SEACOR

May 21, 1991

Mr. Balbir Singh
1611 Canyon Road
Ellensburg, WA 98926

SOIL AND GROUNDWATER INVESTIGATION REPORT, BIG "B" MINI MART/EXXON STATION, ELLENSBURG, WASHINGTON - SEACOR PROJECT NO. 00078-001-01

Dear Mr. Singh:

SEACOR is pleased to submit the following report documenting the removal of petroleum-affected soil and the installation of five groundwater monitoring wells at the Big "B" Mini Mart/Exxon Station in Ellensburg, Washington. This project was completed in accordance with the SEACOR consulting agreement dated December 8, 1990.

This report documents the removal of petroleum-affected soil in the vicinity of a broken product line, the installation and sampling of five groundwater monitoring wells, the conditions of soils in the excavation and monitoring well borings, and the results of soil and groundwater analysis.

Based on analytical results and field observations, petroleum-affected soil is present in samples collected from the excavation side walls and in monitoring well MW-2. Both diesel and gasoline contamination are present in groundwater samples collected from the monitoring wells. Groundwater movement beneath the site is toward the south/southwest at a gradient of approximately one percent.

Sincerely yours,

John M. Gieber
Geologist

Larry Fletcher
Project Manager

JMG:mkl

Enclosure

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#104
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SEACOR

SOIL AND GROUNDWATER INVESTIGATION REPORT

BIG "B" MINI MART/EXXON STATION
ELLENSBURG, WASHINGTON

SEACOR Job No. 00078-001-01

Submitted by
SEACOR

for
Balbir Singh
1611 Canyon Road
Ellensburg, Washington 98926

May 21, 1991

Prepared by:

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1.0 INTRODUCTION

This report documents the removal of petroleum affected soil and the installation of five groundwater monitor wells at the Big "B" Mini Mart/Exxon Station located at 1611 Canyon Road in Ellensburg, Washington 98926. This report also presents analytical results of soil and groundwater samples collected during this investigation.

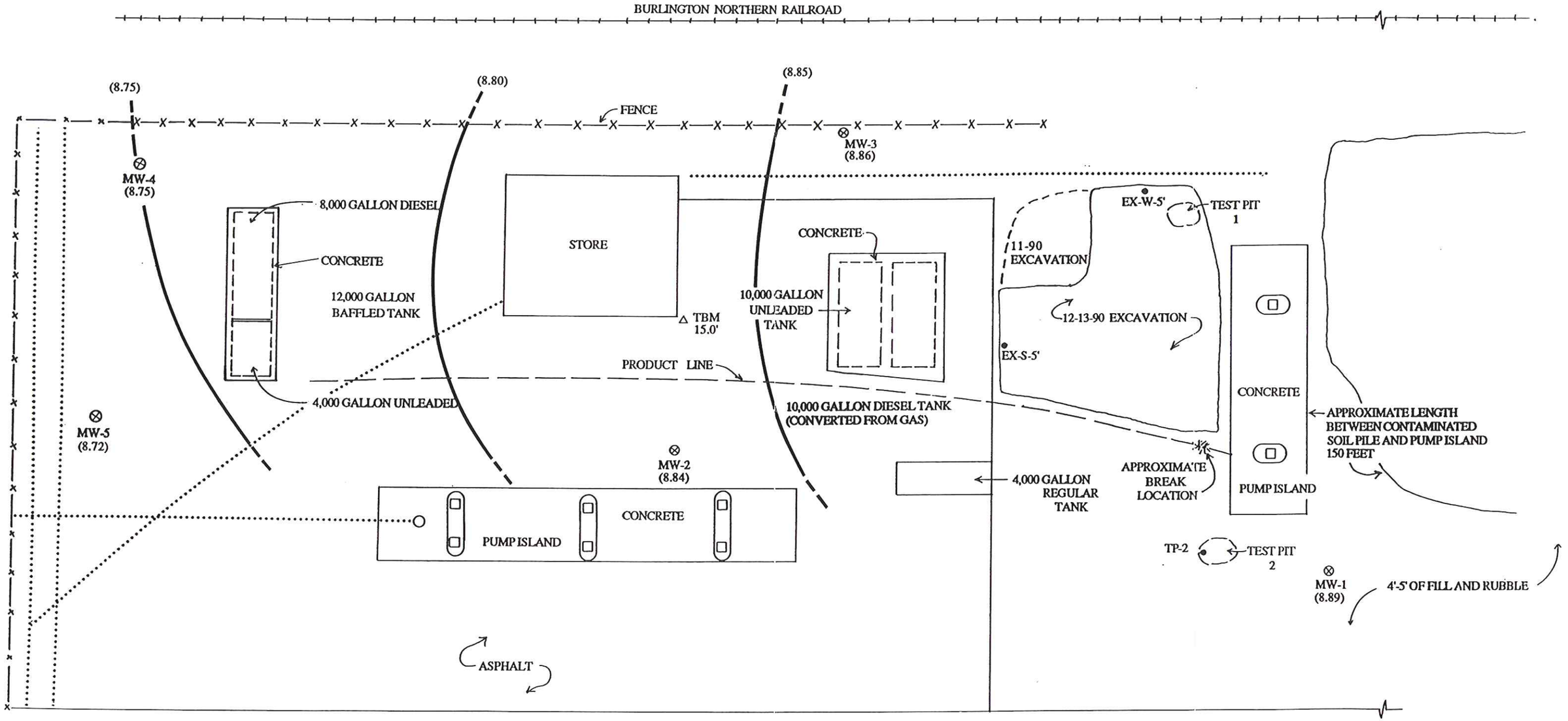
1.1 SITE DESCRIPTION

The legal description of the site is the SW¼ of the NE¼ of Section 11, T17N, R18E.

The site covers approximately 1.5 acres and includes five pump islands and a store (Figure 1). The northern two thirds of the site had been leveled using three to four feet of fill taken from the city landfill. The southern one-third is covered with asphalt except the concrete areas at the pump islands and above the underground storage tanks (USTs). The site is bounded on the west by Burlington Northern Railroad tracks and on the east by Canyon Road. A gasoline station is located to the south and an open field is located to the north.

The USTs present at the site include a 4,000-gallon leaded gasoline tank, a 10,000-gallon unleaded gasoline tank, a 10,000-gallon diesel tank (converted from gasoline), and a 12,000-gallon baffled tank containing 8,000-gallons diesel and 4,000-gallons unleaded gasoline. The two 10,000- and 4,000-gallon tanks were estimated to be greater than 20 years old. The 12,000-gallon tank is less than one year old. A release of diesel was reported after free product was observed on the groundwater in an excavation north of the 10,000-gallon diesel tank. Subsequently, a leak in the product line near the northern pump island was located and repaired.

BIG B MINI-MART
FIGURE 1
SITE PLAN



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2.0 OBJECTIVES AND SCOPES OF WORK

2.1 SOIL EXCAVATION

The objective of the soil excavation was to:

- Excavate petroleum-affected soil in the vicinity of the broken product line.

SEACOR's scope of work included the following tasks:

- Excavate all apparent petroleum-affected soil in the vicinity of the broken product line;
- Monitor the excavated soil for volatile organic vapors with a photoionization detector (PID) until the screening method suggested that vapor concentrations are at or below background levels;
- Collect soil samples from the excavation sidewalls and bottom; and
- Submit selected soil samples to an analytical laboratory for chemical analysis of hydrocarbons.

2.2 GROUNDWATER INVESTIGATION

SEACOR conducted the groundwater investigation in two phases. The objective of the initial phase of the groundwater investigation was to:

- Assess the impact of petroleum-hydrocarbons on the uppermost aquifer zone beneath the site; and
- Assess the groundwater flow direction of the uppermost aquifer zone beneath the site.

SEACOR's scope of work included the following tasks:

- Drill and sample three soil borings to a depth of 15 feet;
- Convert each boring into a groundwater monitoring well in accordance with Washington Administrative Code (WAC) 173-160;
- Survey, develop and sample each groundwater monitoring well;
- Submit groundwater and selected soil samples to an analytical laboratory for chemical analysis; and
- Evaluate the data and make appropriate recommendations.

The objective of the second phase of the groundwater investigation was to:

- Further assess the on-site extent of petroleum-hydrocarbons in groundwater in the downgradient direction beneath the southern boundary of the property; and
- Verify the concentrations of petroleum-hydrocarbons in monitoring wells MW-2 and MW-3.

SEACOR's scope of work included the following tasks:

- Drill and sample two soil borings to a depth of 15 feet;
- Convert each boring into a groundwater monitoring well in accordance with Washington Administration Code (WAC) 173-160;
- Survey, develop and sample these groundwater monitoring wells;
- Conduct a second round of sampling on groundwater monitoring wells MW-2 and MW-3;
- Submit groundwater and selected soil samples to an analytical laboratory for chemical analysis; and
- Evaluate the data and prepare this report documenting our work and summarizing our findings.

3.0 SOIL EXCAVATION

On December 13, 1990, removal of the petroleum-affected soil began and continued through December 14, 1990. Mr. Singh contracted directly with Mike Stougard to remove the petroleum-affected soil and backfill the excavation. In an effort to determine of the extent of petroleum contamination in the subsurface material, one test pit (TP-1) was excavated approximately 50 feet west of the broken product line and one test pit (TP-2) was excavated approximately 20 feet east of the broken product line (Figure 1).

In TP-1 groundwater was encountered at six feet. A sheen was immediately visible on the water. After several minutes, free product had accumulated on the water surface. Soil removed from the test pit was screened using an HNU Systems, Inc. PID (Model PI-101) to assess whether to not elevated levels of petroleum hydrocarbons were present. The soil was evaluated by holding the instrument probe near the stockpiled soil in order to analyze free vapors, and by collecting soil samples in plastic bags and analyzing headspace vapors. Dark gray, discolored soil was encountered from 0.5 to 6.0 feet and headspace measurements taken from soil collected at 1.0 and 5.0 feet were in excess of 100 parts per million (ppm).

In TP-2, groundwater was encountered at 5.5 feet. From zero to four feet, a brown sandy gravel was present. Gray discolored soil was evident from four to six feet. A sample (TP-2) collected from this material at 4.5 feet had a slight petroleum odor and a headspace reading less than 10 ppm. After water had accumulated in the test pit a sheen was visible on the surface.

The excavation began at TP-1, but was limited on the south and north by the 10,000-gallon diesel tank and pump island respectively and on the west by underground utilities. The excavation extended eastward up to the product line. In the southwest corner of the excavation sediment which was used as backfill for a previous excavation was encountered. Field observations of this material indicated that it had not been affected by petroleum compounds and, therefore, was not excavated. Approximately 420 cubic yards of apparent petroleum affected soil was removed by excavation. This material was placed on plastic at the north end of the site. During excavation, dark brown product was entering the water in the excavation from the north and south sides. The free product which had accumulated on the water surface was pumped out and removed by Mr. Stougard. Soil samples EX-S-5 and EX-W-5 were collected at five-foot depths from the south and west side walls, respectively. Soil samples were collected from the backhoe bucket or directly from the excavation sidewalls and bottom, if the excavation was safely accessible. After the excavation was sampled, it was backfilled using clean fill hauled to the site.

