

**HOLDEN VILLAGE
SITE CHARACTERIZATION
PRELIMINARY REPORT**

6649
Release ID#
414765
(2nd release)

Project #HVUST94

Prepared for
Holden Village, Inc.
Chelan Washington, 98816

12 January 1995

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FORWARD

This report is the instrument of services prepared by Nels Cone for the exclusive use by Holden Village, Inc. In order to create a report on which Holden Village could rely, Nels Cone worked closely with Holden Village in developing the scope of service upon which all subsequent tasks have been based. To achieve the objectives stated in this report, Nels Cone was required to base conclusions and professional opinions on the best available information during the period in which services were conducted and within the limits prescribed by Holden Village in Contractual Agreement and Statement of Work (8 August 1994). Nels Cone's professional services were performed using that degree of care and skill ordinarily exercised by environmental consultants practicing in this or similar fields. The findings, conclusions, and professional opinions contained in this report have also been prepared by Nels Cone in accordance with generally accepted professional practice. No warranty or guarantee, expressed or implied is made as to the professional conclusions or opinions contained in this report. The limitations contained in this report supersede all other covenants, implied or otherwise, except those stated or acknowledged with in the previous signed Contractual Agreement and Statement of Work.

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EXECUTIVE SUMMARY

A total of twelve (12) underground storage tanks (USTs) were excavated and removed during the Fall of 1994. These USTs ranged in size from 14,640 gallons to 280 gallons. Inertion of explosive atmospheres within the tanks was verified prior to excavation. Each UST was visually inspected for signs of pitting and seam failure. While most USTs showed little signs of product release, the associated piping revealed corroded areas as an apparent source of leakage. These pipes were either crimped and secured, or capped in place. Overall, most of associated piping remains in the ground, along with USTs that lie under buildings.

Transportation of USTs off-site was performed and contracted by Cragg's Excavation via barge to Chelan, Washington. The USTs were received by West Pac Environmental of Seattle, Washington for final cleaning and disposal. Prior to UST decommissioning activities, there exists no documented release from these tanks. Actual installation dates of these tanks are estimated to be sometime during 1937, except for the 14,370 gallon tank which was installed sometime in 1971. During UST removal, oversight was provided for careful segregation of clean soils from impacted soils. Approximately 2,400 cubic yards of impacted soils were transported to a site located on the third level of the old mining operations. In accordance with Washington State UST regulations, product release to the environment was reported to the Washington State Department of Ecology's (Ecology) Central Office on 24 September 1994.

A total of twenty-five (25) samples for hydrocarbon analysis (Method WTPH-D) were taken during three rounds of sampling. Initial samples were taken to characterize petroleum product release to soils and for soil treatment profiling. Soil samples were also taken to characterize effectiveness of impacted soils removal. One groundwater sample was taken from a seventeen (17) foot depth within a UST excavation. A reported concentration of 13,400 $\mu\text{g}/\text{l}$ (ppb) for TPH-D as diesel compounds was found in the groundwater sample. Reported concentrations of TPH-D as diesel compounds in soils ranged from non-detectable levels, up to a maximum of 46,000 mg/kg (ppm). In accordance with Washington State Toxics Cleanup Program, groundwater monitoring wells were installed in two (2) excavations containing impacted soils and/or upon discovery of product impacted groundwater. Remedial efforts specified by State guidelines are expected to continue in the Spring of 1995.

1.0 INTRODUCTION

1.1 PURPOSE

Nels Cone was retained as consultant to provide underground storage tank (UST) decommissioning and site assessment services for a total of twelve (12) heating oil USTs located at Holden Village Inc., (Holden) Chelan, Washington. These USTs ranged in size from 14,640 gallons to 280 gallons. At this time Ecology does not require that these heating oil tanks be registered as regulated tanks. These tanks however, are subject to the release reporting requirements of the WAC 173-360-372. Nels Cone explained to Holden (7 August 1994 meeting), that possible subsurface contamination may be discovered in the course of UST decommissioning. This report documents the tasks completed during UST decommissioning activities and summarizes the relevant findings and conclusions.

1.2 SCOPE OF WORK

The scope of work conducted was mutually developed and outlined in the Contractual Agreement and Statement of Work (8 August 1994). The scope was based upon the State of Washington Department of Ecology (Ecology) requirements, local regulatory requirements for UST decommissioning and site assessment, and known site conditions. The project scope detailed in the Statement of Work included the items listed below:

- 1) Perform environmental site assessment and/or site check for the decommissioning of USTs and associated piping according to federal, state, and local regulations.
- 2) Effectively coordinate UST decommissioning with Holden Village and its subcontractors.
- 3) Provide safe and effective UST inerting activities acceptable for removal and transport to Chelan, Washington, using established monitoring methods.
- 4) Perform accurate soil sampling activities and submit samples for laboratory analysis to determine hydrocarbon concentrations (Washington State Method TPH-D), and nutrient profiling appropriate for soil treatment, as needed.
- 5) Coordinate hydrocarbon-impacted soil removal and treatment implementation, as needed.

- 6) Submit to Holden Village a site assessment and/or site check report in accordance with state guidelines.

This scope of work did not include decommissioning of USTs remaining under chalets or other buildings. During execution of services, most of the UST's and associated piping contained free product. The extent to which impacted soils were found was beyond the UST decommissioning and site assessment activities outlined in the original Statement of Work. In addition to the added time and resources required for project execution, the above factors resulted in this expanded Site Characterization Report promulgated under Ecology's Toxics Cleanup Program (Model Toxics Cleanup Act, Chapter 173-340, WAC).

2.0 BACKGROUND

2.1 SITE HISTORY

Holden is an isolated mountain property located in the Northern Cascades of Washington State. In 1937 Howe Sound Mining Company began leasing this site from the US Government. It was incorporated as a full-fledged mining operation until sometime in 1957 when the costs of ore extraction became uneconomical. In 1960 the lease transferred to the Lutheran Church. Since then it has operated as a non-profit retreat community by the Lutheran Church.

Twenty-seven (27) heating oil USTs are recorded as being installed at Holden. Actual installation dates of these tanks are estimated to be sometime during 1937, except for the 14,370 gallon tank which was installed sometime during 1971. These tanks are located on property operated by Holden Village and leased from the US Forest Service. Fourteen of these tanks were installed underneath buildings. Twelve are recorded as being installed outside the foundations of buildings. The majority of tanks left active service immediately after Howe Sound mining operations ceased. The auxiliary fuel tank near the diesel generator and the large tank located near Lodge 4 continued in service during operation of this site as a Lutheran retreat. Archived records indicate that these tanks last received Shell heating (fuel) oil #2 in 1985.

In the Fall of 1994, a total of twelve (12) heating oil USTs were excavated and removed from the Holden Village property. These consisted of one 14,370 gallon tank, one

14,640 gallon tank, one 680 gallon tank, and nine (9) 280 gallon tanks. Prior to UST decommissioning activities there exists no documented release from these tanks. During the course of UST decommissioning activities, evidence of product impacted soils and groundwater from past releases was present. In accordance with Washington State UST regulations, product release from these tanks was reported to the Ecology's Central Office on 24 September 1994.

2.2 SITE DESCRIPTION

The Holden site is located approximately twenty-eight (28) miles northwest (up-lake) of Chelan, Washington, and approximately ten (10) miles west of Lake Chelan as shown in **Figure 1**. Holden is remotely situated and accessible only by boat and float-plane with an additional thirteen (13) mile drive up a gravel road, or by helicopter charter. The site is located in Chelan County, range 17, township 31N, section 7. The Village site lies across Railroad Creek to the north of abandoned mining structures.

Present day Holden Village consists of the old Howe Sound Mining Village with several lodges, chalets, a recreation center and other buildings. The Village site is considered a residential area and is surrounded on all sides by the Wenatchee National Forest. Holden is occupied year-round by approximately eighty staff members with its total summertime population exceeding slightly more than 550 individuals, including guests. Holden receives its drinking water from a recently up-dated water purification system fed by a surface water source. This source, Copper Creek, is located approximately 1,000 yards southwest and 500 yards up-gradient from the Village where the leaking USTs were located and shown in **Figure 2**.

3.0 SITE GEOLOGY AND HYDROGEOLOGY

Holden is located in a valley floor shaped by glaciation. Railroad Creek runs roughly through the center of this valley. Data from the US Geological Survey indicates significant water table fluctuation in this area due to seasonal snow melt. Valley floor deposits overlying the metamorphic bedrock commonly include recent fluvial deposits, colluvium, and glacial recessional out-wash. Grain sizes in these deposits range from silty sand up to two foot angular boulders.

The subsurface soils encountered within the Village were typical of those seen during excavation of the UST near Lodge #4. These consisted of a brown rocky loam extending down to approximately six (6) feet. Below this layer a second zone of poorly sorted gravel extends down to ten (10) feet. Beneath this layer a third zone of poorly sorted gravel with one-foot diameter angular boulders extends to twelve (12) feet below ground surface (bgs). A fourth zone directly beneath consists of dense loamy sand. This zone appeared to extend beyond the twenty (20) foot total depth of the excavation. Petroleum impacted soils were observed from a depth of approximately three (3) feet bgs down to a depth of twenty (20) feet bgs. Soils encountered at the twenty foot depth in the UST excavation near Lodge #1 were moist to wet, suggesting this depth was within the groundwater capillary zone.

Of the twelve UST decommissioning sites, groundwater was reached in only one. Groundwater was encountered at approximately seventeen (17) bgs during excavation of the UST near Lodge #4. This is consistent with a groundwater elevation of approximately 3209 feet above mean sea level. Concentrating on one three (3) foot by three (3) foot region of the Lodge 4 excavation pit, excavation continued down to depth of twenty (20) feet. The groundwater recharge rate at the bottom of this region was visually approximated at roughly three (3) gallons per minute, and appeared to be entering from a northerly direction. Considering this observation and the general contours of the ground surface, groundwater migration due south towards Railroad Creek may be inferred. A sheen was observed upon the surface of groundwater in the Lodge 4 excavation and a sample was taken for laboratory analysis. A summary of soil conditions observed is presented below in Table 1.

