

Job No: 193-2004-1
CNI1311R.ENV

**REPORT
OF**

DEPARTMENT OF ECOLOGY
Hazardous Waste Storage Tanks
JUL 22 1993

PHASE II/III ENVIRONMENTAL SITE ASSESSMENT

**Lucky's Service
14579 Alternate Highway 97
Entiat, Washington
Site ID No: 005695**

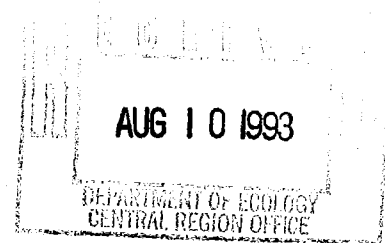
[Handwritten signature]
111

Prepared for:

**Joe Hall Construction
P.O. Box 477
Selah, Washington 98942
(509) 697-4858**

Prepared by:

**CHEN-NORTHERN, INC.
Consulting Engineers & Scientists
2214 North 4th Avenue
Pasco, Washington
(509) 547-1671**



June, 1993

**PHASE II/III ENVIRONMENTAL SITE ASSESSMENT
LUCKY'S SERVICE
ENTIAT, WASHINGTON
JOB NO. 193-2004-1
JUNE, 1993**

Table of Contents

EXECUTIVE SUMMARY

1.0 PROJECT DESCRIPTION	1
1.1 Introduction	1
1.2 Purpose and Scope	1
1.3 Background	2
2.0 ENVIRONMENTAL ASSESSMENT FINDINGS	3
2.1 Site Description	3
2.2 Geology and Hydrology	3
2.3 Field Activities	3
2.4 Field Observations	6
2.5 Analytical Results	8
3.0 DISCUSSION	15
4.0 CONCLUSIONS/RECOMMENDATIONS	19
5.0 LIMITATIONS	20

TABLES

Table 1 - Summary of Analytical Results: Pump Island #1 Excavation Samples	11
Table 2 - Summary of Analytical Results: Pump Island #2 Excavation Samples (5/13/93)	11
Table 3 - Summary of Analytical Results: Pump Island #2 Excavation Samples (5/18/93)	12
Table 4 - Summary of Analytical Results: Stockpile Samples	13
Table 5 - Summary of Analytical Results: Statistical Data of PCS Stockpile	14

FIGURES

Figure 1, Site Location Map	4
Figure 2, Detailed Site Plan	5
Figure 3, Excavation Site Diagram - 5/13/93	9
Figure 4, Excavation Site Diagram - 5/18/93	10
Figure 5, Pump Island Contamination Cross-Section Diagram	16
Figure 6, Pump Island Excavation Cross-Section Diagram	17

APPENDICES

Appendix 1 - Laboratory Results	
Appendix 2 - Washington State Department of Ecology Action Levels	
Appendix 3 - Photographic Records	
Appendix 4 - References	

EXECUTIVE SUMMARY

Chen-Northern has completed phase II/III assessment activities for Lucky's Service located at 14579 Alternate Highway 97 in Entiat, Washington. This report presents the assessment findings on the removal and disposal of petroleum contaminated soil (PCS). The PCS resulted from a release of gasoline from beneath two pump islands previously located at the subject site. Field activities were performed on May 12, 13, and 18, 1993.

Field observations and laboratory results indicated the petroleum hydrocarbon contamination has been successfully removed from the former pump island sites. Petroleum hydrocarbon concentrations in subsoil samples obtained from the final boundaries of the excavations were below Washington State Department of Ecology (WDOE) Method A action levels. Based on the results of this assessment, Chen-Northern's professional opinion is that this site has been successfully remediated and meets the criteria for permanent closure.

Approximately 410 cubic yards of PCS was removed and placed on an adjacent vacant lot. This material was spread out on plastic to a thickness of one to three feet and enclosed with plastic safety fencing. Based on past experience, the PCS appeared suitable for remediation by landfarming (soil aeration) without presenting a significant health hazard to local residents or endangering water resources. Mr. Dave Prosch of the Chelan-Douglas Health District was contacted by phone on May 14, 1993, and informed of plans to landfarm this material on-site. Although Chelan County does not have an official procedure for establishing PCS landfarm sites, laboratory results and pertinent information pertaining to the subject site were forwarded to Mr. Prosch for his review.