All soil sampling was conducted in accordance with the Washington State Department of Ecology's (Ecology's) draft "Policies and Procedures for Underground Storage Tank Removal" dated August 1, 1989. Soil samples were collected using a clean, stainless steel scoop and were contained in clean glass jars. The jars were filled with soil to minimize headspace and sealed with a Teflon-lined lid. The sample jars were then labeled and placed on ice in a cooler. Before collection of each sample, the stainless steel scoop was cleaned in a solution of Liqui-Nox detergent and water. The scoop was then rinsed with tap water, and rinsed a second time with deionized water. This rigorous cleaning of the scoop was performed to insure that there was no cross-contamination during sampling.

4.0 INITIAL GROUNDWATER INVESTIGATION

To assess the impact of hydrocarbons in groundwater and assess the direction of groundwater movement beneath the site, three monitor wells were installed on December 14, 1990. SEACOR contracted directly with Environmental West Exploration, Inc. to drill and install the monitor wells.

Typically, in cases where a lack of groundwater data (i.e., depth and direction of flow) exists, flow direction can be estimated by examination of the surface topography. Groundwater typically flows from the recharge areas of higher elevation and discharges into lower-lying areas (such as streams and lakes). It is believed that groundwater beneath the site moves in a southwesterly direction, towards the Yakima River. Based on this assumption, one well (MW-3) was placed approximately 90 feet southwest of the release location (Figure 1). MW-3 is also west of the tank locations. This well is likely to be downgradient of the areas where hydrocarbon releases have been identified. Another well (MW-1) was placed approximately 40 feet northwest of the release location, in the area likely to be upgradient of the identified hydrocarbon releases at the site. The third well (MW-2) was placed between the store and pump islands to form a triangle so that groundwater movement could be assessed.

4.1 DRILLING AND SAMPLING TECHNIQUES AND PROCEDURES

Soil samples for chemical analyses and lithologic description were collected using a hollow-stem auger with split-spoon samplers. Prior to entering the site, all drilling equipment was steam-cleaned to remove oils, chemicals, soils and other debris. Additional steam-cleaning was performed after each hole was completed to prevent cross-contamination between borings. All soil samples collected during the investigation were taken from in the split spoon sampler with a clean stainless steel scoop and were contained in precleaned glass jars with teflon-lined caps. Prior to the collection of each sample, the sampling tubes and steel scoop were washed in an aqueous solution of Liqui-Nox detergent, rinsed in tap water and rinsed a second time in distilled, deionized water. Soil samples were labeled and stored in a cooler on ice pending delivery under chain-of-custody to an analytical laboratory for testing.

During sampling a calibrated PID was used to semi-quantitatively determine the total concentration of volatile organic compounds in the soils.

Soil samples were collected at five-foot intervals using an 18-inch split-spoon drive sampler in a hollow-stem auger flight. The sampler was lowered into the hole on a wire line down-hole hammer, then driven 18 inches ahead of the auger flight using a 140-pound drop hammer with a 30-inch fall. The number of blows required to drive the sampler over six-inch increments was recorded. The sampler was then removed from the boring and a sample was collected and lithology recorded.

Lithologic logging of all boreholes was performed by the on-site geologist based upon examination of split-spoon samples (when they were taken) and cuttings brought to the surface during drilling. The boring log for each borehole includes the location of the borehole, the name of the geologist preparing the log, the name of the drilling contractor, and the type of equipment used. Descriptions of unconsolidated sediment and soil samples include preliminary grain-size classification (based on ASTM Unified Soil Classification), color, consistency, lithology, odor (if present) and degree of

moisture. In the intervals where a split-spoon sample was taken, the blow count for the sample is included on the log. Boring logs are presented in Appendix A.

4.2 MONITOR WELL INSTALLATION

The monitoring wells were constructed of two-inch OD, flush threaded, schedule 40 PVC blank casing and 0.010-inch machine slotted screen. The wells were screened from fourteen to four feet. The annular space between the well screen and borehole was packed with a clean graded sand from the bottom of the borehole to approximately one foot above the top of the screened casing. A two-foot bentonite seal was placed above the sand pack and the remainder filled with cement. The well head was protected by installing an at-grade, watertight, traffic-rated road box.

4.3 MONITOR WELL DEVELOPMENT AND SAMPLING

Each well was developed using appropriate technologies to remove sediment and enhance communication with the water boring zone.

The top of the casing elevation for each well was surveyed relative to an on-site datum at the northeast corner of the store, assumed elevation equal to 15 feet. Prior to sampling, the depth to water in each well was measured using a sounding device. The total depth of each well was also measured and a casing volume for each was calculated. At least three casing volumes were purged from each well then water samples were collected. The water samples were contained in one liter jars and 40 ml VOA vials, labeled, and placed on ice in a cooler pending delivery, under chain-of-custody to an analytical laboratory. Sampling data sheets and survey records are presented in Appendix A.

5.0 SECONDARY GROUNDWATER INVESTIGATION

Based on the analytical results of groundwater samples collected from MW-2 and MW-3 and the groundwater flow direction beneath the site, SEACOR proposed installing two additional monitoring wells at the downgradient site boundary.

To assess the on site extent of petroleum-hydrocarbons in groundwater in the downgradient direction beneath the southern boundary of the property, two additional monitor wells (MW-4 and MW-5) were installed on March 15, 1991. SEACOR contracted directly with Pacific Testing Laboratories to drill and install the monitor wells. MW-4 was placed approximately 25 feet from the southwest corner of the property. MW-5 was placed approximately 15 feet inside the southern boundary of the property (Figure 1).

5.1 DRILLING AND SAMPLING TECHNIQUE AND PROCEDURES

The procedures used for drilling and sampling were the same as those used in Section 4.1.

5.2 MONITOR WELL INSTALLATION

The monitoring wells were constructed of two-inch O.D., flush threaded, schedule 40 PVC blank casing and 0.020-inch machine slotted screen. The wells were screened from 15 to five feet. The annular space between the well screen and borehole was packed with a clean graded sand from the bottom of the borehole to approximately two feet above the top of the screened casing. A two-foot bentonite seal was placed above the sand pack and the remainder filled with cement. The well head was protected by installing an at-grade, water tight, traffic-rated road box.

5.3 MONITOR WELL DEVELOPMENT AND SAMPLING

The procedures used for development and sampling of MW-4 and MW-5 were the same as those used in Section 4.3.

A second round of groundwater samples were also collected from MW-2 and MW-3 using the above procedures. Sampling data sheets and survey records are presented in Appendix A.

6.0 LABORATORY ANALYSIS

All samples for chemical analysis were submitted to North Creek Analytical in Bothell, Washington under chain-of-custody protocol. All samples were stored in containers, handled and analyzed in accordance with accepted EPA protocol and within EPA-specified holding times. Samples containers were clearly labeled with tags, securely fixed to the sample containers, denoting the job name and number, sample number and location, date, time and sampler name.

6.1 SOIL SAMPLES

Soil samples from the excavation sidewalls and TP-2 were analyzed for total petroleum hydrocarbons (TPH) as diesel using EPA Method 8015 modified. A hydrocarbon identification analysis was also run on the sample from the south wall of the excavation. Soil samples from the unsaturated zones in monitor wells two, four and five were also submitted for chemical analysis. The sample from MW-4 at four feet was analyzed for TPH as diesel using EPA Method 8015 modified. The samples from MW-3 at five feet and MW-5 at four feet were analyzed for TPH as gasoline and benzene, toluene, ethyl benzene and xylenes (BTEX) using EPA Methods 8015 modified and 8020, respectively. Soil sample laboratory results are summarized in Table 1. Laboratory results and chain-of-custody forms are provided in Appendix B.

6.2 GROUNDWATER SAMPLES

Groundwater samples collected from monitor wells MW-1, MW-2 and MW-3 during the initial groundwater investigation were analyzed for TPH as diesel using EPA Method 8015 modified. The sample from MW-3 was also analyzed for TPH as gasoline and BTEX using EPA Methods 8015 modified and 8020, respectively. A hydrocarbon identification analysis was run on the sample from MW-2.

Groundwater samples collected from monitor wells MW-2, MW-3, MW-4 and MW-5 during the secondary groundwater investigation were analyzed for TPH as diesel and gas and BTEX using EPA methods stated above. Groundwater sample laboratory results are summarized in Table 2. Laboratory results and chain-of-custody forms are provided in Appendix B.

TABLE 1
SUMMARY OF ANALYTICAL RESULTS
FOR SOIL SAMPLES IN PARTS PER MILLION (ppm)

Sample I.D.	Sample Location	TPH[1] (as Diesel)	TPH (as Gasoline)	Benzene	Toluene	Ethyl Benzene	Xylenes	Hydrocarbon Identification
TP-2	Test Pit #2 at 5 feet	<1.0	NA[2]	NA	NA	NA	NA	NA
EX-W-5	Excavation west wall at 5 feet	**3,700**	NA	NA	NA	NA	NA	NA
EX-S-5	Excavation south wall at 5 feet	**3,000**	NA	NA	NA	NA	NA	Mix of Gasoline and Diesel Fuels
MW-2-5	Monitor well #2 at 5 feet	NA	**900**	<1.0	<2.0	1.8	**28**	NA
MW-4-4	Monitor well #4 at 4 feet	<10	NA	NA	NA	NA	NA	NA
MW-5-4	Monitor well #5 at 4 feet	NA	<1.0	<0.050	<0.10	<0.10	<0.10	NA
MTCA Cleanup[3] Levels		200	100	0.5	40	20	20	

NOTES:

1 Total Petroleum Hydrocarbons
2 NA = Not Analyzed
3 Cleanup Levels as listed in Model Toxics Control Act Regulation and Proposed Amendments dated February 28, 1991 (Chapter 173-340 WAC).

TABLE 2
SUMMARY OF ANALYTICAL RESULTS
FOR GROUNDWATER SAMPLES IN PARTS PER BILLION (ppb)

Sample I.D.	Sampling Date	TPH[2] (as Diesel)	TPH (as Gasoline)	Benzene	Toluene	Ethyl Benzene	Xylenes	Hydrocarbon Identification
Composite[1] of MW-1-1 & 1-2	12/17/90	<50	NA[3]	NA	NA	NA	NA	NA
Composite of MW-2-1 & 2-2	12/17/90	**5,500**	NA	NA	NA	NA	NA	Mix of Diesel a. Gasoline Fuels
Composite of MW-3-1 & 3-2	12/17/90	**2,100**	**35,000**	<3.0	**1,900**	**460**	**8,300**	NA
MW-2	3/22/91	**160,000**	**21,000**	**580**	**400**	**190**	**2,700**	NA
MW-3	3/22/91	**4,000**	**6,700**	<0.30	<0.30	<0.30	**130**	NA
MW-4	3/22/91	<500	410	**81**	<0.30	<0.30	<0.30	NA
MW-5	3/22/91	**23,000**	**8,400**	**170**	26	**470**	**1,100**	NA
MTCA Cleanup[4] Levels		1,000	1,000	5	40	30	20	

NOTES:

1 Groundwater samples were not composited, this is a laboratory designated ID.
2 Total Petroleum Hydrocarbons
3 NA = Not Analyzed
4 Cleanup Levels as listed in Model Toxics Control Act Regulation and Proposed Amendments dated February 28, 1991 (Chapter 173-340 WAC).

7.0 RESULTS

7.1 SOIL EXCAVATION

Laboratory analysis of the soil samples collected from the west and south sidewalls of the excavation indicate that the concentrations of petroleum hydrocarbons, as diesel, were in excess of the MTCA cleanup levels. A hydrocarbons identification analysis also detected gasoline in the sample from the south wall. Field analysis of soil in the north and east walls showed characteristics of petroleum affected soil. No samples were analyzed from the north and east walls due to plans for continuing the excavation in those directions at a later date. Free petroleum product was present on the water surface in the excavation. Approximately 420 cubic yards of apparent petroleum-affected soil was removed during excavation activities. This material was stockpiled on plastic at the northern end of the site.

