 **Date Received:** 06/27/96 **Method:** SW8020
ield ID: CE17W **Date Prepared:** 07/02/96 **Matrix:** Water
roject Officer: Chung Ki Yee **Date Analyzed:** 07/02/96 **Units:** ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
Ethylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

urrogate Recoveries

4-Difluorobenzene	93	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258196 Date Received: 06/27/96 Method: SW8020
ield ID: CE19W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

urrogate Recoveries

4-Difluorobenzene	94	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258197
eld ID: CE23W
oject Officer: Chung Ki Yee

Date Received: 06/27/96
Date Prepared: 07/03/96
Date Analyzed: 07/03/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
enzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

rrogate Recoveries

4-Difluorobenzene	95	%

horized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258198
ield ID: CE24W
roject Officer: Chung Ki Yee

Date Received: 06/27/96
Date Prepared: 07/06/96
Date Analyzed: 07/06/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	320	
oluene	400	
thylbenzene	79	J
Total Xylenes	500	J
urrogate Recoveries		
,4-Difluorobenzene	103	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258199 Date Received: 06/27/96 Method: SW8020
eld ID: CE25W Date Prepared: 07/03/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/03/96 Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	UJ
Total Xylenes	3.0	UJ

irrogate Recoveries

4-Difluorobenzene	92	%

Authorized By: _____ Release Date: 9/16/96 Page: 1

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

September 18, 1996

Subject:	City of Cle Elum, waters
Samples:	96258180 - 96258199
Case No.	142696
Officer:	Chung Ki Yee
By:	Myrna McIntosh Organics Analysis Unit

WTPH-G Analysis of City of Cle Elum, waters

SUMMARY:

Sample 96258184 contains gasoline range hydrocarbons but its chromatogram does not match the gasoline pattern. The result is quantitated against the gasoline standard and qualified "NJ". All other results reported as gasoline show a matching pattern. Data are usable as reported.

METHODS:

These water samples were analyzed by purge and trap GC-FID.

BLANKS:

No analytes of interest were detected in the blanks.

SURROGATES:

All surrogate recoveries were within the control limits of 50 - 150%.

HOLDING TIMES:

Samples were extracted and analyzed within recommended holding time of 14 days.

DUPLICATE SAMPLES:

Project officer requested that no duplicates samples be analyzed in this set.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: BLN62439
Blank ID: BW6181
Project Officer: Chung Ki Yee

Date Prepared: 07/01/96
Date Analyzed: 07/01/96

Method: WTPH-G
Matrix: Water
Units: mg/L

Analyte	Result	Qualifier
Gasoline	0.12	U
Surrogate Recoveries		
,4-Difluorobenzene	**80**	**%**

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

oject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

mple: BLN62440 Method: WTPH-G
ank ID: BW6183A Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

alyte	Result	Qualifier
soline	0.12	U

Surrogate Recoveries

4-Difluorobenzene	82	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: BLN62441
Blank ID: BW6183B
Project Officer: Chung Ki Yee

Date Prepared: 07/03/96
Date Analyzed: 07/03/96

Method: WTPH-G
Matrix: Water
Units: mg/L

Analyte	Result	Qualifier
Gasoline	0.12	U
Surrogate Recoveries		
1,4-Difluorobenzene	83	%

Authorized By: [signature] Release Date: 9/18/96 Page: 1

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

mple: 96258180 Date Received: 06/25/96 Method: WTPH-G
eld ID: CE01W Date Prepared: 07/01/96 Matrix: Water
Project Officer: Chung Ki Yee Date Analyzed: 07/01/96 Units: mg/L

nalyte	Result	Qualifier
asoline	0.12	U

Surrogate Recoveries

4-Difluorobenzene	80	%

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Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

ample: 96258181 **Date Received:** 06/25/96 **Method:** WTPH-G
ield ID: CE02W **Date Prepared:** 07/01/96 **Matrix:** Water
Project Officer: Chung Ki Yee **Date Analyzed:** 07/01/96 **Units:** mg/L

Analyte	Result	Qualifier
asoline	0.12	U

Surrogate Recoveries

4-Difluorobenzene	80	%

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Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

ample: 96258182 Date Received: 06/25/96 Method: WTPH-G
ield ID: CE03W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

nalyte	Result	Qualifier
asoline	0.12	U

Surrogate Recoveries

4-Difluorobenzene	79	%

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Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258183
Field ID: CE04W
Project Officer: Chung Ki Yee