Chen-Northern recommends that the WDOE be notified as to the conditions that exist at the subject site. We also recommend the stockpiled PCS currently being landfarmed on-site be sampled in six to eight months to monitor the effectiveness of aeration and to determine the need for soil turning or removal.

**PHASE II/III ENVIRONMENTAL SITE ASSESSMENT
LUCKY'S SERVICE
ENTIAT, WASHINGTON
JOB NO. 193-2004-1
JUNE, 1993**

1.0 PROJECT DESCRIPTION

1.1 Introduction

At the request of Mr. Don Geck of Joe Hall Construction, Chen-Northern has completed phase II/III assessment activities for Lucky's Service located at 14579 Alternate Highway 97 in Entiat, Washington. This report presents the assessment findings on the removal and disposal of petroleum contaminated soil (PCS). The PCS resulted from a release of gasoline from beneath two pump islands previously located at the subject site. Field activities were performed on May 12, 13, and 18, 1993.

1.2 Purpose and Scope

The purpose of the project was to assist responsible parties in complying with the current U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (WDOE) regulations and guidelines for an independent cleanup of PCS resulting from petroleum releases.

The following scope of services were performed for this assessment:

- * An environmental professional was mobilized to the subject site to oversee the excavation and removal PCS.
- * The excavation was observed for signs of contamination including visible free product, subsoil discoloration, and odor. Selected subsoil samples were screened with a photoionization detector (PID) to detect volatile organic vapor.
- * Subsoil samples were collected from the excavation and stockpiled soil for laboratory analysis. These samples were selectively analyzed for total petroleum hydrocarbons modified for gasoline (WTPH-G, EPA Method 8015), total lead, (ICP-Lead, EPA

Method 7421) and for benzene, toluene, ethylbenzene, and xylenes (BTEX, EPA Method 8020). Sampling locations were chosen based on visual observations of the excavation and at the pre-specified points referred to by WDOE guidelines.

- * A report was prepared to summarize the field activities performed and the findings of the environmental assessment. The report rendered our evaluation concerning petroleum hydrocarbon contamination at the subject site and the success of the remediation effort.

1.3 Background

Two underground storage tanks (USTs) were to be decommissioned by removal from the subject site. Joe Hall Construction, a licensed excavation firm, was contracted to properly decommission the tanks and to install a new UST system. Chen-Northern was subcontracted to perform the required site assessment. Reportedly, these tanks had been used for storing gasoline for the past 25 years. Both USTs were registered with the WDOE as fuel supply tanks for commercial retail. The USTs were to be decommissioned for regulatory reasons and replaced with a new UST system.

Results of the subsurface investigation indicated petroleum hydrocarbon contamination to be present in subsoils at the subject site (Chen-Northern, 193-2004). Field observations from the UST decommissioning indicated that a release of gasoline occurred beneath both pump islands. Gasoline and BTEX compound concentrations exceeded WDOE Method A action levels in the subsoil sample obtained from beneath pump island #2. Based on the results of this assessment, Chen-Northern's professional opinion was that this site had been impacted by petroleum hydrocarbons.

Chen-Northern recommended that the WDOE be notified as to the conditions that existed at the subject site as dictated by WAC 173-360-372 of the Washington State Underground Storage Tank Regulations. Mr. Jim Chulos of the WDOE Central Region was contacted by phone on May 13, 1993. Based on the results of our site assessment, a phase II/III environmental assessment was initiated to determine the extent of contamination in the subsoil and to remove the PCS. The PCS appeared suitable for on-site landfarming (soil aeration) in accordance with EPA and WDOE guidelines.