Analysis of a soil sample collected from the sidewall in test pit 2 indicated that the concentration of petroleum hydrocarbon, as diesel, was below 1.0 parts per million. TP-2 was located approximately 20 feet east of the leak location.

7.2 MONITOR WELL SOIL SAMPLES

A soil sample collected from the unsaturated zone (at five feet) in MW-2 was analyzed for TPH as gasoline and for BTEX. Analysis indicated that the TPH concentration of 900 ppm and the xylene concentration of 28 ppm were in excess of the MTCA cleanup levels of 100 ppm and 20 ppm, respectively. The other compounds analyzed for were either below the laboratory detection limits or below MTCA cleanup levels. A soil sample collected from MW-4 at four feet was analyzed for TPH as diesel. Laboratory analysis indicated that the concentration was below ten ppm. A soil sample collected from MW-5 at four feet was analyzed for TPH as gasoline and BTEX. Laboratory results were all below the laboratory detection limits.

7.3 MONITOR WELL WATER SAMPLES

Laboratory results for groundwater samples collected on December 17, 1990 from monitor wells MW-1, MW-2 and MW-3 indicated that the concentrations of TPH as diesel were less than 50 parts per billion (ppb) in MW-1. This is below the MTCA cleanup level of 1,000 ppb. The results from MW-2 and MW-3 were in excess of the MTCA cleanup level for TPH as diesel. The sample from MW-3 also had concentrations of TPH as gasoline, toluene, ethylbenzene and xylenes over MTCA cleanup levels. The concentration of benzene in MW-3 was below laboratory detection limits. A hydrocarbon identification analysis run on the sample from MW-2 indicated that gasoline was also present in the groundwater.

Groundwater samples collected on March 22, 1991 from monitor wells MW-2, MW-3, MW-4 and MW-5 were analyzed for TPH as gasoline and diesel and for BTEX. Laboratory analysis indicated that concentrations of TPH and BTEX in MW-2 were in excess of MTCA cleanup levels. The MTCA cleanup levels were also exceeded for TPH and xylenes in MW-3, for benzene in MW-4, and for TPH, benzene, ethyl benzene, and xylenes in MW-5. All other compounds were either below MTCA levels or below laboratory detection limits.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Concentrations of petroleum-hydrocarbons as diesel are present above MTCA clean up levels in the south and west sidewalls of the excavation. Analysis indicated that gasoline is also present in the south sidewall. Field analysis also indicated that the soil in the north and east sidewalls was petroleum-affected. Analysis of the soil sample from MW-2 indicated that petroleum hydrocarbons as gasoline are present above MTCA cleanup levels.

Groundwater samples collected from monitoring wells 2 through 5 indicate that petroleum-hydrocarbon concentrations as gasoline and diesel are present above MTCA cleanup levels in the groundwater beneath the site. The concentrations of petroleum-hydrocarbons as diesel in the groundwater sample collected from MW-1 were below the MTCA cleanup levels.

The presence of gasoline in the soils and groundwater beneath the site indicate that a release of gasoline from underground piping or storage tank(s) has occurred.

Surveying along with groundwater depth measurements indicate that groundwater moves beneath the site in a south southwesterly direction at a gradient of approximately one percent.

Based on these conclusions SEACOR makes the following recommendations:

- An investigation should be conducted to locate and remediate the source of gasoline contamination.
- All petroleum-affected soil above MTCA cleanup levels should be remediated.
- In order to define the extent of groundwater contamination, additional groundwater monitoring wells should be installed off site, to the south and west, and one should be installed east of MW-2.
- A proposal outlining the specifics of further investigations to be conducted at the site will be prepared at Mr. Singh's request.

9.0 LIMITATIONS

The findings and conclusions documented in this report have been prepared for the specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. No warranty, expressed or implied, is made. This report is for the exclusive use of Balbir Singh and their representatives.

A potential always remains for the presence of unknown, unidentified, or unforeseen subsurface contamination. Further evidence against such potential site contamination would require additional subsurface exploration and testing.

If new information is developed in future site work (which may include excavations, borings, or other studies), SEACOR should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

APPENDIX A
BORING LOGS, GROUNDWATER SAMPLING DATA SHEETS, SURVEY DATA SHEETS

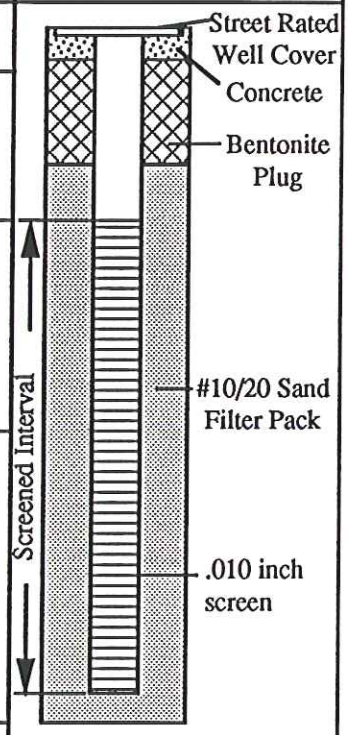
SEACOR

BORING LOG

BORING: MW-1
PAGE 1 of 1

PROJECT SINGH ELLENSBURG 78-001-01 LOCATION SEE SITE MAP
SURFACE ELEVATION _____ CASING TOP ELEVATION 14.20'
START 12/14/90 1030 FINISH 12/14/90 1400
SAMPLER J. GIEBER MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT ENVIRONMENTAL WEST EXPLORATION, MOBILE B-61
COMMENTS 2" X 24" SPLIT SPOON SAMPLING TUBES, 6" I.D. HOLLOW STEM AUGERS

Penetration Results Blows 6"-6"-6"	Sample Depth Interval,feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification
			0	Brown COBBLES, dry	GW
				Dark Brown Gravelly SAND, moist.	SP
15-6-7	no sample recovered		5	Brown-Gray COBBLES, wet to saturated, medium dense.	GW
11-50(4")			10	Gray Sandy GRAVEL, poorly graded, saturated, dense.	GP
2-8-50(2")	no sample recovered		15	Boring completed to 14.5'. Groundwater encountered at 6'. Monitoring well installed to 14'.	
			20		
			25		



Boring Abandonment/ Well Construction Details

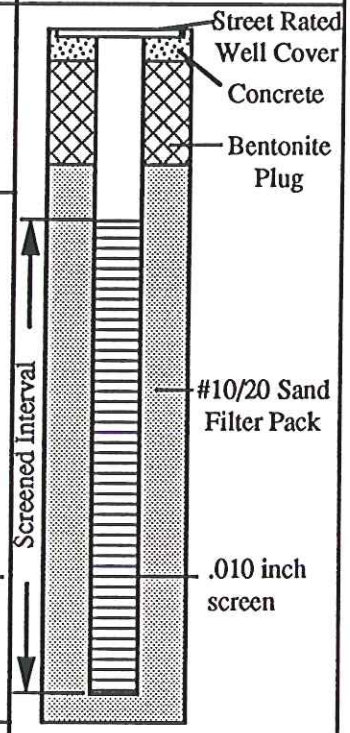
SEACOR

BORING LOG

BORING: MW-2
PAGE 1 of 1

PROJECT SINGH ELLENSBURG 78-001-01 LOCATION SEE SITE MAP
SURFACE ELEVATION _____ CASING TOP ELEVATION 15.00'
START 12/14/90 1030 FINISH 12/14/90 1400
SAMPLER J. GIEBER MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT ENVIRONMENTAL WEST EXPLORATION, MOBILE B-61
COMMENTS 2" X 24" SPLIT SPOON SAMPLING TUBES, 6" I.D. HOLLOW STEM AUGERS

Penetration Results Blows 6"-6"-6"	Sample Depth Interval,feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification
			0	Brown Poorly Graded GRAVEL, very coarse pebbles to small cobbles, dry.	GP
11-21-28		50+	5	Brown Gravelly SAND, poorly graded, moist, medium dense.	SP
				Gray Gravelly SAND, sheen on sample tube, wet to saturated, dense.	
42-50(1")	no sample recovered		10		
				Brown-Gray Small COBBLES, well graded: 2" - 4", dense, hard drilling.	GW
50(1")	no sample recovered		15	Boring completed to 14.5'. Groundwater encountered at 6'. Monitoring well installed to 14'.	
			20		
			25		



Boring Abandonment/ Well Construction Details

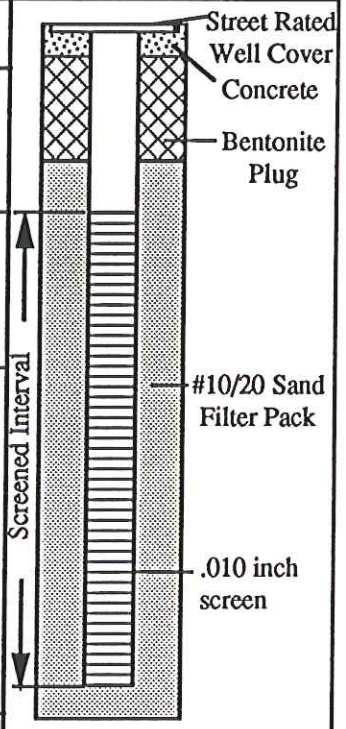
SEACOR

BORING LOG

BORING: MW-3
PAGE 1 of 1

PROJECT SINGH ELLENSBURG 78-001-01 LOCATION SEE SITE MAP
SURFACE ELEVATION _____ CASING TOP ELEVATION 13.85'
START 12/14/90 1030 FINISH 12/14/90 1400
SAMPLER J. GIEBER MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT ENVIRONMENTAL WEST EXPLORATION, MOBILE B-61
COMMENTS 2" X 24" SPLIT SPOON SAMPLING TUBES, 6" I.D. HOLLOW STEM AUGERS

Penetration Results Blows 6"-6"-6"	Sample Depth Interval,feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Boring Abandonment/ Well Construction Details
			0	Brown organic SAND, dry.	OL	
				Dark Brown-Gray Gravelly SAND, moist.	SP	
50(3")	no sample recovered		5	Gray Sandy GRAVEL, poorly graded, sheen on sample tube, saturated, dense.	GP	
6-13-60(4")	no sample recovered		10	Gray COBBLES, well graded: 2" - 4", dense.	GW	
			15	Boring completed to 14.5". Groundwater encountered at 5.5'. Monitoring well installed to 14'.		
			20			
			25			



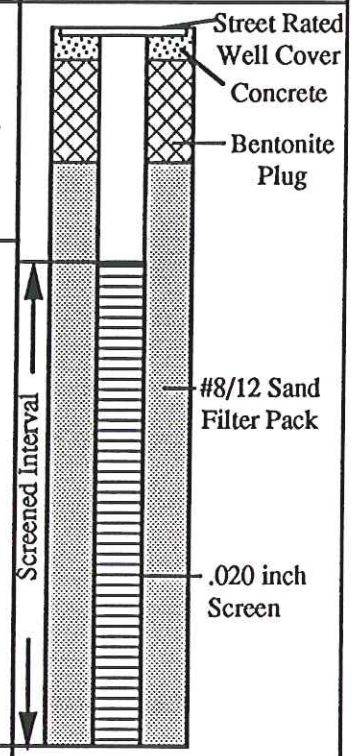
SEACOR

BORING LOG

BORING: MW-4
PAGE 1 of 1

PROJECT SINGH ELLENSBURG 78-001-01 LOCATION SEE SITE MAP
SURFACE ELEVATION _____ CASING TOP ELEVATION 12.45'
START 3/15/91 0800 FINISH 3/15/91 0930
SAMPLER J. GIEBER MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT PACIFIC TESTING LABORATORIES, MOBILE B-65
COMMENTS 2" X 24" SPLIT SPOON SAMPLING TUBES, 6" I.D. HOLLOW STEM AUGERS