Date Received: 06/25/96
Date Prepared: 07/02/96
Date Analyzed: 07/02/96

Method: WTPH-G
Matrix: Water
Units: mg/L

Analyte	Result	Qualifier
Gasoline	0.12	U

Surrogate Recoveries

1,4-Difluorobenzene	81	%

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Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

mple: 96258184
eld ID: CE05W
Project Officer: Chung Ki Yee

Date Received: 06/26/96
Date Prepared: 07/02/96
Date Analyzed: 07/02/96

Method: WTPH-G
Matrix: Water
Units: mg/L

nalyte	Result	Qualifier
asoline	0.24	NJ

urrogate Recoveries

4-Difluorobenzene	82	%

horized By: _____ Release Date: 9/18/96 Page: 1

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Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name:	City of Cle Elum - 25	LIMS Project ID:	1426-96
Sample:	96258185	Date Received: 06/26/96	Method: WTPH-G
Field ID:	CE06W	Date Prepared: 07/02/96	Matrix: Water
Project Officer:	Chung Ki Yee	Date Analyzed: 07/02/96	Units: mg/L

Analyte	Result	Qualifier
Gasoline	0.12	U
Surrogate Recoveries		
4-Difluorobenzene	80	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258186 Date Received: 06/26/96 Method: WTPH-G
ield ID: CE07W Date Prepared: 07/03/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/03/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	21	
ırrogate Recoveries		
4-Difluorobenzene	85	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258187 **Date Received:** 06/26/96 **Method:** WTPH-G
ield ID: CE08W **Date Prepared:** 07/02/96 **Matrix:** Water
roject Officer: Chung Ki Yee **Date Analyzed:** 07/02/96 **Units:** mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	**88**	**%**

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258188 Date Received: 06/26/96 Method: WTPH-G
ield ID: CE09W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
ırrogate Recoveries		
4-Difluorobenzene	**91**	**%**

uthorized By: Release Date: 9/18/96 Page: 1

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Analysis Report for

TPH as Gasoline

oject Name: City of Cle Elum - 25			LIMS Project ID: 1426-96
Sample: 96258189	Date Received: 06/26/96	Method:	WTPH-G
eld ID: CE10W	Date Prepared: 07/02/96	Matrix:	Water
oject Officer: Chung Ki Yee	Date Analyzed: 07/02/96	Units:	mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	**93**	**%**

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Analysis Report for

TPH as Gasoline

oject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258190 Date Received: 06/26/96 Method: WTPH-G
eld ID: CE11W Date Prepared: 07/02/96 Matrix: Water
oject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

alyte	Result	Qualifier
Gasoline	0.12	U

rrogate Recoveries

-Difluorobenzene	96	%

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258191 **Date Received:** 06/26/96 **Method:** WTPH-G
ield ID: CE12W **Date Prepared:** 07/02/96 **Matrix:** Water
roject Officer: Chung Ki Yee **Date Analyzed:** 07/02/96 **Units:** mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	93	%

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Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258192 Date Received: 06/26/96 Method: WTPH-G
ield ID: CE13W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U

urrogate Recoveries

4-Difluorobenzene	93	%

uthorized By: Release Date: 9/18/96 Page: 1

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Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258193 **Date Received:** 06/27/96 **Method:** WTPH-G
ield ID: CE15W **Date Prepared:** 07/02/96 **Matrix:** Water
roject Officer: Chung Ki Yee **Date Analyzed:** 07/02/96 **Units:** mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
Surrogate Recoveries		
4-Difluorobenzene	**80**	**%**

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258194 Date Received: 06/27/96 Method: WTPH-G
ield ID: CE16W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
ırrogate Recoveries		
4-Difluorobenzene	**81**	**%**

Authorized By: Kim Tedder Release Date: 9/18/96 Page: 1

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258195 Date Received: 06/27/96 Method: WTPH-G
eld ID: CE17W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	83	%

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258196 Date Received: 06/27/96 Method: WTPH-G
ield ID: CE19W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	82	%

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258197 Date Received: 06/27/96 Method: WTPH-G
ield ID: CE23W Date Prepared: 07/02/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/02/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U

urrogate Recoveries

4-Difluorobenzene	81	%

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Analysis Report for

TPH as Gasoline

oject Name:	City of Cle Elum - 25		LIMS Project ID: 1426-96
Sample: 96258198		Date Received: 06/27/96	Method: WTPH-G
eld ID: CE24W		Date Prepared: 07/02/96	Matrix: Water
oject Officer:	Chung Ki Yee	Date Analyzed: 07/05/96	Units: mg/L

nalyte	Result	Qualifier
asoline	1.0	
rrogate Recoveries		
4-Difluorobenzene	113	%

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Manchester Environmental Laboratory

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Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258199 Date Received: 06/27/96 Method: WTPH-G
ield ID: CE25W Date Prepared: 07/03/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/03/96 Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	81	%