2.0 ENVIRONMENTAL ASSESSMENT FINDINGS

2.1 Site Description

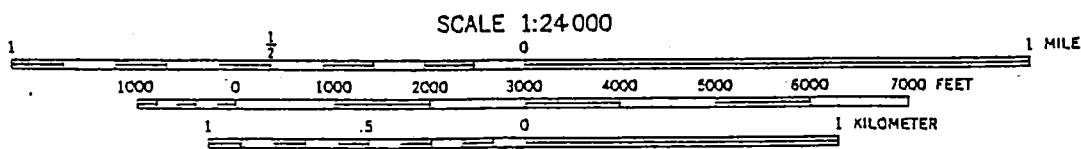
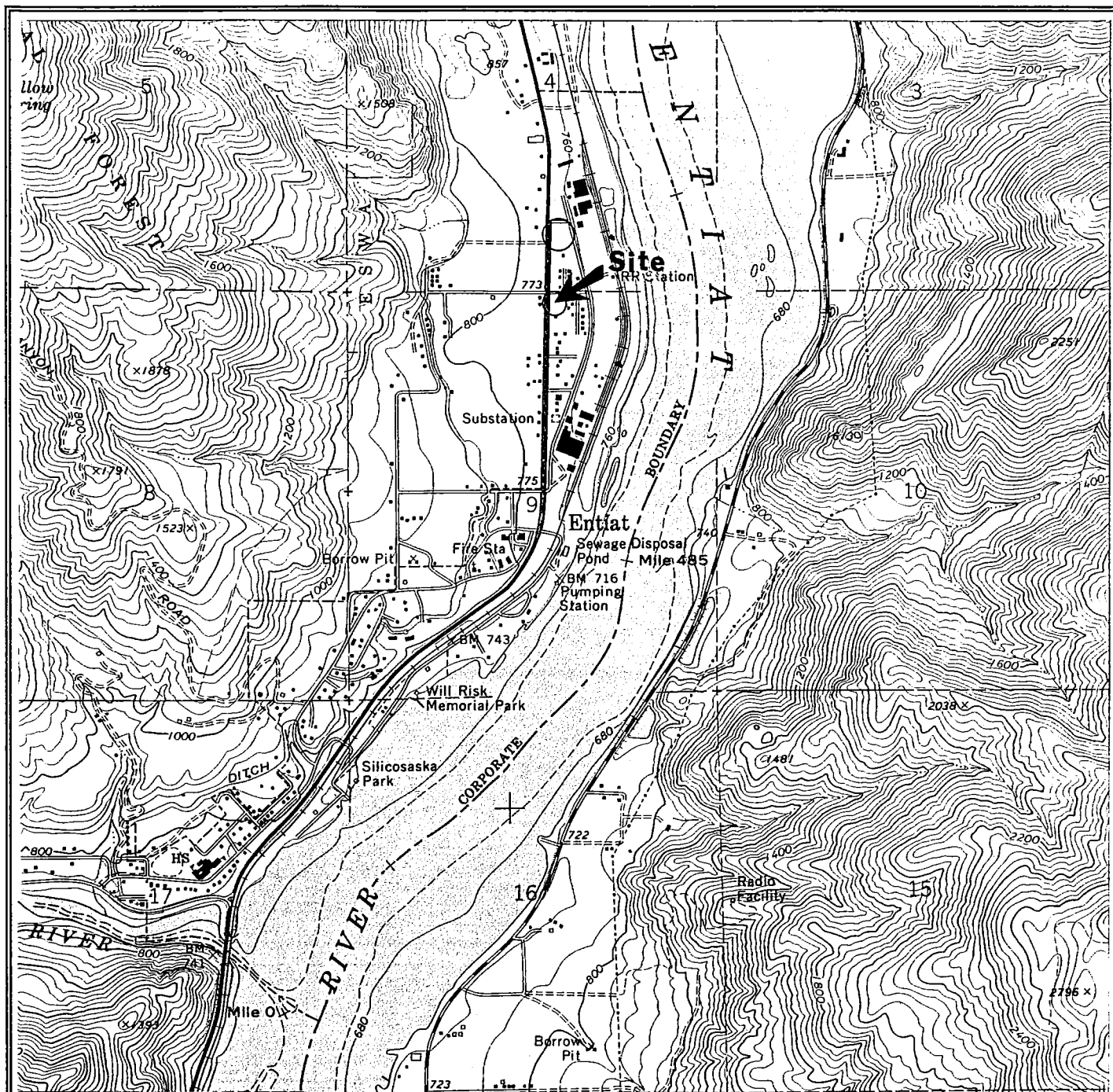
The subject site is identified as Lucky' Service located at 14579 Alternate Highway 97 in Entiat, Washington. An approximate legal description is the northwest quarter of the northeast quarter of Section 9, Township 25 North, Range 21 East, Chelan County, Washington. The subject site is bounded by undeveloped land to the north, Alternate Highway 97 to the west, and residential housing to the east and south. The subject site consists of a single-story building with maintenance bays and pump islands typical of an automobile service station. The building is situated on the center of the lot with paved parking to the front and a fenced open storage area to the rear. The subject site location is depicted in the Site Location Map (Figure 1) while site characteristics are shown in the Detailed Site Plan (Figure 2).