Penetration Results Blows 6"-6"-6"	Sample Depth Interval,feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification
			0	Dark Brown Orgainic Sandy SILT, moist.	OL
7-8-5		0	5	Brown Sandy GRAVEL, saturated, loose.	GP
	not sampled		10	Brown Sandy-Silty GRAVEL, wet, with local cobble lenses, dense.	
	not sampled		15	Boring completed to 15.0'. Groundwater encountered at 4.5'. Monitoring well installed to 15.0'.	
			20		
			25		



Boring Abandonment/ Well Construction Details

SEACOR

BORING LOG

BORING: MW-5
PAGE 1 of 1

PROJECT SINGH ELLENSBURG 78-001-01 LOCATION SEE SITE MAP
SURFACE ELEVATION _____ CASING TOP ELEVATION 13.78'
START 3/15/91 1000 FINISH 3/15/91 1200
SAMPLER J. GIEBER MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT PACIFIC TESTING LABORATORIES, MOBILE B-65
COMMENTS 2" X 24" SPLIT SPOON SAMPLING TUBES, 6" I.D. HOLLOW STEM AUGERS

Penetration Results Blows 6"-6"-6"	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Boring Abandonment/ Well Construction Details
			0	Asphalt		Street Rated Well Cover
				COBBLES AND GRAVEL Fill	GW	Concrete
				Gray Silty SAND, moist, medium dense.	SM	Bentonite Plug
4-7-50(0)		0	5	Gray Sandy GRAVEL with moderate cobbles, wet, dense.		
	not sampled		10	Gray COBBLES, well graded: 2" - 4", wet, dense.	GW	#8/12 Sand Filter Pack; .020 inch Screen; Screened Interval
	not sampled		15	(grades larger cobbles)		
				Boring completed to 15.0'. Groundwater encountered at 5.0'. Monitoring well installed to 15'.		
			20			
			25			

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION mw · 1

PROJECT Singh 0:1 EVENT _____ SAMPLER CVD DATE 12/17/90

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Sampled	C 1355		

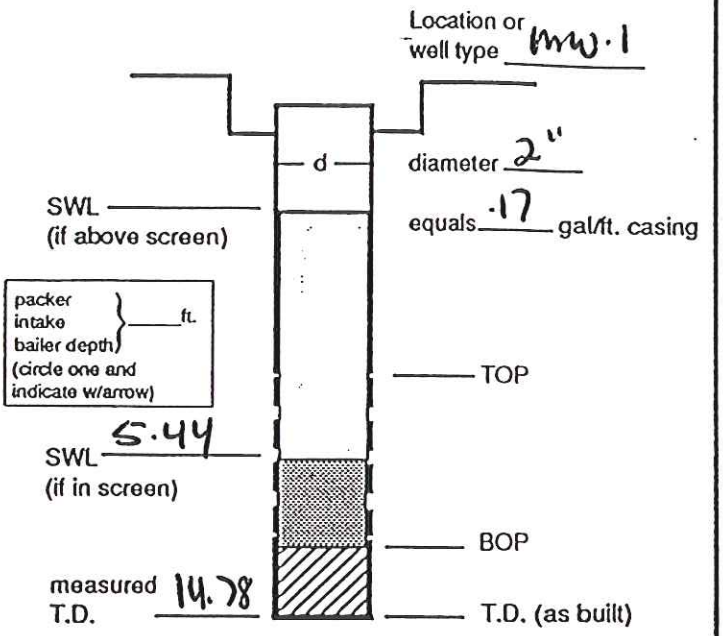
Purge calculation

.17 gal/ft. · 9.34 ft. (SWL to BOP or packer to BOP) = 1.58 gals (one volume) x 3 = 4.76 gals. (purge volume-3 casings)

Head purge calculation (Airlift)

____ gal/ft. · _____ ft. (packer to SWL) = _____ gals.

Well / Hydrologic statistics



Method and Equipment Used:

as mw·2

Event Description:

decon

Actual gallons purged 8

Actual volumes purged 6.06

Well yield ⊕ _____

Additional comments:

no visible sheen, no odor
2 VOA's
1 liter bottle

COC # _____

Sample I.D.	Analysis	Lab
mw·1·1		NC
mw·1·2		NC

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
4.						
5.						

* Take measurement at approximately each casing volume purged

⊕ HY- Minimal W.L. drop

MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or

LY - Able to purge 3 volumes by returning later or next day.

VLY - Minimal recharge - unable to purge 3 volumes.

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-2

PROJECT Singh Oil EVENT _____ SAMPLER CVD DATE 12/17/90

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Sampled @ 12:30			

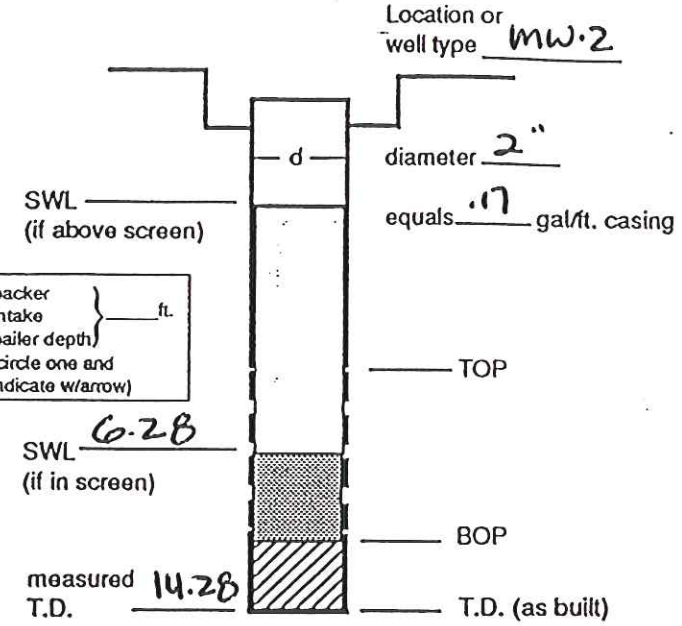
Purge calculation

.17 gal/ft. (SWL to BOP or packer to BOP) · 8 ft. = 1.36 (one volume) gals x 3 = 4.08 (purge volume-3 casings) gals.

Head purge calculation (Airlift)

____ gal/ft. (packer to SWL) · ____ ft. = ____ gals.

Well / Hydrologic statistics



Method and Equipment Used:
Stainless steel bailer
Sounder

Event Description:
decon

Actual gallons purged 8

Actual volumes purged 5.8

Well yield ⊕ _____

COC # _____

Sample I.D.	Analysis	Lab
MW-2-1		N.C.
MW-2-2		N.C.

Additional comments:
Groundwater showed visible sheen
The area was very odiferous (Petro)
2 VOA's
1 liter bottle

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
4.						
5.						

* Take measurement at approximately each

⊕ HY- Minimal W.L. drop

MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or

LY - Able to purge 3 volumes by returning later or next day

VLY - Minimal recharge - unable to purge 3 volumes.

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION mw·3

PROJECT Singh Oil EVENT _____ SAMPLER CUD DATE 12/17/90

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Sampled @ 1320			

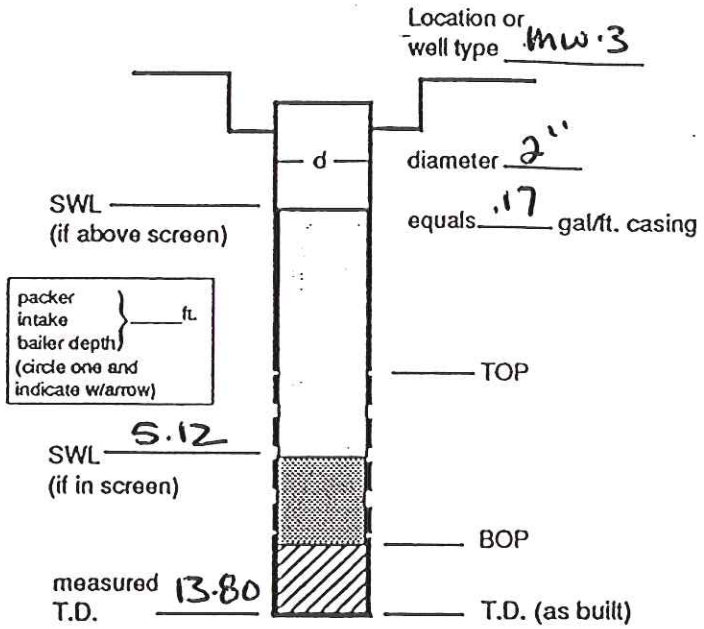
Purge calculation

.17 gal/ft. (SWL to BOP or packer to BOP) · 8.68 ft. = 1.47 gals (one volume) x 3 = 4.42 gals. (purge volume-3 casings)

Head purge calculation (Airlift)

____ gal/ft. (packer to SWL) · ____ ft. = ____ gals.

Well / Hydrologic statistics



Method and Equipment Used:

as mw·2

Event Description:

Slightly visible sheen
no odor

decon

Actual gallons purged 8

Actual volumes purged 5.4

Well yield ⊕ _____

Additional comments:

2 VOA's
1 liter bottle

COC # _____

Sample I.D.	Analysis	Lab
mw·3·1		NC
mw·3·2		NC

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
3.						
4.						
5.						

* Take measurement at approximately each casing volume purged

⊕ ____ HY- Minimal W.L. drop

____ MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or

____ LY - Able to purge 3 volumes by returning later or next day

____ VLY - Minimal recharge - unable to purge 3 volumes.

DRAFT

SHEET 1 OF 1
JOB NO. 00078-001-01
DATE 1/14/91
PROJECT Singh Ellensburg
SUBJECT Survey Data
COMPUTED BY JMG
CHECKED BY

Location	BS	HI	FS	Elevation	Remarks
TBM	5.04	20.04		15.0	
MW-2			5.04	15.0	
MW-3			6.19	13.85'	
MW-1			5.84	14.20'	
move Instrument					
MW-1	5.95	20.15	~~5.95~~		
MW-2			5.15	15.0	
MW-3			6.30	13.85	
TBM			5.15	15.0	

Benchmark: NE corner of store elevation equal to 15.0'

Elevation + BS = HI

DRAFT

SHEET 1 OF 1
JOB NO. 00078-001-01
DATE 3/22/91
COMPUTED BY J. Greber
CHECKED BY

PROJECT Singh Ellensburg
SUBJECT Survey Data

Location	BS	HI	FS	Elevation	Remarks
TBM	4.85	19.85		15.0	
MW-4			7.40	12.45	
MW-5			6.07	13.78	
move instrument					
MW-5	7.07	20.85			
MW-4			8.40	12.45	
TBM			5.86	14.99	

Benchmark: NE corner of store elevation equal to 15.0'

Elevation + BS = HI

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-2

PROJECT Singh Ellensburg EVENT _____ SAMPLER JMG DATE 3/22/91

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1610		
Sampled	1625		

Purge calculation

.17 gal/ft. * 7.84 ft. = 1.33 gals x 3 = 4.0 gals.