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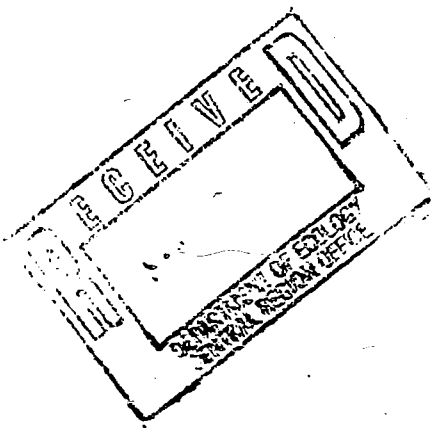
7411 Beach Dr E, Port Orchard Washington 98366



CASE NARRATIVE

September 18, 1996

Subject:	City of Cle Elum, waters
Samples:	96258180 - 96258199
Case No.	142696
Officer:	Chung Ki Yee
By:	Myrna McIntosh Organics Analysis Unit

WTPH-D Analysis of City of Cle Elum, waters

SUMMARY:

The results for samples 96258186 and 96258198 are qualified as estimates due to interference from gasoline range hydrocarbons in the area of interest. Sample 96258196 contains an unidentified diesel range hydrocarbon which does not pattern match the #2 diesel chormatogram. The result of this sample is qualified "NJ" since it is quantitated using a diesel standard. All data are usable as reported.

METHODS:

These water samples were analyzed by the WTPH-D method using GC-FID.

BLANKS:

No analytes of interest were detected in the blanks.

SURROGATES:

All surrogate recoveries were within the control limits of 50 - 150%.

HOLDING TIMES:

Samples were extracted and analyzed within recommended holding times.

DUPLICATE AND SPIKED SAMPLES:

Project officer requested that no duplicates or spiked samples be analyzed in this set.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: BLN62437 Method: WTPH-D
lank ID: BW6180 Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/05/96 Units: mg/L

nalyte	Result	Qualifier
12 Diesel	0.40	U
ırrogate Recoveries		
entacosane	104	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25		LIMS Project ID:	1426-96
Sample: BLN62438		Method:	WTPH-D
lank ID: BW6180D	Date Prepared: 06/28/96	Matrix:	Water
roject Officer: Chung Ki Yee	Date Analyzed: 07/05/96	Units:	mg/L

nalyte	Result	Qualifier
#2 Diesel	0.40	U
urrogate Recoveries		
entacosane	109	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum - 25 | LIMS Project ID: 1426-96

Sample:	96258180	Date Received:	06/25/96	Method:	WTPH-D
eld ID:	CE01W	Date Prepared:	06/28/96	Matrix:	Water
oject Officer:	Chung Ki Yee	Date Analyzed:	07/05/96	Units:	mg/L

nalyte	Result	Qualifier
#2 Diesel	0.25	U
rrogate Recoveries		
ntacosane	**118**	**%**

uthorized By: ____________ Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258181 **Date Received:** 06/25/96 **Method:** WTPH-D
ield ID: CE02W **Date Prepared:** 06/28/96 **Matrix:** Water
roject Officer: Chung Ki Yee **Date Analyzed:** 07/05/96 **Units:** mg/L

nalyte	Result	Qualifier
#2 Diesel	0.36	U
urrogate Recoveries		
entacosane	94	%

Authorized By: Kari Fedde Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

'oject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258182 Date Received: 06/25/96 Method: WTPH-D
'eld ID: CE03W Date Prepared: 06/28/96 Matrix: Water
'oject Officer: Chung Ki Yee Date Analyzed: 07/05/96 Units: mg/L

ıalyte	Result	Qualifier
#2 Diesel	0.25	U

.rrogate Recoveries

ntacosane	94	%

uthorized By: _____ Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258183 Date Received: 06/25/96 Method: WTPH-D
ield ID: CE04W Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/05/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.27	U

Surrogate Recoveries

entacosane	99	%

Authorized By: Kim Todd Release Date: 9/18/96 Page: 1

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Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258185 Date Received: 06/26/96 Method: WTPH-D
eld ID: CE06W Date Prepared: 06/28/96 Matrix: Water
oject Officer: Chung Ki Yee Date Analyzed: 07/05/96 Units: mg/L

ıalyte	Result	Qualifier
#2 Diesel	0.25	U

rrogate Recoveries

ntacosane	106	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258186 Date Received: 06/26/96 Method: WTPH-D
ield ID: CE07W Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/05/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.26	UJ
urrogate Recoveries		
entacosane	105	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name:	City of Cle Elum - 25		LIMS Project ID: 1426-96
Sample: 96258187		Date Received: 06/26/96	Method: WTPH-D
ld ID: CE08W		Date Prepared: 06/28/96	Matrix: Water
oject Officer:	Chung Ki Yee	Date Analyzed: 07/05/96	Units: mg/L

alyte	Result	Qualifier
#2 Diesel	0.26	U

rrogate Recoveries

ntacosane	101	%

uthorized By: _____ Release Date: 9/18/96 Page: 1

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Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258188 Date Received: 06/26/96 Method: WTPH-D
ield ID: CE09W Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.24	U
urrogate Recoveries		
entacosane	109	%