Table 1: SOIL CLASSIFICATION and ESTIMATED GROUNDWATER LEVELS

Vicinity of Site Excavation	Estimated Soil Depth	Soil Visual Description	ASTM Soil Class	Ground Surface Elevation	*Estimated Depth to Groundwater
Lodge 1	1-4 feet	Rocky Loam	GM	3238 feet	
Lodge 1	4-7 feet	Rocky Gravel	GP		
Lodge 1	7-8 feet	Brown Silty Clay	CL		
Lodge 1	≥8 feet	Loamy Sand	SW		≥20 feet
Lodge 4	1-6 feet	Brown Rocky Loam	GM	3226 feet	
Lodge 4	6-10 feet	Rocky Gravel	GP		
Lodge 4	10-12 feet	Poorly Sorted Rocks	GP		
Lodge 4	≥12 feet	Loamy Sand	SW		17 feet

*Groundwater depth measured on 10/8/94

4.0 METHODS

4.1 UST EXCAVATION AND REMOVAL

During the period of time from 26 September 1994 through 28 September 1994, 8 October 1994 and 9 October 1994, a total of twelve (12) USTs were excavated and removed from the Holden Village property. These consisted of one 14,370 gallon heating oil UST, one 14,640 gallon heating oil UST, one 680 gallon heating oil UST, and nine (9) 280 gallon heating oil USTs. On 28 September 1994, approximately two thousand (2000) gallons combined total of product was pumped from the USTs. After UST pumping, de minimis amounts of product and/or tank sludge remained. Prior to excavation, frozen carbon dioxide (dry ice) was placed inside both of the larger USTs as a means of explosive atmosphere inertion. A stabilized and calibrated Combustible Gas Indicator/Oxygen Meter was used to analyze vapor and oxygen levels. All work was performed using standard Health and Safety measures ordinarily required for environmental remediation projects. Project health and safety was discussed with the Holden Village Fire Official and site personnel as outlined in the Chemical Emergency Response Plan in Appendix D.

The USTs were excavated by Cragg's Excavation of Stehekin, Washington. A water main, gray water piping, and lawn sprinkling systems were encountered during subsurface excavation. Each UST was visually inspected during removal and readied for transport to Lake Chelan via a flatbed trailer. Tank inspection results are presented in Table 2. Draining activities for the associated piping is expected to resume in the Spring of 1995. Until that time, these pipes were either crimped and secured, or capped in place. Transportation of USTs off-site was performed and contracted by Cragg's Excavation via barge to Chelan, Washington. The USTs were received by West Pac Environmental of Seattle, Washington for final cleaning and disposal. Disposal Certification is presented in Appendix B. Decommissioning activities for the USTs remaining under buildings are planned to resume in the Spring of 1995. These tanks are expected to be completely drained and closed-in-place.

Approximately 2,400 cubic yards of impacted soils were removed from UST excavations. The majority of this material came from excavation of impacted soils at the Lodge 1 and Lodge 4 sites. Both of these excavations were bounded by building foundations to the North and actively used road surfaces to the South. The approximate

horizontal dimensions of the Lodge 1 excavation reached a maximum of twenty-five (25) feet (north to south) by forty (40) feet (east to west). The approximate horizontal dimensions of the Lodge 4 excavation reached a maximum of sixty (60) feet (north to south) by ninety-five (95) feet (east to west).

4.2 SOIL SAMPLING

Soil samples were collected from each of the UST excavations and arranged for laboratory analysis at Columbia Analytical Services, Inc. of Bothell, Washington. For soil sampling in UST excavations greater than a four (4) foot depth, grab samples were either taken directly from the center of the excavator's bucket, or directly from excavation sidewalls where ramped entrances were possible. Composite sampling of the impacted soils was performed in order to achieve adequate profiling of nutrient and physical conditions. New stainless steel sampling spoons were used to collect soil samples for placement into sealed 8 oz. glass containers. Each sample was properly labeled and immediately stored within an ice-filled cooler. Properly completed chain-of-custody forms accompanied the samples to the laboratory. Three rounds of sampling events were completed. Initial samples were taken to characterize petroleum product release to soils and for soil treatment profiling. Two subsequent sampling events were performed to characterize the effectiveness of impacted soils removal. A brief project Sampling and Analysis Plan is presented in Appendix E. Soil sample locations are depicted in Figure 2.

4.3 GROUNDWATER SAMPLING

One discrete groundwater sample was taken from a seventeen (17) foot depth of the UST excavation near Lodge 4. Sampling was performed to prevent product sheen collection. A new Teflon siphon tube and bulb were used to collect the groundwater sample for placement into a laboratory supplied container. This sample was properly labeled and immediately stored within an ice-filled cooler. A properly completed chain-of-custody form accompanied this sample to the laboratory. The sample was sent for TPH-D analysis to Columbia Analytical Services. A brief project Sampling and Analysis Plan is presented in Appendix E.

4.4 MONITORING WELL INSTALLATION

During excavation of UST sites, petroleum impacted soils were found at depths of twenty (20) bgs in excavations near Lodge 1, Lodge 4, Chalet 2, and Chalet 8. Washington State Labor and Industries Regulations (Chapter 296-155 WAC) indicate this depth is the maximum allowable limit of a non-shored excavation. In accordance with Washington State regulations [WAC 173-340-450(3)(a)(iii)], groundwater monitoring wells were installed in excavations near Lodge 1, and Lodge 4. These monitoring wells were constructed in accordance with Ecology's Standards for Well Construction, WAC 173-160 (January 1994 version), and approved by Rod Thompson (Ecology, Lacey, Washington). At Chalet 2 and Chalet 8 sites, impacted soils were found at successively further depths until continued excavation became impractical. At a depth of approximately twenty (20) feet, these sites were slated for well installation. Due to severe weather conditions work at these sites was postponed.

The Lodge 1 and 4 sites were accessible and well installation proceeded as scheduled. Four-inch diameter, schedule-40 PVC casing with 0.03 inch slotted screen comprising the bottom five (5) feet, was placed into the excavation. The excavation was then back-filled with clean, well-sorted half-inch gravel. This gravel back-fill extended seven (7) feet beyond the top of the screen up to a depth of seven (7) foot bgs. At this point the annular space was packed with bentonite chips and hydrated. The bentonite sealing pack continued up to a depth of two (2) feet bgs, with the remaining upper annular space consisting of a poured cement plug. A vented PVC cap secured the well casing and a waterproof steel monument was set in the concrete annulus of each monitoring well. Well construction reports are presented in Appendix C.

4.5 IMPACTED SOILS STAGING AND TREATMENT

Petroleum impacted soils were encountered during UST decommissioning activities. These soils often had direct visual evidence of fuel oil, had fuel oil odor, or both. Oversight was provided for careful segregation of clean soils from impacted soils. Impacted soils were transported to the third level of the old mining site. These soils were initially placed on a protective eight (8) inches of clean native soils. This protective layer of soils covers a plastic barrier-liner. This site, located on the third level of the old mining operations was planned as a site for biological abatement of petroleum impacted soils. This treatment site was designed to hold approximately one

Table 2: TANK INSPECTION RESULTS

Tank *ID.	Tank Location	Tank Gallonage	Tank Condition	Piping Condition	Impacted ¥Soils
AFT1	Near Generator	14,370	Excellent	Poor	Yes
L1T	Near Lodge 1	680	Very Poor	Poor	Yes
L4T	Near Lodge 4	14,640	Good	Poor	Yes
CH2	Near Chalet 2(site)	280	Poor	Poor	Yes
CH7	Near Chalet 7	280	Poor	Fair	Yes
CH8	Near Chalet 8	280	Good	Fair	Yes
CH9	Near Chalet 9	280	Good	Good	No
CH10	Near Chalet 10	280	Excellent	Good	No
CH11	Near Chalet 11	280	Good	Fair	Yes
CH12	Near Chalet 12	280	Excellent	Fair	Yes
CH13	Near Chalet 13	280	Poor	Poor	Yes
CH14	Near Chalet 14	280	Excellent	Fair	Yes
L4T2	Under Lodge 4	680	Unknown	Poor	Yes
Gas Drum	Chalet 8 walkway	55	Excellent	Excellent	No

*Former tank locations are diagrammed in Figure 2.

¥ Petroleum Hydrocarbon concentrations exceeding 200 mg/kg (MTCA Level A) clean up levels.

5.2 EXCAVATION RESULTS

Out of the twelve (12) USTs decommissioned, site assessment activities indicated that ten (10) required remedial excavation of impacted soils. Remedial excavation was successful at six out of the ten former UST sites where impacted soils were present. These impacted soils appeared to have high levels of product and represented a source of further release to the environment. Laboratory analyses of soils were completed to confirm the results of visual screening during tank decommissioning. An approximate total of 2,400 cubic yards of soil were excavated. Most excavations were replaced with clean back-fill obtained from a local gravel source. Excavation sites at Chalets 2 and 8 have not yet received back-fill, and work at these sites is expected to continue in the Spring of 1995. A summary of remedial excavation results is presented below in Table 3.

Table 3: REMEDIAL EXCAVATION ACTIVITIES

Former Tank *ID.	Remedial Excavation Location	¥Total Cubic Yards Excavated	✕Remedial Excavation Completed	Monitoring Well Installed
AFT1	Near Generator	20	Yes	No
L1T	Near Lodge 1	350	No	Yes
L4T	Near Lodge 4	1930	No	Yes
CH2	Near Chalet 2(site)	25	No	Planned
CH7	Near Chalet 7	15	Yes	No
CH8	Near Chalet 8	25	No	Planned
CH9	Near Chalet 9	0	Yes	No
CH10	Near Chalet 10	0	Yes	No
CH11	Near Chalet 11	5	Yes	No
CH12	Near Chalet 12	10	Yes	No
CH13	Near Chalet 13	5	Yes	No
CH14	Near Chalet 14	15	Yes	No

*Former tank locations are diagrammed in Figure 2. ¥Approximate Volumes. ✕ Petroleum impacted soils successfully removed.

During excavation of the impacted soils near Lodge 4, a water main leading to a fire hydrant was identified transversing an eighty (80) foot East to West span of the excavation site. As excavation progressed, a petroleum impacted soil column extended approximately twelve (12) feet to the bottom of the excavation. Under direction of Holden, clean back-fill was placed down-gradient of this region and the impacted soil left in place.

Both excavations near Lodge 1 and Lodge 4 showed evidence of impacted soils at a depth of twenty (20) feet. Excavations continued to the point of logistical feasibility. Both the Lodge 1 and Lodge 4 site excavations are bounded by building foundations to the North and actively used road surfaces to the South. Evidence suggests that the soils (down-gradient) beneath the road structures may also be impacted. The total down-gradient extent of impacted soils is unknown.

Excavations near Chalet 2 and Chalet 8 showed moist, petroleum impacted soils at a depth of twenty (20) feet. The dimensions of impacted soils in both these areas appeared to be similar. An approximate ten (10) foot diameter impacted soils column extended directly below the leaking USTs at these sites. At approximately the fourteen (14) foot depth, the lateral dimensions of the impacted soils appeared to increase. The exact dimensions of the impacted soil is unknown. These sites were prepared for monitoring well installation. However, well installation was halted due to severe weather conditions.

5.3 SOIL ANALYTICAL RESULTS

A total of twenty-five (25) samples for hydrocarbon analysis (Washington State Method TPH-D) were taken during the Fall of 1994. Samples were received from three rounds of sampling events. Four composite samples for nutrient profiling (total nitrogen, total phosphorus, moisture capacity) were also taken during this time. Reported concentrations of TPH-D as diesel in soils ranged from non-detectable levels, up to a maximum of 46,000 ppm. Reported concentration of TPH-D as oil (30W oil-like compounds) in soils ranged from non-detectable levels, up to a maximum of 29,000 mg/kg. Laboratory reports from Columbia Analytical Services and Chain-of-Custody documentation are provided in Appendix A. A summary of soil analytical results is presented below in Table 4. Site sample locations are shown in Figure 2.