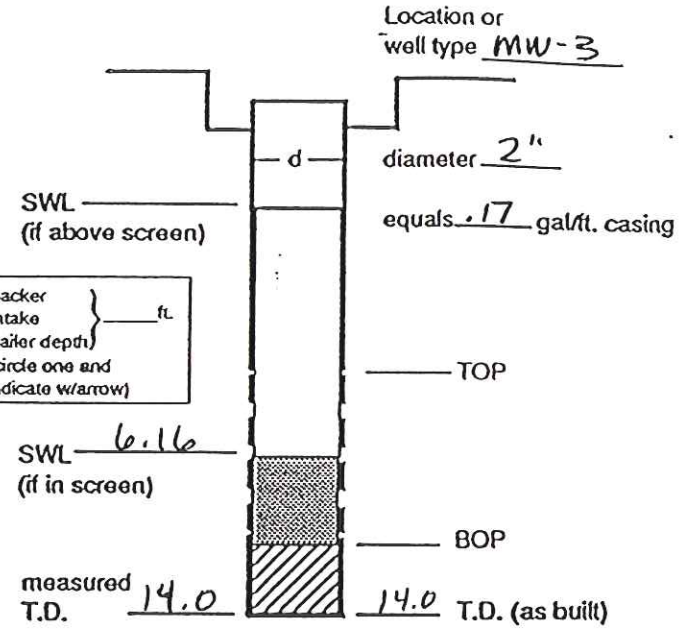
(SWL to BOP or packer to BOP) (one volume) (purge volume-3 casings)

Head purge calculation (Airlift)

___ gal/ft. * _____ ft. = _____ gals.

(packer to SWL)

Well / Hydrologic statistics



Method and Equipment Used:
Disposable polyethylene Bailer
Sounder

Event Description:
Sample in 2-VOAs & 1-liter

Actual gallons purged 4.1

Actual volumes purged 3.07

Well yield ⊕ HY

COC # _____

Sample I.D.	Analysis	Lab
MW-2		N.C.

Additional comments:
Strong sheen on H2O surface, strong petroleum odor. Gray cloudy H2O

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
4.						
5.						

* Take measurement at approximately each

⊕ HY- Minimal W.L. drop ___ MY - WL drop - able to purge 3 volumes during one sitting ___ LY - Able to purge 3 volumes by returning ___ VLY - Minimal recharge - unable to purge

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-3

PROJECT Smyth Ellensburg EVENT _____ SAMPLER JMb DATE 3/22/91

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Sampled			

Purge calculation

.17 gal/ft. * 9.39 ft. = 1.59 gals x 3 = 4.79 gals.

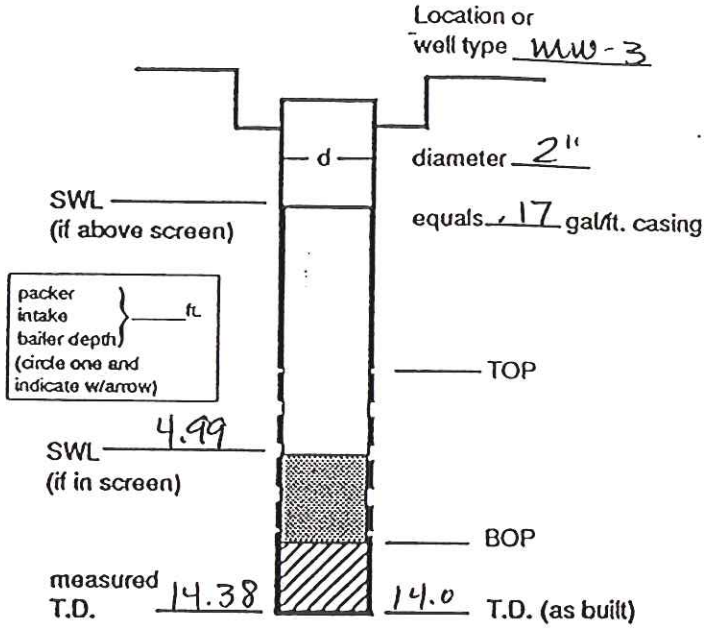
(SWL to BOP or packer to BOP) (one volume) (purge volume-3 casings)

Head purge calculation (Airlift)

____ gal/ft. * ____ ft. = ____ gals.

(packer to SWL)

Well / Hydrologic statistics



Method and Equipment Used:
Disposable Polyethylene bailer
Sonnder

Event Description:
Sample to 2-VOAs + 1-liter

Actual gallons purged 7.0

Actual volumes purged 4.40

Well yield ⊕ HY

COC # _____

Sample I.D.	Analysis	Lab
MW-3		N.C.

Additional comments: Gray tinted H2O with a slight petroleum odor and slight sheen.

Gallons purged *	TEMP °C/°F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
3.						
4.						
5.						

* Take measurement at approximately each

⊕ HY- Minimal W.L. drop

MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate

LY - Able to purge 3 volumes by returning later

VLY - Minimal recharge - unable to purge 3 volumes

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-4

PROJECT Smyth Ellensburg EVENT _____ SAMPLER JMG/GE DATE 3/22/91

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1530 - 1545	(6 gallons)	
	1615	} 5 gallons	
Sampled	1630		

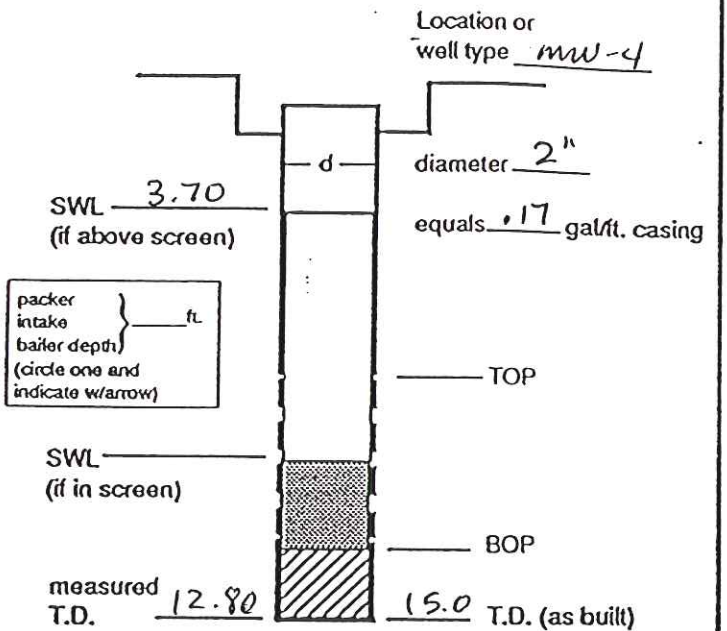
Purge calculation

.17 gal/ft. * 9.1 ft. = 1.5 gals x 3 = 4.6 gals.
(SWL to BOP or packer to BOP) (one volume) (purge volume- 3 casings)

Head purge calculation (Airlift)

___ gal/ft. * _____ ft. = _____ gals.
(packer to SWL)

Well / Hydrologic statistics



Method and Equipment Used:
Stainless Steel Bailer
Sounder

Event Description:
Sample in 2-VOAs + 1-liter

Actual gallons purged 11.
Actual volumes purged 7.33
Well yield ⊕ LY

COC # _____

Sample I.D.	Analysis	Lab
MW-4		N.C

Additional comments: Approx. 2 feet of bentonite in bottom of well, Brown turbid H2O, odiferous

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
4.						
5.						

* Take measurement at approximately each

⊕ ___ HY- Minimal W.L drop ___ MY - WL drop - able to purge 3 volumes during one sitting ___ LY - Able to purge 3 volumes by returning ___ VLY - Minimal recharge - unable to purge

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-5

PROJECT Singh Ellensburg EVENT _____ SAMPLER JMG/GE DATE 3/22/91

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1630		
Sampled	1655		

Purge calculation

.17 gal/ft. * 6.94 ft. = 1.18 gals x 3 = 3.54 gals.

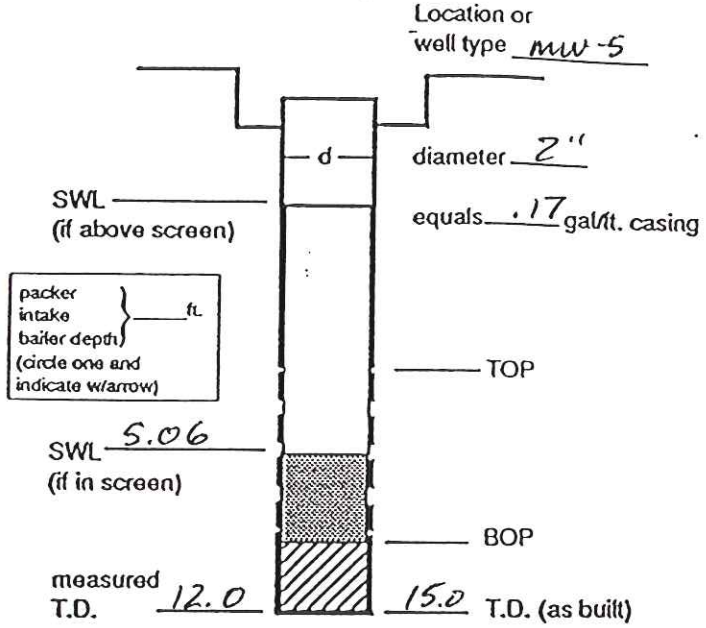
(SWL to BOP or packer to BOP) (one volume) (purge volume-3 casings)

Head purge calculation (Airlift)

___ gal/ft. * _____ ft. = _____ gals.

(packer to SWL)

Well / Hydrologic statistics



Method and Equipment Used:
Teflon Bailer
Sounder

Event Description:
Sample for 2-VOAs + Hardness

Actual gallons purged 7.0

Actual volumes purged 5.93

Well yield ⊕ MY

COC # _____

Sample I.D.	Analysis	Lab
MW-5		N.C.

Additional comments: Bentonite to bottom of well
Brown very turbid H2O

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2						
4.						
5.						