Authorized By: Kari Fedde Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name:	City of Cle Elum - 25		LIMS Project ID: 1426-96
Sample: 96258189		Date Received: 06/26/96	Method: WTPH-D
eld ID: CE10W		Date Prepared: 06/28/96	Matrix: Water
oject Officer:	Chung Ki Yee	Date Analyzed: 07/06/96	Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.27	U
rrogate Recoveries		
ntacosane	110	%

Authorized By: _____ Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258190 Date Received: 06/26/96 Method: WTPH-D
ield ID: CE11W Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.25	U
urrogate Recoveries		
entacosane	108	%

Authorized By: _____ Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Sample: 96258191 **Date Received:** 06/26/96 **Method:** WTPH-D
ield ID: CE12W **Date Prepared:** 06/28/96 **Matrix:** Water
roject Officer: Chung Ki Yee **Date Analyzed:** 07/06/96 **Units:** mg/L

nalyte	Result	Qualifier
Diesel	0.26	U

urrogate Recoveries

entacosane	**100**	**%**

Authorized By: Kim Testolin Release Date: 9/18/96 Page: 1

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Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258192 Date Received: 06/26/96 Method: WTPH-D
ield ID: CE13W Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.25	U

urrogate Recoveries

entacosane	104	%

Authorized By: _____ Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258193 Date Received: 06/27/96 Method: WTPH-D
eld ID: CE15W Date Prepared: 06/28/96 Matrix: Water
oject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

alyte	Result	Qualifier
#2 Diesel	0.26	U

rrogate Recoveries

ıtacosane	92	%

uthorized By: Kari Fiddle Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258194 Date Received: 06/27/96 Method: WTPH-D
ield ID: CE16W Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.25	U
urrogate Recoveries		
entacosane	116	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258195 Date Received: 06/27/96 Method: WTPH-D
eld ID: CE17W Date Prepared: 06/28/96 Matrix: Water
oject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

alyte	Result	Qualifier
#2 Diesel	0.25	U

rrogate Recoveries

ntacosane	114	%

uthorized By: _____ Release Date: 9/18/96 Page: 1

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Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258196 Date Received: 06/27/96 Method: WTPH-D
ield ID: CE19W Date Prepared: 06/28/96 Matrix: Water
roject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.46	J
urrogate Recoveries		
entacosane	106	%

Authorized By: _____ Release Date: 9/18/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum - 25 LIMS Project ID: 1426-96

Sample: 96258198 Date Received: 06/27/96 Method: WTPH-D
eld ID: CE24W Date Prepared: 06/28/96 Matrix: Water
oject Officer: Chung Ki Yee Date Analyzed: 07/06/96 Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.26	J
urrogate Recoveries		
entacosane	106	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name:	City of Cle Elum - 25	LIMS Project ID:	1426-96
Sample:	96258199	Date Received: 06/27/96	Method: WTPH-D
eld ID:	CE25W	Date Prepared: 06/28/96	Matrix: Water
oject Officer:	Chung Ki Yee	Date Analyzed: 07/06/96	Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.26	U

urrogate Recoveries

ntacosane	100	%

Authorized By: _____ Release Date: 9/18/96 Page: 1

July 12, 1996

To: Chung Ki Yee

From: Randy Knox, RK Metals Chemist

Subject: City of Cle Elum -25 Project Water

QUALITY ASSURANCE SUMMARY

Data quality for this project is excellent. No significant quality assurance issues are noted with the data.

SAMPLE INFORMATION

The samples from the City of Cle Elum -25 Project were received by the Manchester Laboratory on 6/25/96 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification were within the relevant USEPA (CLP) control limits. AA calibration gave a correlation coefficient (r) of 0.995 or greater, also meeting CLP calibration requirements standards.

PROCEDURAL BLANKS

The procedural blanks associated with these samples show no analytically significant levels of analyte.

SPIKED SAMPLES ANALYSIS

Spiked and duplicate spiked sample analysis were performed on this data set.. All spike recoveries are within the CLP acceptance limits of +/- 25%.

PRECISION DATA

The results of the spiked and duplicate spiked samples are used to evaluate precision on this sample set. The relative percent difference (RPD) for all analytes is within the 20% CLP acceptance window for duplicate analysis. Spike recovery for analysis of TCLP extract was reported as NC, not calculated, since the sample level was greater than four times the spike level.

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

LCS analyses are within the windows established for each parameter.

Please call Bill Kammin at SCAN 360-871-8801 to further discuss this project.