Table 4: SOIL ANALYTICAL RESULTS
Total Petroleum Hydrocarbons (WTPH-D) as Diesel and Oil in mg/kg (ppm)

Sample Date	*Sample Locations	Sample Depth(feet)	Sample ID	TPH-D as Diesel	TPH-D as Oil
9/23/94	1	0.5	HVL4T-01	31	ND
9/23/94	2	2.5	HVL4T-02	1,700	340
9/23/94	3	1.0	HVAFT-01	10,000	29,000
9/23/94	4	4.0	HVAFT-02	7,140	530
9/23/94	5	1.5	HVL1T-01	16,000	570
9/25/94	6	2.0	HVCH2-01	46,000	1,200
9/25/94	7	1.0	HVCH7-01	14,000	460
9/25/94	8	1.0	HVCH8-01	22,000	980
9/25/94	9	1.5	HVCH9-01	88	180
9/25/94	10	3.0	HVCH10-01	177	210
9/25/94	11	2.0	HVCH11-01	518	240
9/25/94	12	1.0	HVCH13-01	15,000	230
9/25/94	13	2.5	HVCH14-01	13,000	700
9/26/94	14	12.0	HVAFT-03	159	460
9/26/94	15	12.0	HVAFT-13	97	230
10/8/94	16	20.0	HVL4T-03	197	ND
10/8/94	17	2.0	HVCH12-01	1,370	240
Post-Remedial Excavation Results					
10/9/94	18	6.0	HVCH7-02	42	ND
10/9/94	19	5.5	HVCH9-02	33	120
10/9/94	20	4.5	HVCH10-02	ND	ND
10/9/94	21	4.5	HVCH11-02	ND	ND
10/9/94	22	5.0	HVCH12-02	106	ND
10/9/94	23	7.0	HVCH13-02	ND	ND
10/30/94	24	7.5	HVCH14-02	ND	ND
10/30/94	25	14.0	HVAFT-04	ND	ND
10/30/94	26	14.0	HVAFT-14	ND	ND

ND = No detected presence of hydrocarbon at the Method Detection Limit of 25 ppm. Washington State Department of Ecology MTCA (Method A) Soil Cleanup Level is 200 ppm. *Sample Locations are diagrammed in Figure 2.

5.2 GROUNDWATER ANALYTICAL RESULTS

Seasonal groundwater fluctuations due to snow melt would be consistent with hydrogeology of the Holden site and suggests that the groundwater table fluctuates and rises up to approximately one foot bgs. This dynamic water table would appear to rise to levels that submerge most of the USTs and associated piping. Tank and piping inspections made during UST excavations suggest the associated (corroded) piping as a source of product release.

A single groundwater sample (HVL4T-W20-1) for hydrocarbon analysis (Washington State Method TPH-D) was taken on 8 October 1994. This sample was taken from the southwest corner of the Lodge 4 excavation shown in Figure 2. Department of Ecology MTCA Method A Cleanup Level for groundwater is 1000 µg/l (ppb). A reported concentration of 13,400 µg/l (ppb) for TPH-D as diesel was found in this sample. A reported concentration of 7,060 µg/l (ppb) for TPH-D as oil was found in this sample. This result of oil analysis is flagged by the laboratory as having interference from the diesel-range compounds found in the sample. As such this value can not be accurately relied upon for TPH-D as oil quantification purposes, and can be considered as a presence indicator only. The laboratory report from Columbia Analytical Services and Chain-of-Custody documentation are provided in Appendix A.

6.0 CONCLUSIONS

The following conclusions are based upon data collected during UST decommissioning and site assessment services provided by Nels Cone for Holden Village. During the course of providing these services, evidence was observed suggesting that product release to the environment had occurred sometime in the past.

A total of twelve (12) heating oil USTs were decommissioned. Heating oil USTs require no statutory registration. However, product release from these tanks is subject to standard Washington State reporting requirements. Of the twelve UST and piping systems, ten had visual evidence of release. Visual observations were confirmed by laboratory analysis; ten of the UST sites contained TPH-D concentrations exceeding MTCA Method A cleanup levels for soils (200 ppm). These petroleum impacted soils were present in several areas through out the Village.

During excavation of the Lodge 4 site, groundwater was found at a depth of approximately seventeen (17) feet. A slight sheen was observed upon the surface of the groundwater. One groundwater sample was submitted for laboratory analysis. Analytical results from this sample confirmed that TPH-D concentrations exceeding the MTCA Method A cleanup level (1000 µg/l) for groundwater were present.

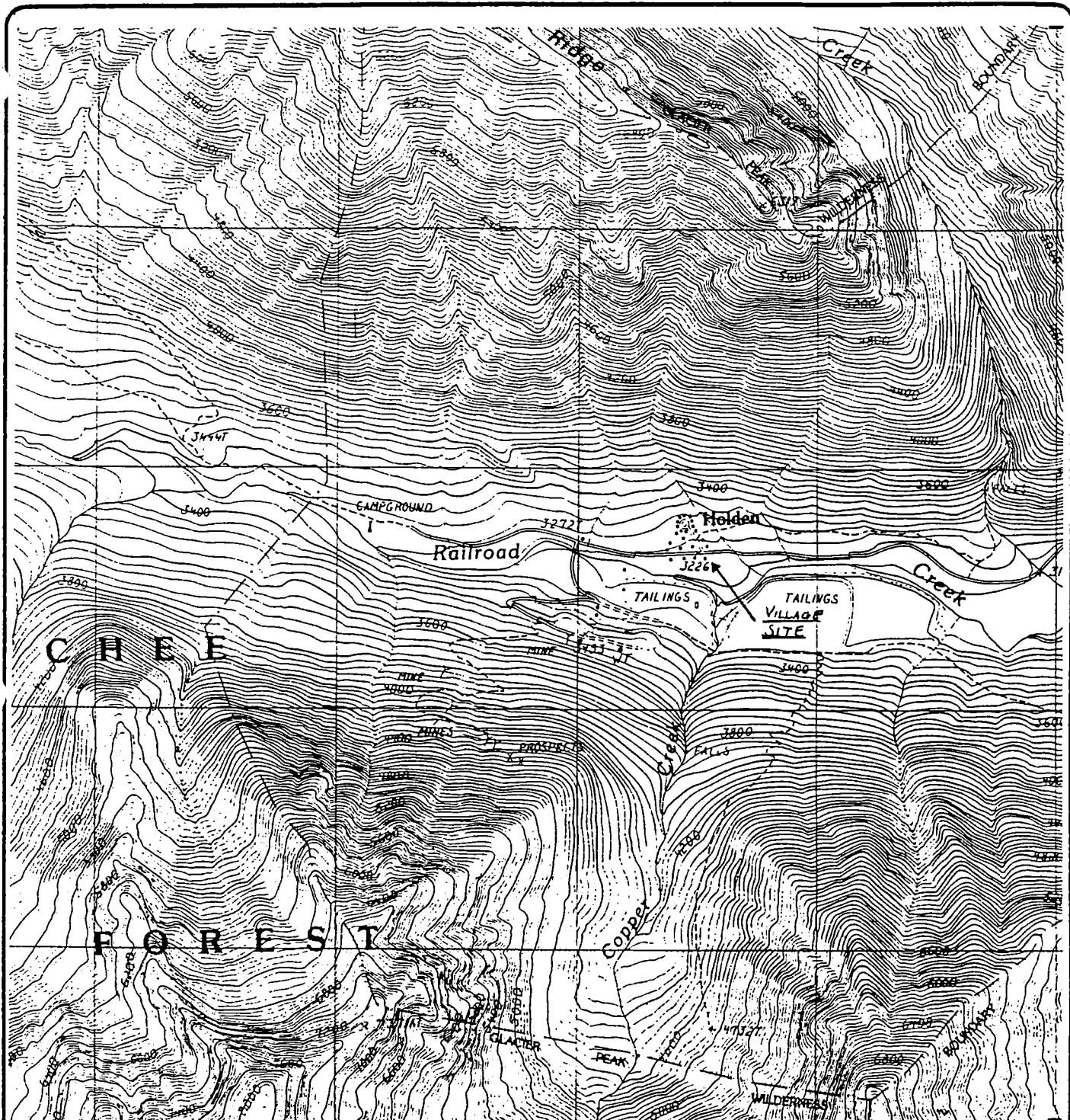
Groundwater level fluctuations in some areas of the Village may vary as much as twenty (20) feet bgs to one foot bgs. Since the heating oil type found within the USTs is less dense than water, free product release may have a similar vertical migration pattern. This conclusion is further suggested by visual observations made during UST excavation.

The exact timing of the product release to the environment at Holden can only be inferred. Holden Village archive photographs taken in 1957 and 1960 indicate surface soil and foundation staining located directly in the area of the Lodge 4 USTs. Given that these USTs were installed sometime in 1937, it is likely that the soil staining observed in these photographs resulted from product release. Additionally, the laboratory sample results from several sites indicate chromatographic profiles consistent with weathered or partially decomposed petroleum product. Given the weathered look of petroleum impact to soils at several sites, it is conceivable that product release began several decades ago.

The chromatographic profile of samples taken from around the 14,370 gallon auxiliary fuel tank displays a distinct pattern of elevated TPH-D as oil (similar to 30W) content when compared to TPH-D as diesel compounds such as heating oil. This unique signature is not as dramatic in other samples taken from the Holden site. Evaluation of the analytical data alone suggests an accidental mixture of fuels or a composite of fuel sources. Site observations confirm this conclusion. The auxiliary fuel tank is located near the diesel generators, and lubricating oils from these units were seen leaking towards the wall of the Generator Building. Lubricating oil leaking over the building foundation was observed on the surface of soils outside the building. These impacted soils were subsequently excavated and removed.

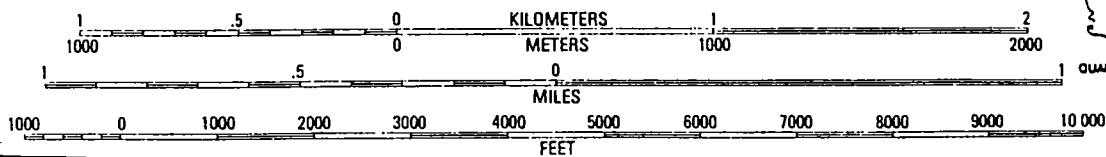
Several tasks have been completed, are underway, or planned to mitigate release of product to the environment. Soil analytical results monitoring the effect of impacted

soils excavation confirm remedial efforts at the majority of USTs sites have been successful. For sites where total excavation was not logistically feasible, installation of monitoring wells will be completed. Additional monitoring wells are expected to be placed down-gradient of impacted areas. One up-gradient monitoring well to evaluate the natural background water quality is also expected to be installed. These wells can be installed as soon as seasonal weather conditions permit.



INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1988

SCALE 1:24 000



QUADRANGLE LOCATION



Nels B. Cone
Washington State Licensed UST Supervisor
Register Site Assessor, State of Washington
Post Office Box 95589
Seattle, WA 98145

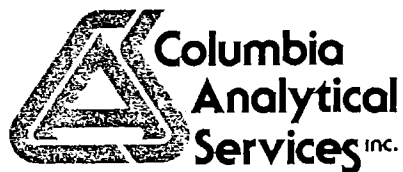
SITE LOCATION MAP

Holden Village
Chelan, Washington

FIGURE

1

APPENDIX A. LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS.



October 17, 1994

Service Request No.: B940706

Nels Cone
P.O. Box 95589
Seattle, WA 98145

Re: Holden Village Project

Dear Nels:

Attached are the results of the sample(s) submitted to our laboratory on September 30, 1994. For your reference, these analyses have been assigned our service request number B940706.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results only apply to samples analyzed.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

A handwritten signature in dark ink, appearing to read "Colin B. Elliott", is written over the printed name.

Colin B. Elliott
Laboratory Manager

CBE/bdr

Page 1 of 10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 09/23,25,26/94
Date Received: 09/30/94
Date Extracted: 10/06/94
Date Analyzed: 10/08/94
Work Order No.: B940706

Total Petroleum Hydrocarbons as Diesel and Oil
 Washington DOE Method WTPH-D
 mg/Kg (ppm)
 Dry Weight Basis

Sample Name	Lab Code	Diesel		Oil*	
		MRL	Result	MRL	Result
HVL4T-01	B0706-1	25	31	100	ND
HVL4T-02	B0706-2	25	1,700	100	(a) 340
HVAFT-01	B0706-3	25	10,000	100	(b) 29,000
HVAFT-02	B0706-4	25	7,140	100	(a) 530
HVL1T-01	B0706-5	25	(b) 16,000	100	(a,b) 570
HVAFT-03	B0706-6	25	159	100	460
HVCH2-01	B0706-7	25	(b) 46,000	100	(a,b) 1,200
HVCH7-01	B0706-8	25	(b) 14,000	100	(a,b) 460
HVCH8-01	B0706-9	25	(b) 22,000	100	(a,b) 980
HVCH9-01	B0706-10	25	88	100	180

* Quantified using 30-weight motor oil as a standard.

MRL Method Reporting Limit

ND None Detected at or above the method reporting limit

(a) Quantified as oil. The sample contained components that eluted in the oil range, but the chromatogram did not match the typical oil fingerprint.

(b) Result is from the analysis of a diluted sample, performed on October 10, 1994.

Approved by Ch. Ellis Date 10/17/94

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 09/23,25,26/94
Date Received: 09/30/94
Date Extracted: 10/06/94
Date Analyzed: 10/08/94
Work Order No.: B940706

Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	Diesel		Oil [♦]	
		MRL	Result	MRL	Result
HVCH10-01	B0706-11	25	177	100	210
HVCH11-02/1 ^{18c}	B0706-12	25	518	100	240
HVCH13-01	B0706-13	25	(a) 15,000	100	(a,b) 530
HVCH14-01	B0706-14	25	(c) 13,000	100	(b,c) 700
HVAFT-13	B0706-15	25	97	100	230
Method Blank	B0706-MB	25	ND	100	ND

♦ Quantified using 30-weight motor oil as a standard.

MRL Method Reporting Limit

ND None Detected at or above the method reporting limit

(a) Result is from the analysis of a diluted sample, performed on October 10, 1994.

(b) Quantified as oil. The sample contained components that eluted in the oil range, but the chromatogram did not match the typical oil fingerprint.

(c) Result is from the analysis of a diluted sample, performed on October 11, 1994.

Approved by Ch. Elliott Date 10/17/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 09/23,25,26/94
Date Received: 09/30/94
Date Extracted: 10/06/94
Date Analyzed: 10/08/94
Work Order No.: B940706

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D

Sample Name	Lab Code	Percent Recovery <i>p</i> -Terphenyl
HVL4T-01	B0706-1	103
HVL4T-02	B0706-2	112
HVAFT-01	B0706-3	107
HVAFT-02	B0706-4	122
HVL1T-01	B0706-5	(a,b) 124
HVAFT-03	B0706-6	106
HVAFT-03	B0706-6MS	102
HVCH2-01	B0706-7	(a) 119
HVCH7-01	B0706-8	(a) 105
HVCH8-01	B0706-9	(a) 118
	CAS Acceptance Criteria	76-122

- (a) Result is from the analysis of a diluted sample, performed on October 10, 1994.
(b) Outside of acceptance limits because of matrix interferences. The chromatogram showed target components that interfered with the analysis.

Approved by

Ch. Elliott

Date

10/17/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 09/23,25,26/94
Date Received: 09/30/94
Date Extracted: 10/06/94
Date Analyzed: 10/08/94
Work Order No.: B940706

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D

Sample Name	Lab Code	Percent Recovery <i>p</i> -Terphenyl
HVCH9-01	B0706-10	115
HVCH10-01	B0706-11	119
HVCH10-01	B0706-11 Dup	103
HVCH11-01	B0706-12	104
HVCH13-01	B0706-13	(a) 105
HVCH14-01	B0706-14	(b) 104
HVAFT-13	B0706-15	100
Method Blank	B0706-MB	98
Method Blank	B0706-LCS	103
CAS Acceptance Criteria		76-122

- (a) Result is from the analysis of a diluted sample, performed on October 10, 1994.
(b) Result is from the analysis of a diluted sample, performed on October 11, 1994.

Approved by Ch. Elliott Date 10/17/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

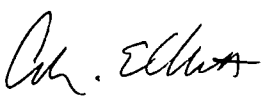
Date Collected: 09/23,25,26/94
Date Received: 09/30/94
Date Extracted: 10/06/94
Date Analyzed: 10/08/94
Work Order No.: B940706

Duplicate Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name: HVCH10-01
Lab Code: B0706-11

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Diesel	25	177	162	170	9
Oil	100	210	180	195	15

MRL Method Reporting Limit

Approved by  Date 10/14/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

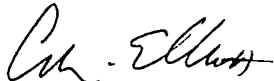
Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 09/23,25,26/94
Date Received: 09/30/94
Date Extracted: 10/06/94
Date Analyzed: 10/08/94
Work Order No.: B940706

Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name: HVAFT-03
Lab Code: B0706-6

Analyte	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Diesel	312	159	477	102	61-141

Approved by  Date 10/14/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
LCS Matrix: Soil

Date Extracted: 10/06/94
Date Analyzed: 10/08/94
Work Order No.: B940706

Laboratory Control Sample Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Diesel	298	301	101	61-141

Approved by  Date 10/14/94



Analytical
Services, Inc.

18912 North Creek Pkwy, Suite 118 • Bothell, WA 98011 • (206) 486-6983 • FAX (206) 486-7695

DATE 9/29/94 PAGE 1 OF 2

PROJECT NAME HVUST94
PROJECT Holden Village
COMPANY ADDRESS P.O. Box 95589
Seattle, WA 98145
PHONE 206-925-3626
SAMPLERS SIGNATURE [Signature]

ANALYSIS REQUEST

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX
HVL4T-01	9/23/94	1030	206-1	5021
HVL4T-02	9/23/94	1350	2	
HVAFT-01	9/23/94	0845	3	
HVAFT-02	9/23/94	0930	4	
HVL1T-01	9/23/94	1320	5	
HVAFT-03	9/24/94	1415	6	
HVCH2-01	9/25/94	1640	7	
HVCH7-01	9/25/94	1645	8	
HVCH8-01	9/25/94	1650	9	
HVCH9-01	9/25/94	1710	10	

NUMBER OF CONTAINERS

PETROLEUM HCS		ORGANIC		ORGANIC METALS/INORGANICS	
TPH - HCID State: _____	TPH - G State: _____ BTEX _____	TPH - D State: _____ OIL _____	TPH - 418.1 State: _____	TPH - Other _____	Halogenated or Aromatic Volatiles 601/8010 _____ 602/8020 _____
					Volatiles Organics GC/MS 624-8240 _____
					Base/New/Acid Organics GC/MS 625/8270 _____
					Pesticides/PCBS 8080 PCB ONLY _____
					PAH 8100 GC _____
					TCLP Metals _____
					Metals Total _____
					Metals Below _____
					Cyanide _____
					pH, Cond Cl, SO ₄ , PO ₄ F, Br NO ₂ NO ₃ (Circle) _____
					NH ₃ - N, COD, (Total-P) TKN TOC TOX (Circle) _____
					Moisture Holding Capacity _____
					REMARKS

RELINQUISHED BY:
Signature Nels B. Cone
Printed Name Nels B. Cone
Firm HV
Date/Time 9/30/94 (11:35)

RECEIVED BY:
Signature [Signature]
Printed Name John M. Regan
Firm C.A.I.
Date/Time 9/30 11:30

TURNAROUND REQUIREMENTS
24 hr _____ 48 hr _____ 5 day _____
☒ Standard (10-15 working days)
Provide Verbal Preliminary Results _____
Provide FAX preliminary Results _____
Requested Report Date _____

REPORT REQUIREMENTS
I. Routine Report _____
II. Report (includes DUP.MAS. MSD, as required, may be charged as samples) ☒ _____
III. Data Validation Report (includes All Raw Data) _____
IV. CLP Deliverable Report _____

INVOICE INFORMATION:
P.O.# _____
Bill To _____

SAMPLE RECEIPT:
Shipping VIA: _____
Shipping to: _____
Condition: _____
Lab No: BV10706

RELINQUISHED BY:
Signature [Signature]
Printed Name C.S. Bollwell
Firm C.S. Bollwell
Date/Time 9/30/94 1630

RECEIVED BY:
Signature _____
Printed Name _____
Firm _____
Date/Time _____

SPECIAL INSTRUCTIONS/COMMENTS:
Please call to discuss -> Please include Batch QC/QA data if not on these samples



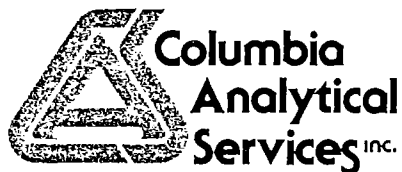
Analytical
Services INC.