* Take measurement at approximately each

⊕ ___ HY- Minimal W.L. drop ___ MY - WL drop - able to purge 3 volumes during one sitting ___ LY - Able to purge 3 volumes by returning ___ VLY - Minimal recharge - unable to purge

APPENDIX B
LABORATORY REPORTS AND CHAIN-OF-CUSTODY RECORDS

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	See Below
330 112th Avenue N.E., #104	Matrix Descript:	Soil	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 3550/8015	Extracted:	Jan 2, 1991
Attention: Larry Fletcher	First Sample #:	012-0447	Analyzed:	Jan 2, 1991
			Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)	F. Print Ident.
012-0447	EX-W-5 12/14/90	3,700	
012-0448	TP-2 12/13/90	N.D.	
012-0449	ES-S-5 12/14/90	3,000	Mix of gasoline and diesel fuels

Detection Limits:	**1.0**

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	See Below
330 112th Avenue N.E., #104	Matrix Descript:	Soil	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Dec 26, 1990
Attention: Larry Fletcher	First Sample #:	012-0446	Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
012-0446	MW-2-5 12/14/90	900	N.D.	N.D.	1.8	28
Detection Limits:		20	1.0	2.0	2.0	2.0

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

)RTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	Dec 17, 1990
330 112th Avenue N.E., #104	Matrix Descript:	Water	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 3510/8015	Extracted:	Jan 2, 1991
Attention: Larry Fletcher	First Sample #:	012-0450	Analyzed:	Jan 2, 1991
			Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	Extractable Hydrocarbons µg/L (ppb)	F. Print Ident.
012-0450	Comp of MW1-1&1-2	N.D.	
012-0451	Comp of MW2-1&2-2	5,500	Mix of gasoline & diesel Fuels
012-0452	Comp of MW3-1&3-2	2,100	

Detection Limits:	**50**

Extractable (high boiling point) Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	Dec 17, 1990
330 112th Avenue N.E., #104	Sample Descript.:	Water, Comp. of MW3-1&3-2	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 5030/ 8015/8020	Analyzed:	Dec 26, 1990
Attention: Larry Fletcher	Lab Number:	012-0452	Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Purgeable Hydrocarbons	300	35,000
Benzene	3.0	N.D.
Toluene	3.0	1,900
Ethyl Benzene	3.0	460
Xylenes	3.0	8,300

Purgeable (low to medium boiling point) Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Singh Ellensburg	Sampled:	Mar 15, 1991
330 112th Avenue N.E., #104	Matrix Descript:	Soil	Received:	Mar 19, 1991
Bellevue, WA 98004	Analysis Method:	EPA 3550/8015	Extracted:	Mar 21, 1991
Attention: Larry Fletcher	First Sample #:	103-0519	Analyzed:	Mar 21, 1991
			Reported:	Apr 1, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	Extractable Hydrocarbons mg/kg (ppm)
103-0519	MW-4-4'	N.D.

Detection Limits:	10

Extractable (high boiling point) Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Please Note:
This sample appears to contain heavy non-chromatographable hydrocarbons. Quantitation by EPA 418.1 Modified is recommended.

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Singh Ellensburg	Sampled:	Mar 15, 1991
330 112th Avenue N.E., #104	Sample Descript.:	Soil, MW-5-4'	Received:	Mar 19, 1991
Bellevue, WA 98004	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Mar 29, 1991
Attention: Larry Fletcher	Lab Number:	103-0520	Reported:	Apr 1, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Purgeable Hydrocarbons	1.0	N.D.
Benzene	0.050	N.D.
Toluene	0.10	N.D.
Ethyl Benzene	0.10	N.D.
Xylenes	0.10	N.D.

Purgeable (low to medium boiling point) Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

ORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR
330 112th Avenue N.E., #104
Bellevue, WA 98004
Attention: Larry Fletcher

Client Project ID: Singh Ellensburg
Sample Matrix: Soil
QC Sample Group: 103-0519 to -0520

Reported: Apr 1, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel Fuel	Benzene	Toluene	Ethyl Benzene	Xylenes
EPA Method:	8015	8020	8020	8020	8020
Analyst:	S. Kouri	B. Fletcher	B. Fletcher	B. Fletcher	B. Fletcher
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Mar 21, 1991	Mar 29, 1991			
QC Sample #:	BLK032191	103-0477			
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	54	0.50	0.50	0.50	1.50
Conc. Matrix Spike:	59	0.41	0.46	0.50	1.47
Matrix Spike % Recovery:	109	82	92	100	98
Conc. Matrix Spike Dup.:	87	0.41	0.49	0.50	1.51
Matrix Spike Duplicate % Recovery:	161	82	98	100	101
Relative % Difference:	38	0	6.3	0	2.7

)RTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Singh Ellensburg, 00078-001-01	Sampled:	Mar 22, 1991
330 112th Avenue N.E., #104	Matrix Descript:	Water	Received:	Mar 25, 1991
Bellevue, WA 98004	Analysis Method:	EPA 3510/8015	Extracted:	Mar 29, 1991
Attention: Larry Fletcher	First Sample #:	103-0744	Analyzed:	Apr 4, 1991
			Reported:	Apr 8, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	Extractable Hydrocarbons mg/L (ppm)
103-0744	MW-4	N.D.
103-0745	MW-5	23
103-0746	MW-2	160
103-0747	MW-3	4.0

Note: Results reported in parts per million the conversion to parts per billion = times by 1000.
JMG 5/21/91

Detection Limits:	0.50

Extractable (high boiling point) Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Singh Ellensburg, 00078-001-01	Sampled:	Mar 22, 1991
330 112th Avenue N.E., #104	Matrix Descript:	Water	Received:	Mar 25, 1991
Bellevue, WA 98004	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Apr 5, 1991
Attention: Larry Fletcher	First Sample #:	103-0744	Reported:	Apr 8, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Purgeable Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
103-0744	MW-4	410	81	N.D.	N.D.	N.D.
103-0745	MW-5	8,400	170	26	470	1,100
103-0746	MW-2	21,000	580	400	190	2,700
103-0747	MW-3	6,700	N.D.	N.D.	N.D.	130
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

Purgeable (low to medium boiling point) Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

ORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Please Note:
The detection limit for Benzene, Toluene and Ethyl Benzene on Sample #103-0747 has been raised to 3.0 µg/L.

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR
330 112th Avenue N.E., #104
Bellevue, WA 98004
Attention: Larry Fletcher

Client Project ID: Singh Ellensburg, 00078-001-01
Sample Matrix: Water
QC Sample Group: 103-0744 to -0747

Reported: Apr 8, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes	Diesel Fuel
EPA Method:	8020	8020	8020	8020	8015
Analyst:	B. Fletcher	B. Fletcher	B. Fletcher	B. Fletcher	S. Kouri
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Apr 5, 1991	Apr 5, 1991	Apr 5, 1991	Apr 5, 1991	Mar 21, 1991
QC Sample #:	103-0751	103-0751	103-0751	103-0751	BLK032191
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	5.0	5.0	5.0	15.0	1,630
Conc. Matrix Spike:	4.6	5.2	5.4	17.4	2,820
Matrix Spike % Recovery:	92	104	108	116	170
Conc. Matrix Spike Dup.:	4.6	4.8	5.0	15.2	2,803
Matrix Spike Duplicate % Recovery:	92	96	100	101	171
Relative % Difference:	0	8.0	7.7	13	0.5

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEACOR

CHAIN-OF-CUSTODY RECORD

SEACOR 330 112th Ave. NE, #104 Bellevue, WA 98004	PHONE: (206) 646-0280	PROJECT MANAGER: Larry Fletcher	PROJECT NUMBER/NAME: Singh Ellensburg
SAMPLER: (Sign and print name) John M Gieber John M. Gieber	LABORATORY: North Creek	LABORATORY ID NUMBER:	

SAMPLE ID NUMBER	DATE	TIME	SAMPLE TYPE	STATION/LOCATION	ANALYSIS REQUESTED/REMARKS
MW-2-5 ~~Rinsate~~	12/14/90	1240	Soil	Monitor well 2 5 feet	TPH (gas) BTEX (8020)
EX-W-5'	12/14/90	1540	"	West Wall 5'	TPH (diesel) 8015
TP-2	12/13/90	0950		Test Pit #2 4.5'	TPH (as diesel) 8015
EX-S-5'	12/14/90	1430		South Wall 5'	TPH (Fingerprint)

RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature) John M Gieber	DATE: TIME: 12/14/90 10:00	RECIEVED FOR LABORATORY BY: (Signature) Ellen Emmett			REMARKS:

SEACOR

CHAIN-OF-CUSTODY RECORD

SEACOR 330 112th Ave. NE, #104 Bellevue, WA 98004	PHONE: (206) 646-0280	PROJECT MANAGER: Larry Fletcher	PROJECT NUMBER/NAME: Singh ~~est~~ Ellensburg
SAMPLER: (Sign and print name) Cornelis Van Dijk	LABORATORY: North Creek		LABORATORY ID NUMBER:

SAMPLE ID NUMBER	DATE	TIME	SAMPLE TYPE	STATION/LOCATION	ANALYSIS REQUESTED/REMARKS
mw-1-1	12/17/90	1355	H_2O	mw-1	TPH (Diesel) EPA 8015
mw-1-2		↓		↓	
mw-2-1		1230		mw-2	TPH (Fryer front)
mw-2-2		↓		↓	
mw-3-1		1320		mw-3	TPH (diesel + gas) BTEX
mw-3-2	↓	↓	↓	↓	

RELINQUISHED BY: (Signature)	DATE: 12/17 TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature) John M. Guler	DATE: 12/18 TIME: 9:55	RECIEVED FOR LABORATORY BY: (Signature)			REMARKS:

SEACOR

CHAIN-OF-CUSTODY RECORD

0302

SEACOR 330 112th Ave. NE, #104 Bellevue, WA 98004	PHONE: (206) 646-0280	PROJECT MANAGER: Lacy Fletcher	PROJECT NUMBER/NAME: Smash Ellensburg
SAMPLER: (Sign and print name) John M. Green John M Green	LABORATORY: North Creek	LABORATORY ID NUMBER:	

SAMPLE ID NUMBER	DATE	TIME	SAMPLE TYPE	STATION/LOCATION	ANALYSIS REQUESTED/REMARKS
MW-4-4'	3/15/91	1800	soil	Junior well #4 (@ 4')	TPH (as diesel) 8015
MW-5-4'	"	1015	"	" #5 (@ 4')	TPH (as gas) 8015 BTEX 8020

RELINQUISHED BY: (Signature)	DATE: 3/19 TIME: 930	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: 3/19/91 TIME: 1300	RECIEVED BY: Signature
John M. Green		Carl Van Dyke	Carl Van Dyke		
RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED FOR LABORATORY BY: (Signature)			REMARKS: 2 wk TAT

SEACOR

CHAIN-OF-CUSTODY RECORD

0307

SEACOR 330 112th Ave. NE, #104 Bellevue, WA 98004	PHONE: (206) 646-0280	PROJECT MANAGER: LF	PROJECT NUMBER/NAME: 00078-001-01 Sixth Ellensburg
SAMPLER: (Sign and print name) George Ehlen, George Ehlen	LABORATORY: Northcreek	LABORATORY ID NUMBER:	

SAMPLE ID NUMBER	DATE	TIME	SAMPLE TYPE	STATION/LOCATION	ANALYSIS REQUESTED/REMARKS
MW-4	3/22/91		H_2O 1 VOA		TPH as gas and diesel 8015 BTEX 8020
MW-5	3/22/91		H_2O 1 VOA		" "
MW-2	3/22/91	4:30	H_2O 1 VOA		" "
MW-3	3/22/91		H_2O 1 VOA		" "

RELINQUISHED BY: (Signature) George Ehlen	DATE: 3/25/91 TIME: 1:35	RECIEVED BY: (Signature) John M. Gick	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature) John M. Gick	DATE: 3/25 TIME: 5:13	RECIEVED FOR LABORATORY BY: (Signature)			REMARKS:

SEACOR

January 23, 1991

Washington State Department of Ecology
ATTN: Mr. Tony Valero
3601 W. Washington
Yakima, Washington 98903-1164

Dear Mr. Valero:

In reference to our telephone conversation on January 22, 1991 concerning funds available for clean up of the Big "B" Mini Mart (Exxon) in Ellensburg, Washington 98926, the datum we have acquired to date is presented in the following letter report and attachments.