RLK:rlk

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Lead

Project Name: City of Cle Elum - 25 **LIMS Project ID:** 1426-96

Project Officer: Chung Ki Yee
Date Reported: 11-JUL-96
Method: EPA239.2
Matrix: Water
Analyte: Lead

Sample	QC	Field ID	Result	Qualifier	Units	Received	Analyzed
96258180		CE01W	1.6		ug/L	06/25/96	07/10/96
96258181		CE02W	1.8		ug/L	06/25/96	07/10/96
96258182		CE03W	1.2		ug/L	06/25/96	07/10/96
96258183		CE04W	1.8		ug/L	06/25/96	07/10/96
96258184		CE05W	3.4		ug/L	06/26/96	07/10/96
96258185		CE06W	1.6		ug/L	06/26/96	07/10/96
96258186		CE07W	2.8		ug/L	06/26/96	07/10/96
96258187		CE08W	1.6		ug/L	06/26/96	07/10/96
96258188		CE09W	1.6		ug/L	06/26/96	07/10/96
96258189		CE10W	1.4		ug/L	06/26/96	07/10/96
96258190		CE11W	1.1		ug/L	06/26/96	07/10/96
96258190	Matrix Spike		107 %			06/26/96	07/10/96
96258190	Matrix Spike		102 %			06/26/96	07/10/96
96258191		CE12W	1	U	ug/L	06/26/96	07/10/96
96258192		CE13W	1.2		ug/L	06/26/96	07/10/96
96258193		CE15W	3.5		ug/L	06/27/96	07/10/96
96258194		CE16W	2.1		ug/L	06/27/96	07/10/96
96258195		CE17W	1.7		ug/L	06/27/96	07/10/96
96258196		CE19W	1.3		ug/L	06/27/96	07/10/96
96258197		CE23W	3.6		ug/L	06/27/96	07/10/96
96258198		CE24W	1.7		ug/L	06/27/96	07/10/96
96258199		CE25W	1.5		ug/L	06/27/96	07/10/96
BLN62141		WPB2704	1	U	ug/L		07/10/96
LCS62142		WLC2704	104 %				07/10/96

Authorized By: Sally Cull Release Date: 7/12/96

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

October 18, 1996

Subject:	City of Cle Elum
Samples:	96398040 - 96398045
Case No.	163596
Officer:	Chung Ki Yee
By:	Myrna McIntosh MM Organics Analysis Unit

BTEX and WTPH-G Analysis of City of Cle Elum

SUMMARY:

Samples 96398040 - 96398045 were analyzed for BTEX and WTPH-G. Some of the sample results were reported from dilutions because the concentration of the analytes detected in the original analysis exceeded the calibration range.

Use the DIL1 results of sample 96398042 and 96398045 for benzene. Use the original analysis for all other analytes in these two samples.

The reporting limits for all BTEX analysis with the exception of m & p xylenes, are 1 ug/L. (The reporting limit for m & p xylenes is 2 ug/L). BTEX values below the reporting limits are reported and qualified as estimates.

All data are usable as reported.

METHODS:

These water samples were analyzed by purge and trap GC-PID and GC-FID.

BLANKS:

No analytes of interest were detected in the blanks.

SURROGATES:

All surrogate recoveries were within the control limits of 50 - 150% with the exception of the BTEX analysis of sample 96398042. The surrogate spike gave a high recovery due to the interference of the large amount of gasoline present in this sample. The benzene and toluene results calculated from the DIL1 are very similar to those of the sample with the high surrogate recovery. Therefore, the values for this sample are not qualified, since they do appear to be affected by this interference.

HOLDING TIMES:

Samples were analyzed within recommended holding times.

DUPLICATE AND SPIKED SAMPLES:

A duplicate analysis was performed on sample 96398044 for WTPH-G analysis. The relative percent difference (RPD) between the results was 13%. No QC limits have yet been established for precision data for this method. However, this RPD value is acceptable for WTPH-G analysis.

A BTEX standard was spiked into replicates of sample 96398040. All analytes were recovered within the control limits of 75 - 150%.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum **LIMS Project ID:** 1635-96

Sample: BLN63520
lank ID: OBW6275A1
roject Officer: Chung Ki Yee

Date Prepared: 10/01/96
Date Analyzed: 10/01/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
thylbenzene	1.0	U
m & p-Xylene	2.0	U
-Xylene	1.0	U

Surrogate Recoveries

4-Difluorobenzene	**84**	**%**

Authorized By: _____ Release Date: 10/21/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum

LIMS Project ID: 1635-96

Sample: BLN63521
lank ID: OBW6276A1
roject Officer: Chung Ki Yee

Date Prepared: 10/02/96
Date Analyzed: 10/02/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	U
m & p-Xylene	2.0	U
Xylene	1.0	U