18912 North Creek Pkwy, Suite 118 • Bothell, WA 98011 • (206) 486-6983 • FAX (206) 486-7695

CI N C O U D A E I A I Y I A L Y S R C O F

DATE 9/29/94 PAGE 2 OF 2

PROJECT INFORMATION					NUMBER OF CONTAINERS	ANALYSIS REQUEST																		REMARKS			
PROJECT NAME <u>HVUST94</u>						PETROLEUM HCS						ORGANIC						ORGANIC METALS/INORGANICS									
PROJECT <u>Holden Village</u>						TPH - HClD	TPH - G	TPH - D	TPH - 418.1	TPH - Other	Halogenated or Aromatic Volatiles	Volatiles Organics	Base/Neu/Acid Organics	Pesticides/PCBS	PAH	TCCLP	Metals	Metals Total	Cyanide	pH, Cond Cl, SO ₄ , PO ₄ F, Br	NH ₃ - N, COD, TOX (Circle)	TOX (Circle)					
COMPANY/ADDRESS <u>P.O. Box 95589</u>																											
SEATTLE, WA <u>98145</u>																											
PHONE <u>782-9254</u>																											
SAMPLERS SIGNATURE <u>Nels B. Cone</u> = <u>NBC</u>																											
SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX																							
HVCH10-01	9/25/94	1708	206-11	Soil				X																			
HVCH11-01	9/25/94	1702	12																								
HVCH13-01	9/25/94	1700	13																								
HVCH14-01	9/25/94	1655	14																								
HVAFET-13	9/26/94	1420	15	↓				↓																			
RELINQUISHED BY: <u>Nels B. Cone</u>					TURNAROUND REQUIREMENTS					REPORT REQUIREMENTS					INVOICE INFORMATION:					SAMPLE RECEIPT:							
Signature <u>Nels B. Cone</u>					☒ 24 hr ☐ 48 hr ☐ 5 day					☒ I. Routine Report					P.O.# _____					Shipping VIA: _____							
Printed Name <u>Nels B. Cone</u>					☒ Standard (10-15 working days)					☒ II. Report (includes DUP.MAS. MSD, as required, may be charged as samples)					Bill To _____					Shipping to: _____							
Firm <u>HV</u>					☐ Provide Verbal Preliminary Results					☐ III. Data Validation Report (includes All Raw Data)					_____					Condition: _____							
Date/Time <u>9/30/94 1135</u>					☐ Provide FAX preliminary Results					☐ IV. CLP Deliverable Report					_____					Lab No: <u>B940706</u>							
Date/Time _____					Requested Report Date _____					SPECIAL INSTRUCTIONS/COMMENTS: <u>7 Please Call to discuss</u> <u>Please include Batch QC/QA data if not performed on these samples</u>																	
RELINQUISHED BY:					RECEIVED BY:																						
Signature _____					Signature _____																						
Printed Name _____					Printed Name _____																						
Firm _____					Firm _____																						
Date/Time _____					Date/Time _____																						



October 19, 1994

Service Request No.: K946040B

Nels Cone
Holden Village
P. O. Box 95589
Seattle, WA 98145

Re: **Holden Village/B94-0706**

Dear Nels:

Enclosed are the results of the sample(s) submitted to our laboratory on September 30, 1994. For your reference, these analyses have been assigned our service request number K946040B.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 260.

Respectfully submitted,

Columbia Analytical Services, Inc.

A handwritten signature in cursive script, reading "Janice M. Sedlak".

Janice M. Sedlak
Project Chemist

JMS/sam

Page 1 of 6

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons

99902

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Holden Village
Project: Holden Village
Sample Matrix: Soil

Service Request: K946040B
Date Collected: 9/23,25/94
Date Received: 9/30/94
Date Extracted: NA

Inorganic Parameters
 Units: mg/Kg (ppm)
 Dry Weight Basis

Sample Name:	HVL4T-01	HVCH9-01	Method Blank
Lab Code:	K946040-001	K946040-002	K946040-MB

Analyte	EPA Method	MRL			
Nitrogen, Total Kjeldahl (TKN)	351.4M	25	360	480	ND
Phosphorus, Total	365.3M	0.2	650	1500	ND
Solids, Total (%)	160.3M	--	81.0	95.8	--

M Modified for analysis of soil.

Approved By: _____

Tracy L. Harris

Date: _____

10/17/94



Soil and Plant Laboratory, Inc.

P.O. Box 6566, Orange, California 92613-6566/(714) 282-8777/FAX (714) 282-8575
P.O. Box 153, Santa Clara, California 95052-0153/(408) 727-0330/FAX (408) 727-5125
P.O. Box 1648, Bellevue, Washington 98008-1648/(206) 746-6665/FAX (206) 562-9531

NELS B. CONE
P.O. Box 95589
Seattle, WA 98145

Northwest Office
Lab No. 65811
HV94UST

Samples Taken:

Samples Rec'd: 10/ 7/94

Sam
ple

#	Analysis Requested	Quantity	Units	Sample Description & Log Number
1	Half Saturation %	14.		HVL47-01 94-A3357332
	Moisture Percentage	17.6	% as rec'd	
2	Half Saturation %	18.		HVSH9-01 94-A3357432
	Moisture Percentage	4.4	% as rec'd	

10/14/94

October 19, 1994

As requested, above data are supplied without comment or interpretation.

Sincerely,


DIRK W. MUNTEAN, M.A.

DWM/bsk



18912 North Creek Pkwy, Suite 118 • Bothell, WA 98011 • (206) 486-6983 • FAX (206) 486-7695

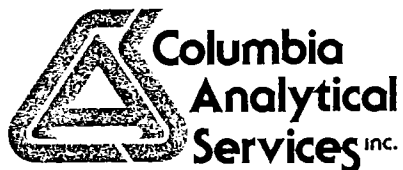
CHAIN OF CUSTODY/LABORATORY ANALYSIS REPORT FORM

DATE 9/29/94 PAGE 1 OF 2

PROJECT INFORMATION					NUMBER OF CONTAINERS	ANALYSIS REQUEST																REMARKS			
PROJECT NAME	PROJECT	COMPANY/ADDRESS	PHONE	SAMPLERS SIGNATURE		PETROLEUM HCS				ORGANIC				ORGANIC METALS/INORGANICS											
SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	TPH - HClD	TPH - G	TPH - D	TPH - 418.1	TPH - Other	Halogenated or Aromatic Volatiles	Volatile Organics	Base/Neu/Acid Organics	Pesticides/PCBS	PAH	8100 GC	TCLP Metals	Semi VOA	Metals Total	Pest/Herb	Cyanide	pH, Cond Cl, SO ₄ , PO ₄ F, Br	NH ₃ , NO ₃ (Circle)	TOX (Circle)	Total-P (TKN) TOC	Moisture Holding Capacity
HVL4T-01	9/23/94	1030	706-1	Soil			X															X	X		
HVL4T-02	9/23/94	1350	2																						
HVAFT-01	9/23/94	0845	3																						
HVAFT-02	9/23/94	0930	4																						
HVL1T-01	9/23/94	1320	5																						
HVAFT-03	9/26/94	1445	6																						
HVCH2-01	9/25/94	1640	7																						
HVCH7-01	9/25/94	1645	8																						
HVCH8-01	9/25/94	1650	9																						
HVCH9-01	9/25/94	1710	10																			X	X		

RELINQUISHED BY:		RECEIVED BY:		TURNAROUND REQUIREMENTS		REPORT REQUIREMENTS		INVOICE INFORMATION:		SAMPLE RECEIPT:	
Signature: <u>Nels B. Cone</u>	Signature: <u>John M. Regan</u>	____ 24 hr ____ 48 hr ____ 5 day	____ I. Routine Report	P.O.# _____	Shipping VIA: _____						
Printed Name: <u>Nels B. Cone</u>	Printed Name: <u>John M. Regan</u>	☒ Standard (10-15 working days)	☒ II. Report (includes DUP.MAS. MSD, as required, may be charged as samples)	Bill To _____	Shipping to: _____						
Firm: <u>HV</u>	Firm: <u>C.A.I.</u>	____ Provide Verbal Preliminary Results	____ III. Data Validation Report (includes All Raw Data)	____	Condition: <u>K94-6040B</u>						
Date/Time: <u>9/30/94 (11:35)</u>	Date/Time: <u>9/30 4:30</u>	____ Provide FAX preliminary Results	____ IV. CLP Deliverable Report	____	Lab No: <u>BWL0706</u>						

RELINQUISHED BY:		RECEIVED BY:		SPECIAL INSTRUCTIONS/COMMENTS:	
Signature: <u>B. Regan</u>	Signature: <u>Tom K. Hawk</u>	<u>Please call to discuss → Please include Batch QC/QA data if not on these samples</u>			
Printed Name: <u>B. Regan</u>	Printed Name: <u>Tom K. Hawk</u>				
Firm: <u>CAS/Bothell</u>	Firm: <u>CAS-K</u>				
Date/Time: <u>9/30/94 1630</u>	Date/Time: <u>10-1-94 0800</u>				



October 26, 1994

Service Request No.: B940739

Nels Cone
P.O. Box 95589
Seattle, WA 98145

Re: Holden Village/Project #HVUST94

Dear Nels:

Attached are the results of the sample(s) submitted to our laboratory on October 10, 1994. For your reference, these analyses have been assigned our service request number B940739.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results only apply to samples analyzed.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

A handwritten signature in cursive script, appearing to read "Colin B. Elliott".

Colin B. Elliott
Laboratory Manager

CBE/bdr

Page 1 of 10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 10/08,09/94
Date Received: 10/10/94
Date Extracted: 10/18,19/94
Date Analyzed: 10/20/94
Work Order No.: B940739

Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	MRL	Diesel	Result	MRL	Oil*	Result
HVL4T-03	B0739-2	25		197	100		ND
HVCH7-02	B0739-3	25		42	100		ND
HVCH9-02	B0739-4	25		*33	100		120
HVCH10-02	B0739-5	25		ND	100		ND
HVCH11-02	B0739-6	25		ND	100		ND
HVCH12-01	B0739-7	25		1,370	100		**240
HVCH12-02	B0739-8	25		106	100		ND
HVCH13-02	B0739-9	25		ND	100		ND
Method Blank	B0739-MB	25		ND	100		ND

* Quantified using 30-weight motor oil as a standard.

MRL Method Reporting Limit

ND None Detected at or above the method reporting limit

* Response does not match a typical diesel chromatogram.