2.2 Geology and Hydrology

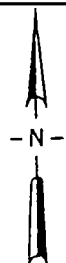
The subject site is located on the distal portion of an alluvial fan at the base of the Entiat Mountains. Alluvial fan deposits may be interbedded with alluvial deposits from the ancestral Columbia River. Subsurface materials, as observed during excavation activities, consist of light brown silty clay of alluvial origin with poorly graded sand seams. Groundwater contact is estimated to be approximately 50 feet below ground surface (BGS) based on previous experience and topographic elevation. The groundwater flow direction, if consistent with the surrounding surface topography, is estimated to be towards the east. The nearest surface water is the Columbia River located approximately 400 yards to the east.

2.3 Field Activities

An environmental professional from Chen-Northern remained at the subject site to oversee excavation activities on May 12, 1993, after completing the field evaluations for the underground storage tank site assessment. The 10000 and 8000 gallon capacity USTs had been removed from the site earlier that day. Overexcavating activities were initiated at the



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETTIC VERTICAL DATUM OF 1929



CHEN-NORTHERN, INC.

Job No.: 193-2004-1

SITE LOCATION MAP

LUCKY'S SERVICE
14579 HWY 97
ENTIAT, WASHINGTON

DATE:
5/27/93

DRAWN BY:
GT

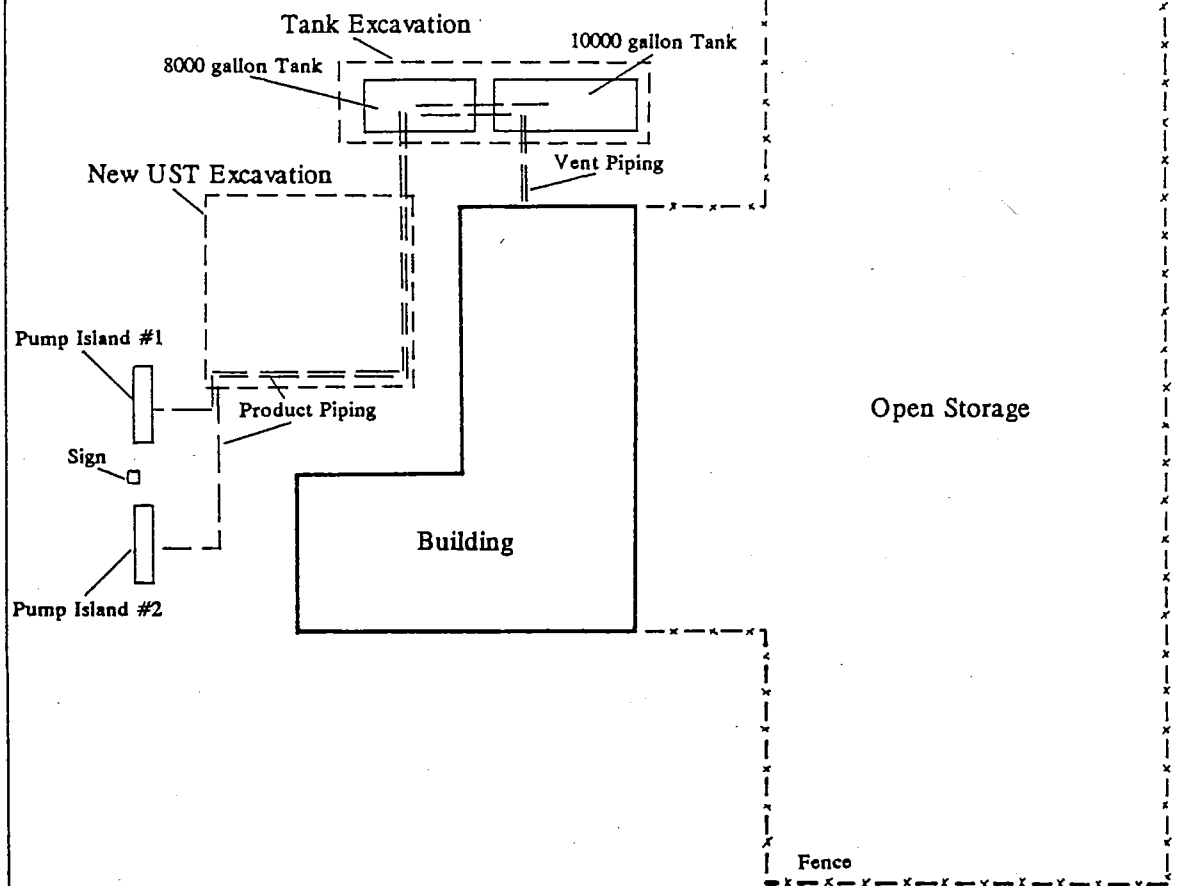
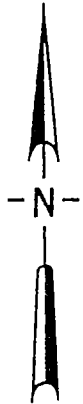
REVIEWED BY:
GH

SCALE:
As Shown

FIGURE NO.
1

Alternate Highway 97

Vacant Lot



SCALE



FEET

CHEN-NORTHERN, INC.

Job No.: 193-2004-1

DETAILED SITE PLAN

LUCKY'S SERVICE
14579 HWY 97
ENTIAT, WASHINGTON

DATE:
6/4/93

DRAWN BY:
GT

REVIEWED BY:
GH

SCALE:
1:360

FIGURE NO.
2

former locations of the two pump islands where field observations indicated PCS was present. The removal of PCS was conducted by examining the subsoil for visual discoloration and the presence of volatile organic vapors and expanding the excavation accordingly.