Surrogate Recoveries

4-Difluorobenzene	84	%

Authorized By: _____ Release Date: 10/21/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: BLN63522 — Method: SW8020
lank ID: OBW6277A1 — Date Prepared: 10/03/96 — Matrix: Water
roject Officer: Chung Ki Yee — Date Analyzed: 10/03/96 — Units: ug/L

nalyte	Result	Qualifier
Benzene	1.0	U
oluene	1.0	U
hylbenzene	1.0	U
m & p-Xylene	2.0	U
Xylene	1.0	U

Surrogate Recoveries

4-Difluorobenzene	85	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398040 — Date Received: 09/30/96 — Method: SW8020
eld ID: CE01W — Date Prepared: 10/03/96 — Matrix: Water
roject Officer: Chung Ki Yee — Date Analyzed: 10/03/96 — Units: ug/L

nalyte	Result	Qualifier
Benzene	0.96	J
oluene	0.62	J
thylbenzene	0.26	J
m & p-Xylene	0.32	J
Xylene	0.12	J

Surrogate Recoveries

4-Difluorobenzene	93	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398040 (Matrix Spike - LMX1) — Date Received: 09/30/96 — Method: SW8020
eld ID: CE01W — Date Prepared: 10/03/96 — Matrix: Water
roject Officer: Chung Ki Yee — Date Analyzed: 10/03/96 — Units: % Recovery

nalyte	Result	Qualifier
Benzene	103	
oluene	103	
thylbenzene	104	
m & p-Xylene	109	
Xylene	112	

Surrogate Recoveries

4-Difluorobenzene	102	%

Authorized By: _____ Release Date: 10/21/96 Page: 2

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398040 (Matrix Spike - LMX2) — Date Received: 09/30/96 — Method: SW8020
eld ID: CE01W — Date Prepared: 10/03/96 — Matrix: Water
roject Officer: Chung Ki Yee — Date Analyzed: 10/03/96 — Units: % Recovery

nalyte	Result	Qualifier
Benzene	101	
oluene	102	
hylbenzene	103	
m & p-Xylene	109	
Xylene	112	

Surrogate Recoveries

4-Difluorobenzene	102	%

Authorized By: _____ Release Date: 10/21/96 Page: 3

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398041 — Date Received: 09/30/96 — Method: SW8020
ield ID: CE05W — Date Prepared: 10/01/96 — Matrix: Water
roject Officer: Chung Ki Yee — Date Analyzed: 10/01/96 — Units: ug/L

nalyte	Result	Qualifier
Benzene	0.58	J
oluene	0.40	J
thylbenzene	0.58	J
m & p-Xylene	0.12	J
Xylene	0.12	J

Surrogate Recoveries

4-Difluorobenzene	95	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398042
eld ID: CE07W
roject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/03/96
Date Analyzed: 10/03/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	140	
oluene	100	
thylbenzene	450	E
m & p-Xylene	1700	E
Xylene	420	E

Surrogate Recoveries

4-Difluorobenzene	161	%

uthorized By: _____ Release Date: 10/21/96 Page: 1

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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398042 (Dilution - DIL1)
eld ID: CE07W
roject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/03/96
Date Analyzed: 10/03/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	140	
oluene	98	J
thylbenzene	460	
m & p-Xylene	2000	
Xylene	480	

Surrogate Recoveries

4-Difluorobenzene	105	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398043
ield ID: CE19W
roject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/03/96
Date Analyzed: 10/03/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	0.54	J
oluene	0.40	J
thylbenzene	1.5	
m & p-Xylene	5.9	
-Xylene	1.4	

Surrogate Recoveries

4-Difluorobenzene	98	%

uthorized By: _____ Release Date: 10/21/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name:	City of Cle Elum	LIMS Project ID:	1635-96
Sample: 96398044	Date Received: 09/30/96	Method:	SW8020
ield ID: CE23W	Date Prepared: 10/02/96	Matrix:	Water
roject Officer: Chung Ki Yee	Date Analyzed: 10/02/96	Units:	ug/L

nalyte	Result	Qualifier
Benzene	35	
oluene	4.5	
thylbenzene	19	
m & p-Xylene	34	
-Xylene	21	

Surrogate Recoveries

,4-Difluorobenzene	107	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398045
eld ID: CE24W
roject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/03/96
Date Analyzed: 10/03/96

Method: SW8020
Matrix: Water
Units: ug/L

nalyte	Result	Qualifier
Benzene	390	E
oluene	99	
hylbenzene	31	
m & p-Xylene	61	
Xylene	32	

Surrogate Recoveries

4-Difluorobenzene	93	%

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Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

'roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398045 (Dilution - DIL1) — Date Received: 09/30/96 — Method: SW8020
'ield ID: CE24W — Date Prepared: 10/03/96 — Matrix: Water
'roject Officer: Chung Ki Yee — Date Analyzed: 10/03/96 — Units: ug/L