** Oil response due to the overlap of diesel components into the oil region.

Approved by

Ch. Elliott

Date

10/27/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Water

Date Collected: 10/08/94
Date Received: 10/10/94
Date Extracted: 10/12/94
Date Analyzed: 10/17,18/94
Work Order No.: B940739

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D

Sample Name	Lab Code	Percent Recovery <i>p</i> -Terphenyl
HVL4T-W20-1	B0739-1	112
Method Blank	B0739-MB	99
Laboratory Control Sample	B0739-LCS	106
Laboratory Control Sample	B0739-DLCS	90
	CAS Acceptance Criteria	59-124

Approved by Ch. Elliott Date 10/26/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Water

Date Extracted: 10/12/94
Date Analyzed: 10/18/94
Work Order #: B940739

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
 $\mu\text{g/L}$ (ppb)

Percent Recovery

Analyte	Spike Level		Spike Result				CAS Acceptance Criteria	Relative Percent Difference
	LCS	DLCS	LCS	DLCS	LCS	DLCS		
Diesel	5,970	5,970	5,560	4,930	93	83	42-155	11

Approved by

Colin Elliott

Date

10/26/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 10/08,09/94
Date Received: 10/10/94
Date Extracted: 10/18,19/94
Date Analyzed: 10/20/94
Work Order No.: B940739

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D

Sample Name	Lab Code	Percent Recovery <i>p</i> -Terphenyl
HVL4T-03	B0739-2	92
HVCH7-02	B0739-3	101
HVCH9-02	B0739-4	104
HVCH10-02	B0739-5	105
HVCH11-02	B0739-6	113
HVCH12-01	B0739-7	109
HVCH12-02	B0739-8	107
HVCH13-02	B0739-9	102
HVCH13-02	B0739-9MS	98
Method Blank	B0739-MB	115
Laboratory Control Sample	B0739-LCS	105

CAS Acceptance Criteria

76-122

Approved by

Ch. Elliott

Date

10/26/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: 10/08,09/94
Date Received: 10/10/94
Date Extracted: 10/18,19/94
Date Analyzed: 10/20/94
Work Order No.: B940739

Duplicate Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name: HVCH13-02
Lab Code: B0739-9

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Diesel	25	ND	ND	--	--
Oil	100	ND	ND	--	--

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Ch. Elliott Date 10/26/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
Sample Matrix: Soil

Date Collected: ----/----/----
Date Received: ----/----/----
Date Extracted: 10/18,19/94
Date Analyzed: 10/20/94
Work Order No.: B940739

Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name: Batch QC
Lab Code: B0768-1

Analyte	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Diesel	409	105	513	100	61-141

Approved by John Ellert Date 10/26/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: Holden Village
LCS Matrix: Soil

Date Extracted: 10/18,19/94
Date Analyzed: 10/20/94
Work Order No.: B940739

Laboratory Control Sample Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Diesel	298	303	102	61-141

Approved by

Ch. Elliott

Date

10/26/94



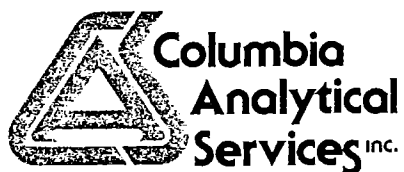
analytical
Services inc.

18912 North Creek Pkwy, Suite 118 • Bothell, WA 98011 • (206) 486-6983 • FAX (206) 486-7695

DATE 10/10/94 PAGE 1 OF 1

PROJECT INFORMATION					NUMBER OF CONTAINERS	ANALYSIS REQUEST																REMARKS
PROJECT NAME	PROJECT	COMPANY/ADDRESS	SAMPLERS SIGNATURE	PHONE		PETROLEUM HCS				ORGANIC				ORGANIC METALS/INORGANICS								
SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	TPH - HCID State: _____	TPH - G State: _____	TPH - D State: _____	TPH - 418.1 State: _____	TPH - Other State: _____	Halogenated or Aromatic Volatiles 601/8010	Volatiles Organics GC/MS 602/8020	Base/Neutral/Acid Organics GC/MS 824-8240	Pesticides/PCBS 8080 PCB ONLY	PAH 8100 GC	TCPL Metals 8100 HPCL	Semi VOA Metals Total List Below	Pest/Herb Cyanide	pH, Cond Cl, SO ₄ , PO ₄ F, Br NO ₂ NO ₃ (Circle)	NH ₃ - N, COD, Total-P TKN, TOC (Circle)			
HVL4T-W20-1	10/9/94	1115	739-1	Water			X															
HVL4T-03	10/9/94	1125	-2	Soil																		
HVCH7-02	10/9/94	1545	-3	Soil																		
HVCH9-02	10/9/94	1725	-4																			
HVCH10-02	10/9/94	1715	-5																			
HVCH11-02	10/9/94	1645	-6																			
HVCH12-01	10/9/94	1630	-7																			
HVCH12-02	10/9/94	1635	-8																			
HVCH13-02	10/9/94	1615	-9																			

RELINQUISHED BY:		RECEIVED BY:		TURNAROUND REQUIREMENTS		REPORT REQUIREMENTS		INVOICE INFORMATION:		SAMPLE RECEIPT:	
Signature <u>Nels B Conc</u>	Signature <u>Cch. Elliott</u>	____ 24 hr ____ 48 hr ____ 5 day	____ I. Routine Report	P.O.# _____	Shipping VIA: _____						
Printed Name <u>Nels B Conc</u>	Printed Name <u>Cch. Elliott</u>	____ Standard (10-15 working days)	☒ II. Report (includes DUP.MAS. MSD, as required, may be charged as samples)	Bill To _____	Shipping to: _____						
Firm <u>HV</u>	Firm <u>CHS</u>	____ Provide Verbal Preliminary Results	____ III. Data Validation Report (includes All Raw Data)	____	Condition: _____						
Date/Time <u>10/10/94 17:38</u>	Date/Time <u>10/10/94 5:30 pm</u>	____ Provide FAX preliminary Results	____ IV. CLP Deliverable Report	____	Lab No: _____						
RELINQUISHED BY:		RECEIVED BY:		SPECIAL INSTRUCTIONS/COMMENTS: <u>Please include batch QC/QA data if not on these samples</u>							
Signature	Signature										
Printed Name	Printed Name										
Firm	Firm										
Date/Time	Date/Time										



November 17, 1994

Service Request No.: B940853

Nels Cone
P.O. Box 95589
Seattle, WA 98145

Re: HVUST94/Holden Village Project

Dear Nels:

Attached are the results of the sample(s) submitted to our laboratory on November 4, 1994. For your reference, these analyses have been assigned our service request number B940853.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results only apply to samples analyzed.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

A handwritten signature in cursive script, appearing to read "Colin B. Elliott".

Colin B. Elliott
Laboratory Manager

CBE/bdr

Page 1 of 7

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Nels Cone
Project: HVUST94/Holden Village
Sample Matrix: Soil

Date Collected: 10/30/94
Date Received: 11/04/94
Date Extracted: 11/08/94
Date Analyzed: 11/10/94
Work Order No.: B940853

Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	Diesel		Oil*	
		MRL	Result	MRL	Result
HV CH1 ⁴ 3 -02	B0853-1	25	ND	100	ND
HV AFT-04	B0853-2	25	ND	100	ND
HV AFT-14	B0853-3	25	ND	100	ND
Method Blank	B0853-MB	25	ND	100	ND

* Quantified using 30-weight motor oil as a standard.
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by C. Elliott Date 11/18/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: HVUST94/Holden Village
Sample Matrix: Soil

Date Collected: 10/30/94
Date Received: 11/04/94
Date Extracted: 11/08/94
Date Analyzed: 11/10,11/94
Work Order No.: B940853

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D

Sample Name	Lab Code	Percent Recovery <i>p</i> -Terphenyl
HV CH13-02	B0853-1	104
HV AFT-04	B0853-2	103
HV AFT-14	B0853-3	102
Method Blank	B0853-MB	81
Laboratory Control Sample	B0853-LCS	107
	CAS Acceptance Criteria	76-122

Approved by

Ch. Elliott

Date

11/18/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: HVUST94/Holden Village
Sample Matrix: Soil

Date Collected: ----/----/----
Date Received: ----/----/----
Date Extracted: 11/08/94
Date Analyzed: 11/10/94
Work Order No.: B940853

Duplicate Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name: Batch QC
Lab Code: B0825-30

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Diesel	25	ND	ND	--	--
Oil	100	220	230	225	4

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by  Date 11/18/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: HVUST94/Holden Village
Sample Matrix: Soil

Date Collected: ----/----/----
Date Received: ----/----/----
Date Extracted: 11/08/94
Date Analyzed: 11/11/94
Work Order No.: B940853

Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)
Dry Weight Basis

Sample Name: Batch QC
Lab Code: B0825-21

Analyte	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Diesel	150	ND	197	131	61-141

ND None Detected at or above the method reporting limit

Approved by

Ch. Elliott

Date

11/18/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Nels Cone
Project: HVUST94/Holden Village
LCS Matrix: Soil

Date Extracted: 11/08/94
Date Analyzed: 11/11/94
Work Order No.: B940853

Laboratory Control Sample Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
mg/Kg (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Diesel	149	171	115	61-141

Approved by



Date

11/18/94



Analytical
Services Inc.

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DATE 10/30/94 PAGE 1 OF 1

PROJECT INFORMATION					NUMBER OF CONTAINERS	ANALYSIS REQUEST																REMARKS							
PROJECT NAME	PROJECT	COMPANY/ADDRESS	PHONE	SAMPLERS SIGNATURE		PETROLEUM HCS				ORGANIC				ORGANIC METALS/INORGANICS															
SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	TPH - HCID State:	TPH - G State:	TPH - D State:	TPH - 418.1 State:	TPH - Other	Halogenated or Aromatic Volatiles 601/8010	Volatile Organics GC/MS 602/8020	Base/Neutral/Acid Organics GC/MS 624-8240	Pesticides/PCBS 8080	PAH PCB ONLY 8310	HPCL 8310	TCLP Metals	Semi VOA	Metals Total List Below	Pest/Herb	Cyanide	PH, Cond Cl, SO ₄ , PO ₄ F, Br	NO ₂ NO ₃ (Circle)	NH ₃ - N, COD, TOX (Circle)	Total-P TKN, TOC					
HVCH14-02	10/30/94	0930		Soil																									
HVAET-04	10/30/94	1015		"																									
HVAET-11	10/30/94	1030		"																									

RELINQUISHED BY:		RECEIVED BY:		TURNAROUND REQUIREMENTS		REPORT REQUIREMENTS		INVOICE INFORMATION:		SAMPLE RECEIPT:	
Signature	<u>Neil B. Cane</u>	Signature	<u>Yablan N. Yarell</u>	☐ 24 hr	☐ 48 hr	☐ 5 day	☒ I. Routine Report	P.O.#		Shipping VIA:	
Printed Name	<u>Neil B. Cane</u>	Printed Name	<u>Yablan N. Yarell</u>	☒ Standard (10-15 working days)			☒ II. Report (includes DUP.MAS. MSD, as required, may be charged as samples)	Bill To		Shipping to:	
Firm	<u>HV</u>	Firm	<u>GAS</u>	☐ Provide Verbal Preliminary Results			☐ III. Data Validation Report (includes All Raw Data)			Condition:	
Date/Time	<u>4 Nov 94 1545</u>	Date/Time	<u>11/04/94 4:45</u>	☐ Provide FAX preliminary Results			☐ IV. CLP Deliverable Report			Lab No:	
Requested Report Date											

RELINQUISHED BY:		RECEIVED BY:		SPECIAL INSTRUCTIONS/COMMENTS:
Signature		Signature		
Printed Name		Printed Name		
Firm		Firm		
Date/Time		Date/Time		

Please include path with a date if not on these specific samples

APPENDIX B. UST DISPOSAL CERTIFICATION.