Analysis of soil and water samples taken at the site indicate that petroleum hydrocarbon concentrations exceed the draft clean up levels at several locations on the site. Proposed cleanup standards are presented in Tables 1 and 2. Figure 1 is a site plan which shows the approximate location of the excavation sampling and three monitor wells. Copies of laboratory reports and chain-of-custody records are contained in Appendix A. Boring logs and sampling event data sheets are contained in Appendix B. Groundwater was encountered at approximately 6 feet in the excavations at the site.

Soil samples for chemical analysis were collected using appropriate procedures from test pit #2 (TP-2) at 4.5 feet, from monitor well (MW-2) at 5 feet, and from the west (EX-W-5) and south (EX-S-5) walls of the excavation at 5 feet.

Water samples were collected using appropriate technologies, from each of the three monitor wells which were installed at the site.

Although the well survey is incomplete, indications lead us to believe that the groundwater is moving in an south-southwest direction beneath the site.

We are currently planning to install two additional monitor wells south of MW-2 and southwest of the store location.

Sincerely,

John M. Gieber

John M. Gieber
Geologist

Attachments

CC: Balbir Singh

330 112th Northeast
#104
Bellevue, WA 98004
206.646.0280

TABLE 1
PROPOSED CLEANUP STANDARDS FOR PETROLEUM-RELATED COMPOUNDS IN SOIL[1]

Compound	Cleanup Level
TPH[2] (gasoline)	100 ppm[3]
TPH (diesel)	200 ppm
Benzene	.5 ppm
Toluene	40 ppm
Ethyl Benzene	20 ppm
Xylene	20 ppm

NOTE:

1 Cleanup levels as listed in Model Toxics Control Act Cleanup Regulations and Proposed Amendments dated July 2, 1990 (Chapter 173-230)

2 TPH = Total Petroleum Hydrocarbons

3 ppm = Parts Per Million

TABLE 2
PROPOSED CLEANUP STANDARDS FOR PETROLEUM-RELATED COMPOUNDS IN GROUNDWATER[1]

Compound	Cleanup Level
TPH[2]	1,000[3] ppb
Benzene	5 ppb
Toluene	40 ppb
Ethyl Benzene	20 ppb
Xylene	20 ppb

NOTE:

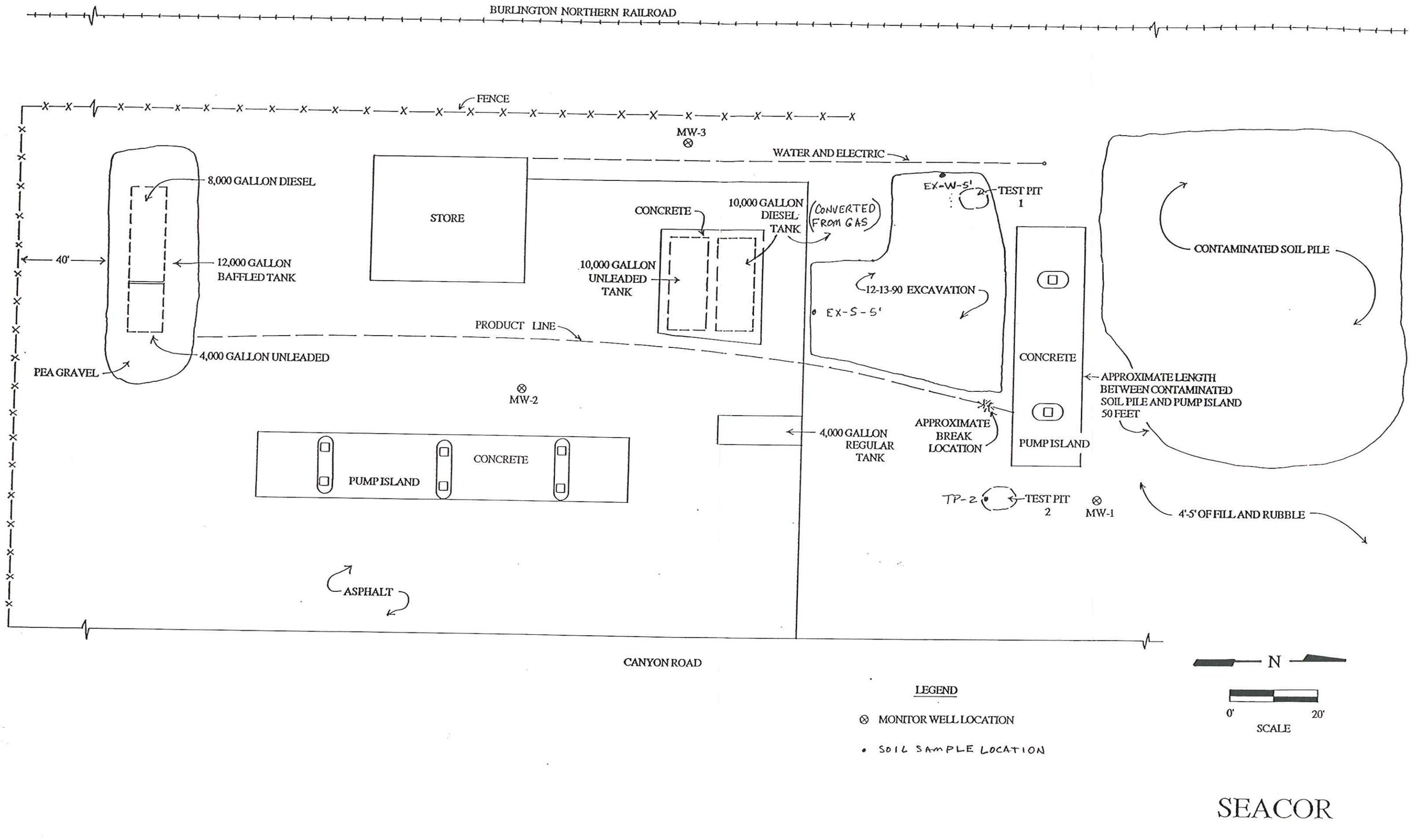
1 Cleanup levels as listed in Model Toxics Control Act Cleanup Regulations and Proposed Amendments dated July 2, 1990 (Chapter 173-230)

2 TPH = Total Petroleum Hydrocarbons

3 ppb= Parts Per Billion

DRAFT

FIGURE 1
SITE PLAN



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APPENDIX A

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	See Below
330 112th Avenue N.E., #104	Matrix Descript:	Soil	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Dec 26, 1990
Attention: Larry Fletcher	First Sample #:	012-0446	Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
012-0446	MW-2-5 12/14/90	900	N.D.	N.D.	1.8	28
Detection Limits:		**20**	**1.0**	**2.0**	**2.0**	**2.0**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	See Below
330 112th Avenue N.E., #104	Matrix Descript:	Soil	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 3550/8015	Extracted:	Jan 2, 1991
Attention: Larry Fletcher	First Sample #:	012-0447	Analyzed:	Jan 2, 1991
			Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)	F. Print Ident.
012-0447	EX-W-5 12/14/90	3,700	
012-0448	TP-2 12/13/90	N.D.	
012-0449	ES-S-5 12/14/90	3,000	Mix of gasoline and diesel fuels

Detection Limits:	1.0

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	Dec 17, 1990
330 112th Avenue N.E., #104	Matrix Descript:	Water	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 3510/8015	Extracted:	Jan 2, 1991
Attention: Larry Fletcher	First Sample #:	012-0450	Analyzed:	Jan 2, 1991
			Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	Extractable Hydrocarbons µg/L (ppb)	F. Print Ident.
012-0450	Comp of MW1-1&1-2	N.D.	
012-0451	Comp of MW2-1&2-2	5,500	Mix of gasoline & diesel Fuels
012-0452	Comp of MW3-1&3-2	2,100	

Detection Limits:	**50**

Extractable (high boiling point) Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

SEACOR	Client Project ID:	Sihgh Ellensburg	Sampled:	Dec 17, 1990
330 112th Avenue N.E., #104	Sample Descript.:	Water, Comp. of MW3-1&3-2	Received:	Dec 18, 1990
Bellevue, WA 98004	Analysis Method:	EPA 5030/ 8015/8020	Analyzed:	Dec 26, 1990
Attention: Larry Fletcher	Lab Number:	012-0452	Reported:	Jan 3, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Purgeable Hydrocarbons	300	35,000
Benzene	3.0	N.D.
Toluene	3.0	1,900
Ethyl Benzene	3.0	460
Xylenes	3.0	8,300

Purgeable (low to medium boiling point) Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

SEACOR

CHAIN-OF-CUSTODY RECORD

SEACOR 330 112th Ave. NE, #104 Bellevue, WA 98004	PHONE: (206) 646-0280	PROJECT MANAGER: Lappy Fletcher	PROJECT NUMBER/NAME: Stnyh Ellensburg
SAMPLER: (Sign and print name) John M Gieber John M. Gieber	LABORATORY: North Creek	LABORATORY ID NUMBER:	

SAMPLE ID NUMBER	DATE	TIME	SAMPLE TYPE	STATION/LOCATION	ANALYSIS REQUESTED/REMARKS
MW-2-5	12/14/90	1240	Soil	Monitor well 2 5 feet	TPH (gas) BTEX (8020)
EX-W-5'	12/14/90	1540	"	West Wall 5'	TPH (diesel) 8015
TP-2	12/13/90	0950		Test Pit #2 4.5'	TPH (as diesel) 8015
EX-S-5'	12/14/90	1430		South Wall 5'	TPH (Fingerprint)

RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE: TIME:	RECIEVED BY: Signature
RELINQUISHED BY: (Signature) John M Gieber	DATE: TIME: 12/14/90 10:00	RECIEVED FOR LABORATORY BY: (Signature) Glen Cargi			REMARKS:

SEACOR

CHAIN-OF-CUSTODY RECORD

SEACOR 330 112th Ave. NE, #104 Bellevue, WA 98004	PHONE: (206) 646-0280	PROJECT MANAGER: Larry Fletcher	PROJECT NUMBER/NAME: Singh ~~Est~~ Ellensburg
SAMPLER: (Sign and print name) Cornelis Van Dijk	LABORATORY: North Creek		LABORATORY ID NUMBER:

SAMPLE ID NUMBER	DATE	TIME	SAMPLE TYPE	STATION/LOCATION	ANALYSIS REQUESTED/REMARKS
mw-1-1	12/17/90	1355	H_2O	mw-1	TPH (Diesel) EPA 8015
mw-1-2		↓		↓	
mw-2-1		1230		mw-2	TPH (Fryer front)
mw-2-2		↓		↓	
mw-3-1		1320		mw-3	TPH (diesel + gas) BTEX
mw-3-2		↓		↓	

RELINQUISHED BY: (Signature)	DATE: 12/17	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE:	RECIEVED BY: Signature
	TIME:			TIME:	
RELINQUISHED BY: (Signature)	DATE:	RECIEVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE:	RECIEVED BY: Signature
	TIME:			TIME:	
RELINQUISHED BY: (Signature)	DATE: 12/18	RECIEVED FOR LABORATORY BY: (Signature)			REMARKS:
John M. Guba	TIME: 9:55				