Subsoil samples were collected during the PCS removal process from various locations in the excavation for volatile organic vapor screening. Volatile organic vapor screening procedures consisted of scanning the excavated subsoil with a photoionization detector (PID), Microtip Model 102, for the detection of volatile organic compounds. Headspace samples were prepared by placing representative subsoil samples in a clean glass container, covering the container with aluminum foil, sealing the container, and allowing the sample to warm to approximately 75 degrees F. The headspace (air trapped in the uppermost portion of the container) of each sample was then measured with the PID to detect volatile compounds. This methodology is considered representative of in-situ conditions but is dependent on field conditions, including the chemical nature of the contaminant, soil moisture content and weather conditions.

After the extent of petroleum hydrocarbon contamination had been removed as determined by field observations and volatile organic vapor screening, subsoil samples were collected from each of the two final excavation boundaries for laboratory analysis. The excavations were then backfilled with clean gravel fill. All stockpiled PCS was placed on plastic in the vacant lot located adjacent to the service station. Field methods conformed to local health codes and regulations prescribed by the WDOE for the removal and disposal of PCS.

2.4 Field Observations

Subsoils from the excavations were examined for evidence of petroleum hydrocarbon contamination. Slightly stained and odorous subsoil was noted at the base and south sidewall of each excavation during initial excavating activities. These were the areas that previous field observations had indicated elevated levels of petroleum hydrocarbons were present (Chen-Northern, 193-2004). The original excavations are depicted in the Detailed

Site Plan (Figure 2).