'nalyte	Result	Qualifier
Benzene	410	
'oluene	100	
.thylbenzene	31	J
m & p-Xylene	50	
-Xylene	25	J

Surrogate Recoveries

,4-Difluorobenzene	104	%

Authorized By: _____ Release Date: 10/21/96 Page: 2

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name:	City of Cle Elum		LIMS Project ID: 1635-96
Sample:	BLN63529		Method: WTPH-G
lank ID:	OBW6275A1	Date Prepared: 10/01/96	Matrix: Water
roject Officer:	Chung Ki Yee	Date Analyzed: 10/01/96	Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
ırrogate Recoveries		
4-Difluorobenzene	74	%

uthorized By: Kari Todd Release Date: 10/21/96 Page: 1

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Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name:	City of Cle Elum		**LIMS Project ID:** 1635-96
Sample:	**BLN63530**		**Method:** WTPH-G
lank ID:	OBW6276A1	**Date Prepared:** 10/02/96	**Matrix:** Water
roject Officer:	Chung Ki Yee	**Date Analyzed:** 10/02/96	**Units:** mg/L

nalyte	**Result**	**Qualifier**
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	**78**	**%**

Authorized By: Kim Field Release Date: 10/21/96 Page: 1

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Analysis Report for

TPH as Gasoline

roject Name:	City of Cle Elum		LIMS Project ID: 1635-96
Sample:	BLN63620		Method: WTPH-G
lank ID:	OBW6277A1	Date Prepared: 10/03/96	Matrix: Water
roject Officer:	Chung Ki Yee	Date Analyzed: 10/03/96	Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U
ırrogate Recoveries		
4-Difluorobenzene	**73**	**%**

Authorized By: _____ Release Date: 10/21/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

oject Name: City of Cle Elum **LIMS Project ID:** 1635-96

Sample: 96398040
eld ID: CE01W
oject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/01/96
Date Analyzed: 10/01/96

Method: WTPH-G
Matrix: Water
Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.12	U

Surrogate Recoveries

4-Difluorobenzene	73	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name:	City of Cle Elum		LIMS Project ID: 1635-96
Sample: 96398041		Date Received: 09/30/96	Method: WTPH-G
ield ID: CE05W		Date Prepared: 10/01/96	Matrix: Water
roject Officer:	Chung Ki Yee	Date Analyzed: 10/01/96	Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.10	J
urrogate Recoveries		
,4-Difluorobenzene	74	%

Authorized By: Kai Zedek Release Date: 10/21/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name:	City of Cle Elum		LIMS Project ID: 1635-96
Sample: 96398042		Date Received: 09/30/96	Method: WTPH-G
Field ID: CE07W		Date Prepared: 10/02/96	Matrix: Water
Project Officer:	Chung Ki Yee	Date Analyzed: 10/02/96	Units: mg/L

Analyte	Result	Qualifier
Gasoline	18	
Surrogate Recoveries		
1,4-Difluorobenzene	90	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398043 — Date Received: 09/30/96 — Method: WTPH-G
ield ID: CE19W — Date Prepared: 10/03/96 — Matrix: Water
roject Officer: Chung Ki Yee — Date Analyzed: 10/03/96 — Units: mg/L

alyte	Result	Qualifier
Gasoline	0.12	U
urrogate Recoveries		
4-Difluorobenzene	**72**	**%**

thorized By: _____ Release Date: 10/21/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398044 — Date Received: 09/30/96 — Method: WTPH-G
ield ID: CE23W — Date Prepared: 10/01/96 — Matrix: Water
roject Officer: Chung Ki Yee — Date Analyzed: 10/01/96 — Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.97	
urrogate Recoveries		
4-Difluorobenzene	108	%

Authorized By: Ken Fedd — Release Date: 10/21/96 — Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

oject Name:	City of Cle Elum		LIMS Project ID: 1635-96
Sample: 96398044 (Duplicate - LDP1)		Date Received: 09/30/96	Method: WTPH-G
eld ID: CE23W		Date Prepared: 10/01/96	Matrix: Water
oject Officer:	Chung Ki Yee	Date Analyzed: 10/01/96	Units: mg/L

nalyte	Result	Qualifier
Gasoline	0.85	
irrogate Recoveries		
4-Difluorobenzene	112	%

Authorized By: Kevin Hebdon Release Date: 10/21/96 Page: 2

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

roject Name: City of Cle Elum

LIMS Project ID: 1635-96

Sample: 96398045
ield ID: CE24W
roject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/03/96
Date Analyzed: 10/03/96

Method: WTPH-G
Matrix: Water
Units: mg/L

nalyte	Result	Qualifier
Gasoline	1.6	
urrogate Recoveries		
4-Difluorobenzene	90	%

Authorized By: Kari Todoh

Release Date: 10/21/96

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

October 21, 1996

Subject: City of Cle Elum
Samples: 96398040 - 96398045
Case No. 163596
Officer: Chung Ki Yee
By: Myrna McIntosh
Organics Analysis Unit

WTPH-D Analysis of City of Cle Elum

SUMMARY:

Samples 96398040 - 96398045 were extracted into methylene chloride and analyzed for diesel range compounds by WTPH-Dx.