**West Pac
Environmental,
Inc.**

DISPOSAL CERTIFICATION

November 1, 1994

Holden Village
Chelan, Wa 98816

REFERENCE P.O. # Bill Lorrance

To whom it may concern,

This letter is to certify that West Pac Environmental, Inc. has received the following tank(s) for cleaning and disposal in accordance with all federal, state and local rules and regulations:

Two (2) 15,000 gallon diesel tanks
One (1) 675 gallon diesel tank
Nine (9) 300 gallon diesel tanks

WEST PAC JOB # 36-37336

DATE RECEIVED: 10-07-94

DATE CLEANED: 10-10 & 11-94 10-13 & 14-94

DATE OF DISPOSAL: 10-13-94 10-19-94

METHOD OF DISPOSAL: Scrap Steel

LOCATION OF TANK ORIGIN: Holden Village/ Chelan, WA

If you have any questions or requests for service, feel free to contact this office at (206) 762-1190.

Thank you for your business and we look forward to being of service in the future.

Sincerely,
West Pac Environmental, Inc.

J. D. Umbinetti
Remedial Technologies
JU/pva
dcholden

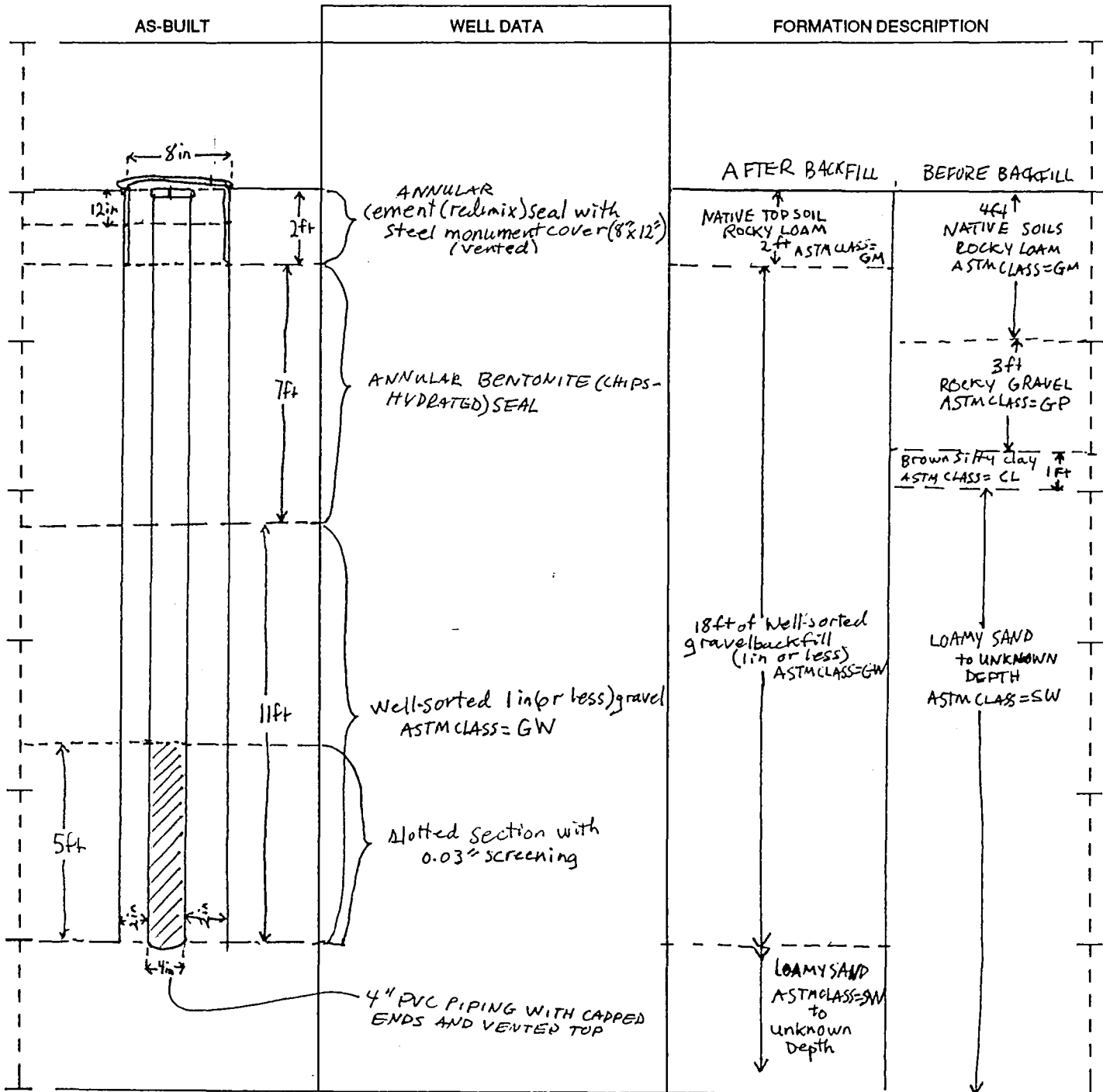
APPENDIX C. WELL CONSTRUCTION REPORTS

RESOURCE PROTECTION WELL REPORT

START CARD NO. (1)

PROJECT NAME: HVUST94
 WELL IDENTIFICATION NO. HVLIT-01
 DRILLING METHOD: EXCAVATION BACKFILL
 DRILLER: Nels B. Cone
 FIRM: Holden Village
 SIGNATURE: Nels B. Cone
 CONSULTING FIRM: NA
 REPRESENTATIVE: NA

COUNTY: Chelan
 LOCATION: 1 1/4 1 1/4 Sec 7 Twn 31N R 17E
 STREET ADDRESS OF WELL: Lodge #1, Holden Village Main Road
 WATER LEVEL ELEVATION: 12ft → 26ft, Seasonal fluctuation
 GROUND SURFACE ELEVATION: ≈ 3850 ft
 INSTALLED: 9/29/94
 DEVELOPED: NA



SCALE: 1" = 4 ft (height)
width not to scale
 ECY 050-12 (Rev. 11/89)

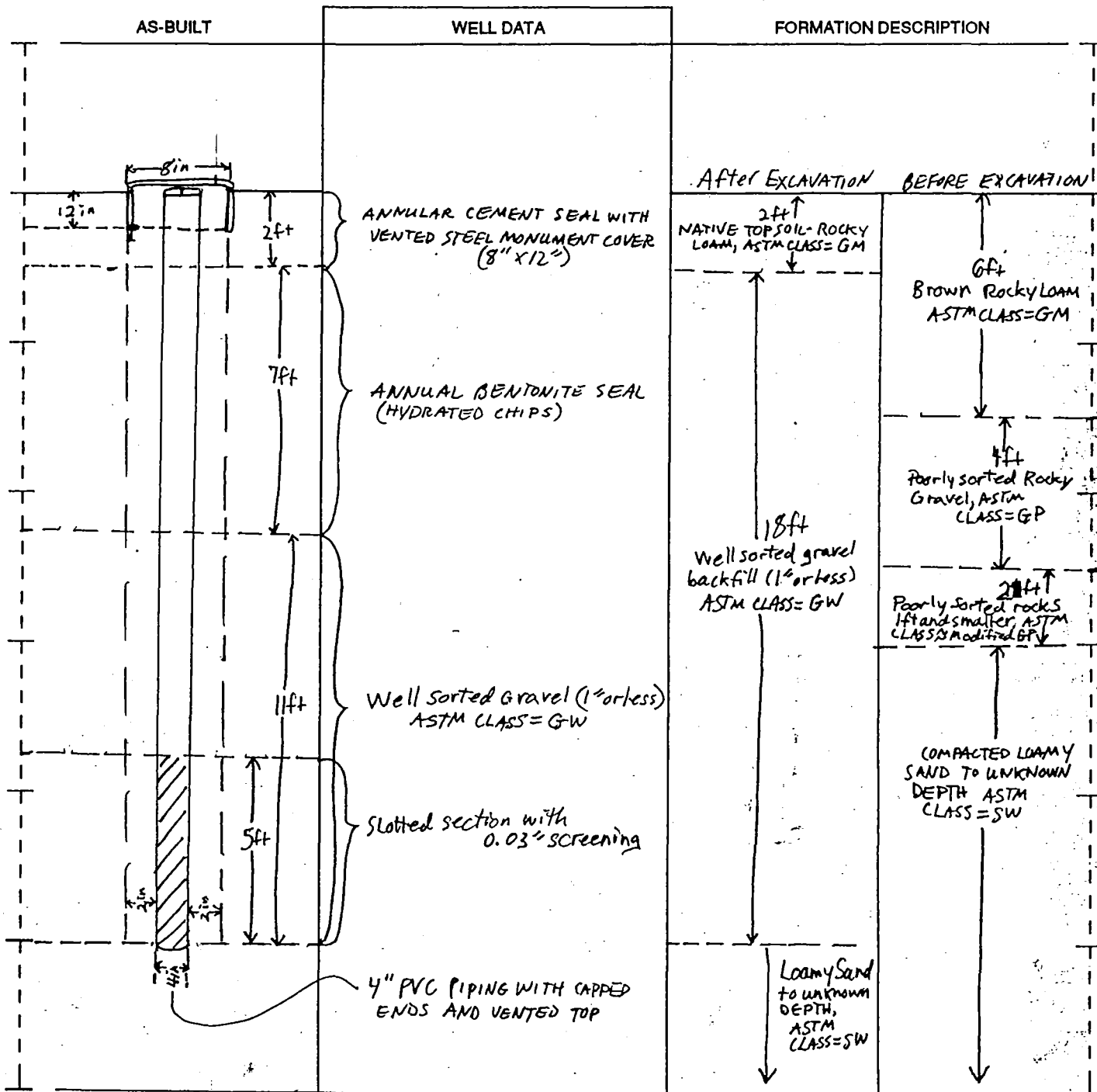
PAGE 1 OF 2

RESOURCE PROTECTION WELL REPORT

START CARD NO. (2)

PROJECT NAME: HVHST94
 WELL IDENTIFICATION NO. HVLT-01
 DRILLING METHOD: EXCAVATION BACKFILL
 DRILLER: Nels B. Cone
 FIRM: Holden Village
 SIGNATURE: Nels B. Cone
 CONSULTING FIRM: NA
 REPRESENTATIVE: NA

COUNTY: Chelan
 LOCATION: 1 1/4 1 1/4 Sec 7 Twn 31N R 17E
 STREET ADDRESS OF WELL: Lodge #4, Holden Village Main Road
 WATER LEVEL ELEVATION: 12ft → 26ft, Seasonal Fluctuation
 GROUND SURFACE ELEVATION: ≈ 3850ft
 INSTALLED: (IN PROGRESS) COMPLETION DATE: 198/9
 DEVELOPED: NA



SCALE: 1" = 4 ft. (height)
 width not to scale
 ECV 050-12 (Rev. 11/89)

PAGE 1 OF 2

APPENDIX D. HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN MODIFIED TO

CHEMICAL EMERGENCY RESPONSE PLAN (CERP)

To be used for Emergency Response or jobs expected to last less than one week

Project Description UST (Fuel Oil) Decommissioning Project No. HV94UST

DESCRIPTION OF MATERIAL TO BE HANDLED -- To be completed by Project Manager Petroleum Impacted Soils (fuel oil #2)

Actual T S and/or C = 14500 ppm

T = Time Weighted Average (TWA) S = Short Term Exposure Limit (STEL) C = Ceiling

LOCATION AND DESCRIPTION -- To be completed by Project Manager. (Include size/area, topography, open or confined space, ventilation, ignition sources, other materials/wastes in area, site accessibility, expected vapor dispersion, i.e., vertical -- horizontal -- likely to seek lower levels and form pockets -- leakage, available body/eye safety showers, etc.) A total of 12 USTs will be excavated and removed from the property. These tanks are located in a variety of areas throughout the site and lay in areas with a gentle southward sloping grade. These tanks will be CO₂ inerted and sealed prior to excavation. No site personnel will enter these excavations unless proper shoring (30° angle) is in place. From mid-morning to late afternoon light wind travels down valley (westerly) and from evening to next morning light winds travel in the opposite direction. The work areas will be secured to non-working personnel. All working personnel will be either 40 hr OSHA trained or be wearing Level-D P.P.E., depending upon the task. No known utilities exist underground at these sites.