Overexcavating activities commenced in the center of the contaminated area beneath pump island #1. After excavating to 8 feet BGS, sampling and headspace testing of the subsoils indicated volatile organic vapors were present at concentrations of 339 parts per million (ppm). The excavation was expanded in all directions and continued until petroleum hydrocarbon contamination could not be detected using field methods. The resulting excavation was approximately 10 feet by 8 feet by 14 feet BGS. The boundaries of the excavation were sampled and volatile organic vapors were detected in concentrations ranging from 0.0 ppm to 2.3 ppm. These readings were not considered significant based on past field experience. Approximately 60 cubic yards (yds³) of PCS were removed from the excavation and deposited on the adjacent vacant lot.

Overexcavating activities were then initiated in the center of the contaminated area beneath pump island #2. After excavating to 8 feet BGS, field observations indicated petroleum hydrocarbon contamination was still present. Volatile organic vapors were detected at concentrations of 27.2 ppm for the base, and the south sidewall was stained and odorous. Excavating activities were stopped due to time restraints but were resumed the next day.

On May 13, 1993, the excavation was expanded several feet in all directions and headspace testing was repeated. At the north end of the excavation along the north, east and west sidewalls at 8 feet BGS, volatile organic vapors were detected at concentrations ranging from 29.8 ppm to 287.0 ppm. Subsoil samples from the north and south base of the excavation, collected at 9 feet BGS, exhibited volatile organic vapor concentrations of 500 ppm and 2365 ppm, respectively. The sidewalls from the south end of the excavation remained slightly stained and odorous with volatile organic vapor concentrations ranging from 28.1 ppm to 442 ppm.

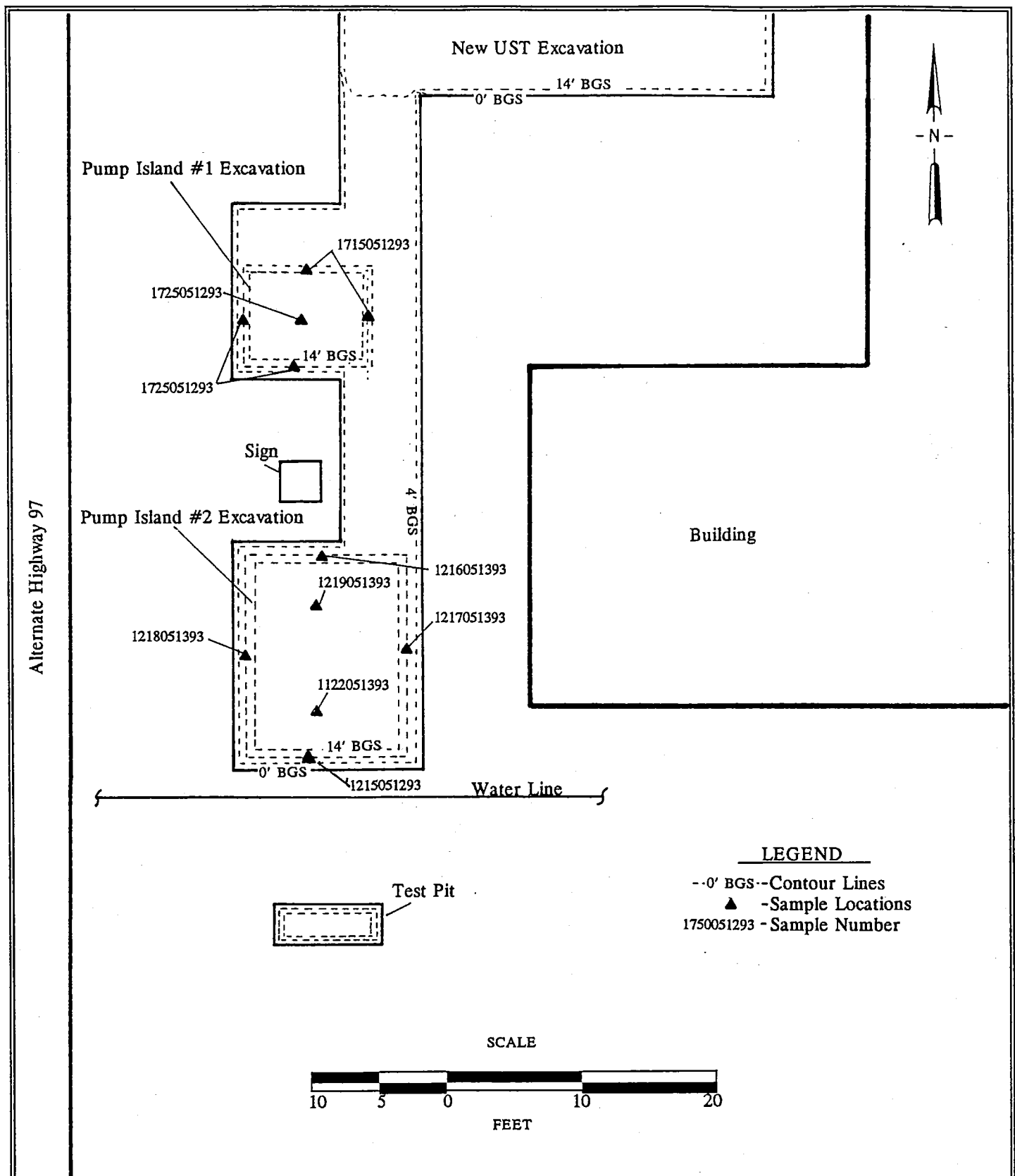
The excavation was again expanded several feet in all directions except in the south where digging was inhibited by a water line. The excavation reached a depth of 14 feet when