Sample 96398044 contained large amounts of gasoline range hydrocarbons which overlapped into the diesel range of the chromatogram. The quantitation limit for this sample is reported as an estimate to account for this interference.

Sample 96398042 contained large amounts of gasoline range hydrocarbons as well as lubricating oil range hydrocarbons. The lubricating oil range hydrocarbons were quantitated against a motor oil standard. Because of the interference from the gasoline present in the sample, the reported result is qualified and is to be considered a low estimate. The on-column amount detected is reported although it is 42% above the high standard of the calibration curve.

BLANKS:

No analytes of interest were detected in the blanks.

SURROGATES:

All surrogate recoveries were within the control limits of 50 - 150%, with the exception of sample 96398042 which is 163%. This sample is already qualified as an estimate for the reasons mentioned above.

HOLDING TIMES:

All samples were extracted and analyzed within the recommended holding times.

DUPLICATES AND SPIKED SAMPLES:

There were insufficient samples available to analyze duplicates or matrix spiked samples. Additional 1 liter containers of sample are necessary for each duplicate and each spike.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

'oject Name: City of Cle Elum **LIMS Project ID:** 1635-96

Sample: BLN63524 **Method:** WTPH-D
ank ID: OBW6275A1 **Date Prepared:** 10/01/96 **Matrix:** Water
'oject Officer: Chung Ki Yee **Date Analyzed:** 10/04/96 **Units:** mg/L

ıalyte	Result	Qualifier
#2 Diesel	0.20	U
..ırrogate Recoveries		
ıntacosane	**99**	%

.uthorized By: [signature] Release Date: 10/21/96 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum **LIMS Project ID:** 1635-96

Sample: BLN63525
lank ID: OBW6275A2
roject Officer: Chung Ki Yee

Date Prepared: 10/01/96
Date Analyzed: 10/04/96

Method: WTPH-D
Matrix: Water
Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.20	U

Surrogate Recoveries

entacosane	116	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum			LIMS Project ID: 1635-96
Sample: 96398040	Date Received: 09/30/96	Method:	WTPH-D
eld ID: CE01W	Date Prepared: 10/01/96	Matrix:	Water
oject Officer: Chung Ki Yee	Date Analyzed: 10/04/96	Units:	mg/L

alyte	Result	Qualifier
#2 Diesel	0.14	U

urrogate Recoveries

ntacosane	128	%

uthorized By: _____ Release Date: 10/21/96 Page: 1

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Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum **LIMS Project ID:** 1635-96

Sample: 96398041
ield ID: CE05W
roject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/01/96
Date Analyzed: 10/04/96

Method: WTPH-D
Matrix: Water
Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.15	U

urrogate Recoveries

entacosane	**118**	**%**

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398042
eld ID: CE07W
oject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/01/96
Date Analyzed: 10/04/96

Method: WTPH-D
Matrix: Water
Units: mg/L

ıalyte	Result	Qualifier
Lube Oil	1.8	J

rrogate Recoveries

ntacosane	163	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398043
eld ID: CE19W
roject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/01/96
Date Analyzed: 10/07/96

Method: WTPH-D
Matrix: Water
Units: mg/L

nalyte	Result	Qualifier
#2 Diesel	0.14	U

Surrogate Recoveries

ntacosane	71	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

oject Name: City of Cle Elum — LIMS Project ID: 1635-96

Sample: 96398044
ld ID: CE23W
oject Officer: Chung Ki Yee

Date Received: 09/30/96
Date Prepared: 10/01/96
Date Analyzed: 10/04/96

Method: WTPH-D
Matrix: Water
Units: mg/L

alyte	Result	Qualifier
Diesel	0.49	UJ
rrogate Recoveries		
itacosane	155	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Diesel

roject Name:	**City of Cle Elum**		**LIMS Project ID:** 1635-96
Sample:	**96398045**	**Date Received:** 09/30/96	**Method:** WTPH-D
ield ID:	CE24W	**Date Prepared:** 10/01/96	**Matrix:** Water
roject Officer:	Chung Ki Yee	**Date Analyzed:** 10/04/96	**Units:** mg/L

nalyte	**Result**	**Qualifier**
#2 Diesel	0.12	U

Surrogate Recoveries

entacosane	**135**	**%**

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