SAFETY & HEALTH MANAGER TO COMPLETE THE FOLLOWING:

TOXICITY BY INHALATION SKIN ABSORPTION (CHECK ONE OR BOTH AS APPLICABLE)

Based on the lowest TWA, STEL and/or Ceiling. Check (X) the level of toxicity and circle T, S, or C to indicate TWA, STEL, and/or Ceiling below:

0 - 100 PPM	3	T	S	C	<u>Severely Toxic</u> - Hazardous waste that is capable of producing irreversible damage to employee health and/or employee death.	
101 - 500 PPM	2	T	S	C	<u>Moderately Toxic</u> - Hazardous waste that is capable of causing reversible or irreversible changes in the human body not necessarily severe enough to cause serious physical impairment or threaten life.	
Over 500 PPM	<u>X</u>	1	<u>(T)</u>	S	C	<u>Low or Slightly Toxic</u> - Hazardous wastes that are capable of producing changes readily reversible once exposure ceases <u>with or without medical intervention</u> .

TOXICITY BY INGESTION - Based on the lowest human LD50 or, if not available, the lowest animal LD50. Check (X) the applicable degree of toxicity below.

DOSE PER KG OF BODY WEIGHT	DEGREE OF TOXICITY	PROBABLE LETHAL DOSE FOR A 70 KG (155lb) MAN
More than 1.0 mg	<u> </u> (6) Dangerously Toxic	-- A taste
1 - 50 mg	<u> </u> (5) Seriously Toxic	-- A teaspoonful
50 - 500mg	<u> </u> (4) Highly toxic	<u>-- An ounce</u>
<u>0.5 - 5 gm</u>	<u>X</u> (3) Moderately Toxic	-- A pint
5 - 15 gm	<u> </u> (2) Slightly Toxic	-- A quart
less than 15 gm	<u> </u> (1) Low Toxicity	-- More than a quart

1. CHARACTERISTICS

Vapor Pressure 1.8 atm Vapor Density 1.52 (Air = 1) Other NA

2. PHYSICAL HAZARDS - FIRE/EXPLOSION

Flash point 144 °F LEL 1% % by Vol to UEL 6% % Other Tank inertion @ 0.2% LEL

3. REACTIVITY

Stable ☒ Unstable ☐ Pyroforic ☐ Oxidizer ☐ Water ☐ Hazardous Polymerization ☐

Decomposes to CO₂ and H₂O

Type decomposition Oxidation Due to: Heat, UV light, biodegradation

4. ACTION PLAN BASED ON MATERIAL/SITE/HAZARD INFORMATION (to be completed by Project Manager) A total of 12 USTs will be excavated and removed from the site property. These tanks contained fuel oil #2 sometime in the past. Without ingestion this material presents no unusual hazard. However, fumes from this material present a very real explosion hazard. For this reason precautions are taken and the large USTs will be inerted with CO₂. Equipment or clothing coming in contact with free product shall be decontaminated by washing with Alconox or similar agent.

5. PPE (DETAIL) Level D: Hardhat, safety glasses, steel-toe footwear, and gloves

6. DECONTAMINATION/FIRE PROTECTION All flame sources and motor vehicles (other than necessary equipment) are at least 50ft away from work site perimeter. Excavation vehicles to be upwind. Decontamination all sampling equipment will be conducted as needed.

7. MONITORING (Determined by Safety/Health Manager. Circle one. YES ☐ NO ☒)

USTs receive LEL/O₂ monitoring for inertion purpose only.

To be done by: _____ (A) On entry before job begins. Circle one. YES ☐ NO ☐

(B) During time in hazardous waste location -- EEMR (Required) YES ☐ NO ☐ -- Copy to Safety/Health Mgr.

8. AL SURVEILLANCE (determined by Safety/Health Manager) YES ☐ NO ☒

Emergency Radio		Emergency Radio	
Agency Numbers - Fire # <u>WNAVG49</u>	Injury # <u>WNAVG49</u>	Customer # <u>NA</u>	Contact Name <u>Bill Lorraine</u>
<u>WNAVG49</u>	<u>9/21/94</u>	<u>WNAVG49</u>	<u>9/21/94</u>
SAFETY & HEALTH MANAGER (REQUIRED)	DATE	PROJECT MANAGER/SUPERVISOR (REQUIRED)	DATE

9. CREW EMPLOYEES TO ACKNOWLEDGE ORIENTATION TO THIS CERP (REQUIRED)

NAME	SOC. SEC. #	NAME	SOC. SEC. #
<u>WNAVG49 - Fire Chief</u>	<u>535-94-8037</u>		
<u>WNAVG49 - Mechanic</u>	<u>533-74-2696</u>		
<u>WNAVG49 - Ops Mgr.</u>	<u>103 36 3052</u>		
<u>WNAVG49</u>			
DATE TRAINED <u>9/21/94</u>		TRAINING TIME <u>8:00 P.M.</u>	

APPENDIX E. SAMPLING AND ANALYSIS PLAN

The objective of this plan is to ensure that sample collection, handling, and analysis results in data of sufficient quality for initial characterization and to evaluate remedial actions at the site. Samples were received from three rounds of sampling events. Initial samples were taken to characterize petroleum product release to soils. Laboratory precision was verified using a set of blind duplicates samples taken from the site. Two subsequent sampling events were performed to characterize effectiveness of impacted soils removal.

All samples were collected by a Washington State Registered Site Assessor during the period beginning on 22 September 1994 to 30 October 1994. Sampling was performed using Personal Protective Equipment of Safety Level D. Disposable nitrile gloves were worn through out the sampling procedure.

For soils analysis, discrete grab samples were either taken directly from the center of the excavator's bucket, or from excavation sidewalls where ramped entrances were practical. Composite sampling of the impacted soils was performed in order to achieve adequate profiling of nutrient and physical conditions. Sampling containers were supplied by the analytical laboratory. New stainless steel sampling spoons were used to collect soils samples for placement into sealed glass containers. Each sample was properly labeled and immediately stored within an ice-filled cooler.

For groundwater analysis, a discrete grab sample was taken using new Teflon siphon tube and bulb. Ground water was then transferred into a one-liter sealed amber glass bottle. This laboratory supplied bottle contained dilute nitric acid as preservative. The sample was properly labeled and immediately stored within an ice-filled cooler.

Documentation of the sampling collection was completed immediately following sampling. The Chain-of-Custody/Analytical Request forms were filled out in triplicate, using an ink pen and placed in a plastic bag to avoid damage. The Chain-of-Custody/Analytical Request forms include the sampling time and date, site designation, sample identification number, analysis required, and authorized chain-of-custody

signatures of field sampling personnel and analytical laboratory personnel. No sample seals were necessary as samples were delivered directly to the analytical laboratory.

Chemical analysis for diesel-range compounds (WPTH-D), was performed in accordance with Ecology Guidance for Remediation of Releases from Underground Storage Tanks, Appendix L, (1992). The WPTH-D Method, also known as "8015 Modified", adapts EPA SW-846 Methods 3540 and 800 and covers the quantitative analysis of diesel-range compounds in both soil and water. Sample analysis was performed by Columbia Analytical Services, Inc. of Bothell, Washington.

Appendix F. Quality Assurance/Quality Control Project Plan

The objective of this plan is to ensure adequate Quality Assurance/Quality Control (QA/QC) of the analytical data generated from the samples. Sample results were evaluated in accordance with the *National Functional Guidelines for Organic Data Review*, (USEPA, 1991). The analytical data is evaluated for completeness, representativeness, comparability, accuracy, and precision. Any items that compromise this QA/QC criteria will tend to bias the resulting data and should be identified to users of this report. Additional "batch" QA/QC results were obtained from the lab for each set of sample that were analyzed. This information, along with the sample results, is used to make conclusions regarding data validation or usability.

All samples results and data, along with other information collected during the site characterization, were evaluated by a Washington State Registered Site Assessor. Samples results were received from three rounds of sampling events. Initial samples were taken to characterize petroleum product release to soils. Laboratory precision was verified using a set of blind duplicates samples taken from the site. Two subsequent sampling events were performed to characterize the effectiveness of impacted soils removal.

Sample Matrix	Number of Samples	Analysis Requested	Container Type	Holding Time	Sample Preservation	Quantitation Limit
Soil	24	WTPH-D	8 oz. jar	14 days	Cool to 4°C	25mg/kg
Water	1	WTPH-D	1 liter jar	14 days	Cool to 4°C w/5 ml HNO ₃	0.25mg/liter

The samples were submitted to Columbia Analytical Services (work orders B940706, B940739, B940853), along with properly completed chain-of-custody forms. The samples were documented as having been properly preserved and received in good condition. All samples were analyzed within the required holding times. Proper data qualifier flags were used by the laboratory as needed.

Field duplicate results demonstrate appropriate analytical precision was achieved. Surrogate recoveries for all samples were within required QC limits with the exception

of HVL1T-01. Surrogate recoveries from this sample slightly exceeded QC limits due to target analytes that interfered with TPH-D as oil analysis. However, the usefulness of the results have not been compromised. Laboratory duplicate analyses were performed, and the proper analytical precision is displayed. Matrix spike analyses indicate the required analytical accuracy was achieved. The method blank analysis results met the required QC criteria and no corrections were needed. Results from TPH-D as oil analysis for sample HVCH12-01 indicate an overlap of diesel components into the oil-range of analysis. As such the data user is advised that the results for TPH-D as oil for this sample is biased high and should be used with caution. Aside from the items mentioned above, the data quality objectives as defined by the *Functional Guidelines* are met. accordingly, this data set can be considered valid for its intended purpose.