APPENDIX B

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SEACOR

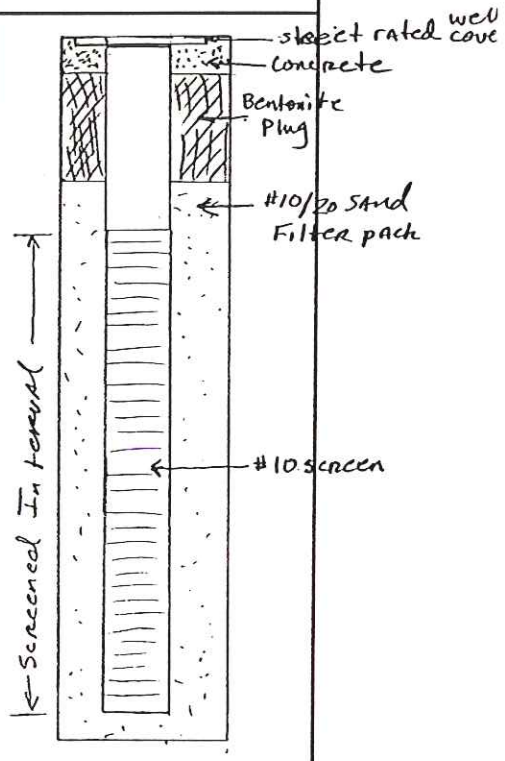
BORING LOG

BORING: MW-1
PAGE 1 of 1

PROJECT Singh Ellensburg — LOCATION see site map
SURFACE ELEVATION — CASING TOP ELEVATION
START 12/14/90 1030 — FINISH 12/14/90 1200
SAMPLER J. Gieber — MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT Environmental West Exploration, Mobile B-61
COMMENTS 2" x 24" Split spoon sampling tubes

Penetration Results Blows 6"-6"-6"	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification
			0	Brown Cobbles, dry	GW
				Dark Brown Gravelly Sand moist	SP
15-6-7	no sample		5	Brown-Gray Cobbles very moist to saturated	GW
11-50(4")		–	10	Gray Sandy Gravel poorly graded saturated	GP
2-8-50(2")	no sample		15	Boring completed to 14.5'. Groundwater encountered at 6'. Moniton well installed to 14',	
			20		
			25		

Boring Abandonment/ Well Construction Details



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SEACOR

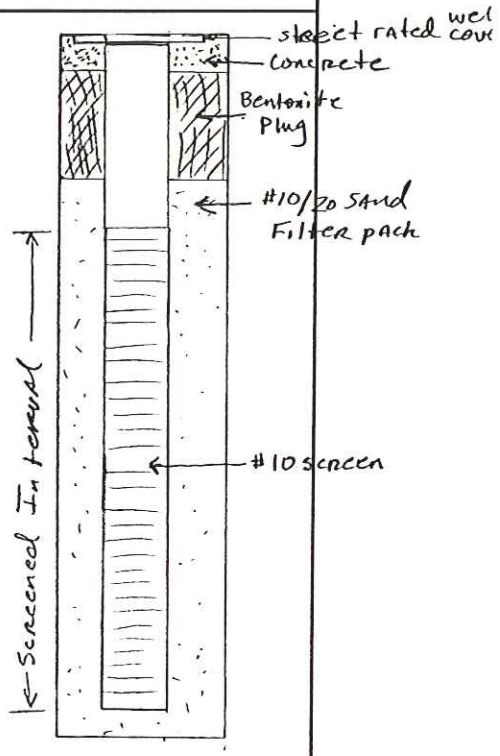
BORING LOG

BORING: MW-2
PAGE 1 of 1

PROJECT Singh Ellensburg — LOCATION see site MAP
SURFACE ELEVATION ____ — CASING TOP ELEVATION ____
START 12/14/90 1230 — FINISH 12/14/90 1400
SAMPLER J Gieber — MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT Environmental West Exploration, mobile B-61
COMMENTS 2" by 24" split spoon sampling tubes

Penetration Results Blows 6"-6"-6"	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification
			0	Brown Poorly Graded Gravel very coarse pebbles to small cobbles dry	GP
11-21-28		50+	5	Brown Gravelly Sand poorly graded moist	
				Gray Gravelly Sand sheen on sample tube very moist to saturated	SP
42-50(1")	no sample		10		
				Brown-Gray Small Cobbles well graded: 2"-4" hard drilling	GW
50 (1")	no sample		15	Boring completed to 14.5' Groundwater encountered at 6' Monitor well installed to 14'	
			20		
			25		

Boring Abandonment/ Well Construction Details



DRAFT

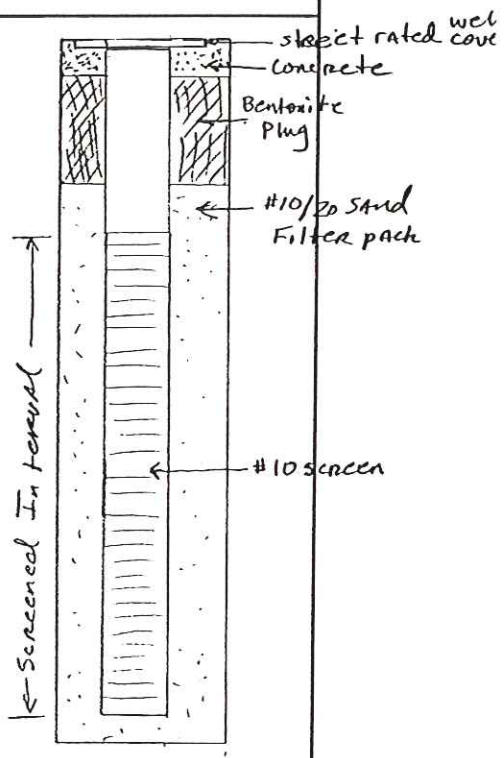
SEACOR

BORING LOG

BORING: MW-3
PAGE 1 of 1

PROJECT Singh - Ellensburg
LOCATION See site map
SURFACE ELEVATION
CASING TOP ELEVATION
START 12/14/90 1430
FINISH 12/14/90 1800
SAMPLER J Gieber
MONITORING DEVICE HNu
SUBCONTRTACTOR AND EQUIPMENT Environmental West Exploration, Mobile B-61
COMMENTS 2" x 24" Split Spoon sampling tubes, At 1600 (10') broke main cable.

Penetration Results Blows 6"-6"-6"	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Boring Abandonment/ Well Construction Details
			0	Brown Sandy Loam organics, dry	OL	
				Dark Brown - Gray Gravelly Sand moist	SP	
50 (3")	no sample		5	Gray Sandy Gravel poorly graded sheen on sample tube saturated	GP	
6-13-60(4")	no sample		10	Gray Cobbles well graded: 2"-4"	GW	
			15	Boring completed to 14.5' Ground water encountered at 5.5' Monitor well installed to 14'.		
			20			
			25			



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SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION mw-1

PROJECT Singh Oil EVENT _____ SAMPLER CVD DATE 12/17/90

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Sampled	C 1355		

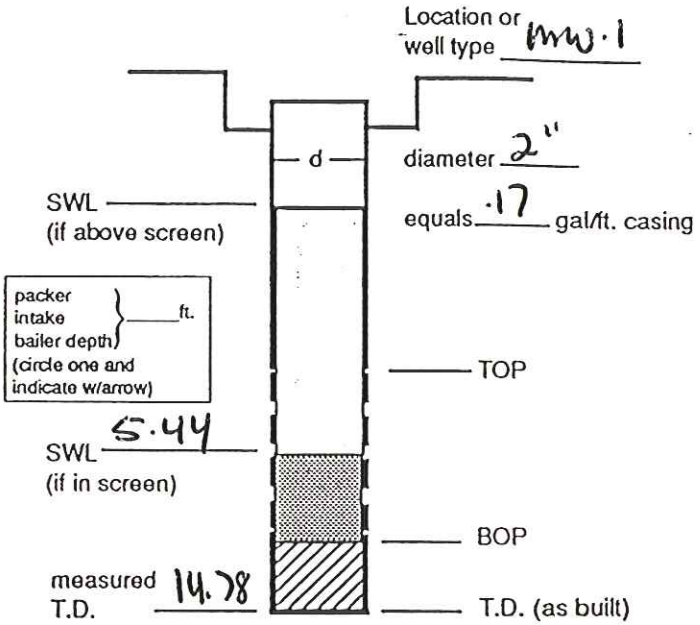
Purge calculation

.17 gal/ft. (SWL to BOP or packer to BOP) · 9.34 ft. = 1.58 gals (one volume) x 3 = 4.76 gals. (purge volume-3 casings)

Head purge calculation (Airlift)

_____ gal/ft. (packer to SWL) · _____ ft. = _____ gals.

Well / Hydrologic statistics



Method and Equipment Used:

as mw-2

Event Description:

decon

Actual gallons purged 8

Actual volumes purged 5.06

Well yield ⊕ _____

Additional comments:

no visible sheen, no odor
2 VOA's
1 liter bottle

COC # _____

Sample I.D.	Analysis	Lab
mw-1-1		NC
mw-1-2		NC

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
3.						
4.						
5.						

* Take measurement at approximately each casing volume purged.

⊕ HY- Minimal W.L. drop MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or LY - Able to purge 3 volumes by returning later or next day. VLY - Minimal recharge - unable to purge 3 volumes.

DRAFT

SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW·2

PROJECT Singh Oil EVENT _____ SAMPLER CUD DATE 12/17/90

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Sampled @ 12:30			

Purge calculation

.17 gal/ft. · 8 ft. = 1.36 gals x 3 = 4.08 gals.

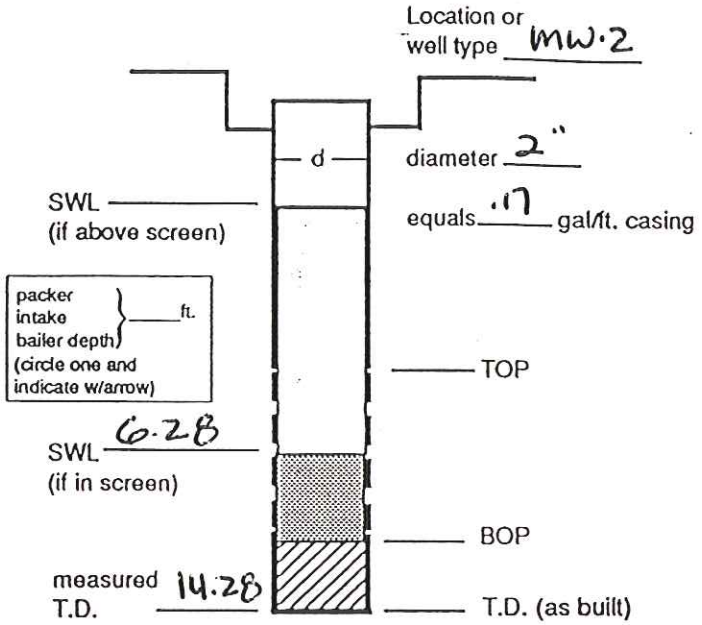
(SWL to BOP or packer to BOP) (one volume) (purge volume-3 casings)

Head purge calculation (Airlift)

____ gal/ft. · ____ ft. = ____ gals.

(packer to SWL)

Well / Hydrologic statistics



Method and Equipment Used:
Stainless steel bailer
Bounder

Event Description:
decon

Actual gallons purged 8
Actual volumes purged 5.8
Well yield ⊕ _____

COC # _____

Sample I.D.	Analysis	Lab
MW·2·1		N.C.
MW·2·2		N.C.

Additional comments:
Groundwater showed visible sheen
The area was very odiferous (Petro)
2 VOA's
1 liter bottle

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
3.						
4.						
5.						

* Take measurement at approximately each casing volume purged.

⊕ HY- Minimal W.L. drop MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or LY - Able to purge 3 volumes by returning later or next day. VLY - Minimal recharge - unable to purge 3 volumes.