visual observations indicated the vertical extent of petroleum hydrocarbon contamination had been reached. The south end, however, remained odorous and volatile organic vapor concentrations were detected at concentrations ranging from 87.8 ppm to 2706 ppm. Due to the presence of the water line, a test pit was placed approximately 10 feet south of the excavation. Headspace testing of subsoil samples from the test pit indicated that volatile organic vapors were present at concentrations of 1.8 ppm at 10 feet BGS and 89.3 ppm at 14 feet BGS. Excavating activities were stopped until the water line could be removed. Subsoil samples were collected from the excavation boundaries for laboratory analysis. The dimensions of this excavation and the excavation from pump island #1 are depicted in the Excavation Site Diagram - 5/13/93 (Figure 3).

Excavating activities resumed May 18, 1993, with the removal of the water line and continued until field observations indicated the petroleum hydrocarbon contamination was removed. The excavation was expanded 5 feet south past the test pit (15 feet from the previous excavation boundary), 5 feet west to the highway right-of-way, and 5 feet in the vertical direction. The resulting excavation was approximately 35 feet by 20 feet by 19.5 feet BGS. Subsoil samples were again collected from the excavation boundaries for laboratory analysis. A combined total of approximately 350 yds³ of PCS were removed from this excavation and deposited on the adjacent vacant lot. The dimensions of the final excavation is depicted in the Excavation Site Diagram - 5/18/93 (Figure 4).

2.5 Analytical Results

Representative subsoil samples were obtained from various locations of the pump island excavation boundaries completed on May 13, 1993. These samples were collected in laboratory supplied containers, labelled, and placed in coolers with ice for temporary storage until received by our accredited laboratory in Billings, Montana. Sample locations are depicted in the Excavation Site Diagram - 5/13/93 (Figure 3). Laboratory results are summarized in Tables 1 and 2 while the actual laboratory report and chain-of-custody documentation can be found in Appendix 1.



LEGEND

- 0' BGS--Contour Lines
- ▲ -Sample Locations
- 1750051293 - Sample Number

EXCAVATION SITE DIAGRAM - 5/13/93

CHEN-NORTHERN, INC.

Job No.: 193-2004-1

LUCKY'S SERVICE
14579 HWY 97
ENTIAT, WASHINGTON

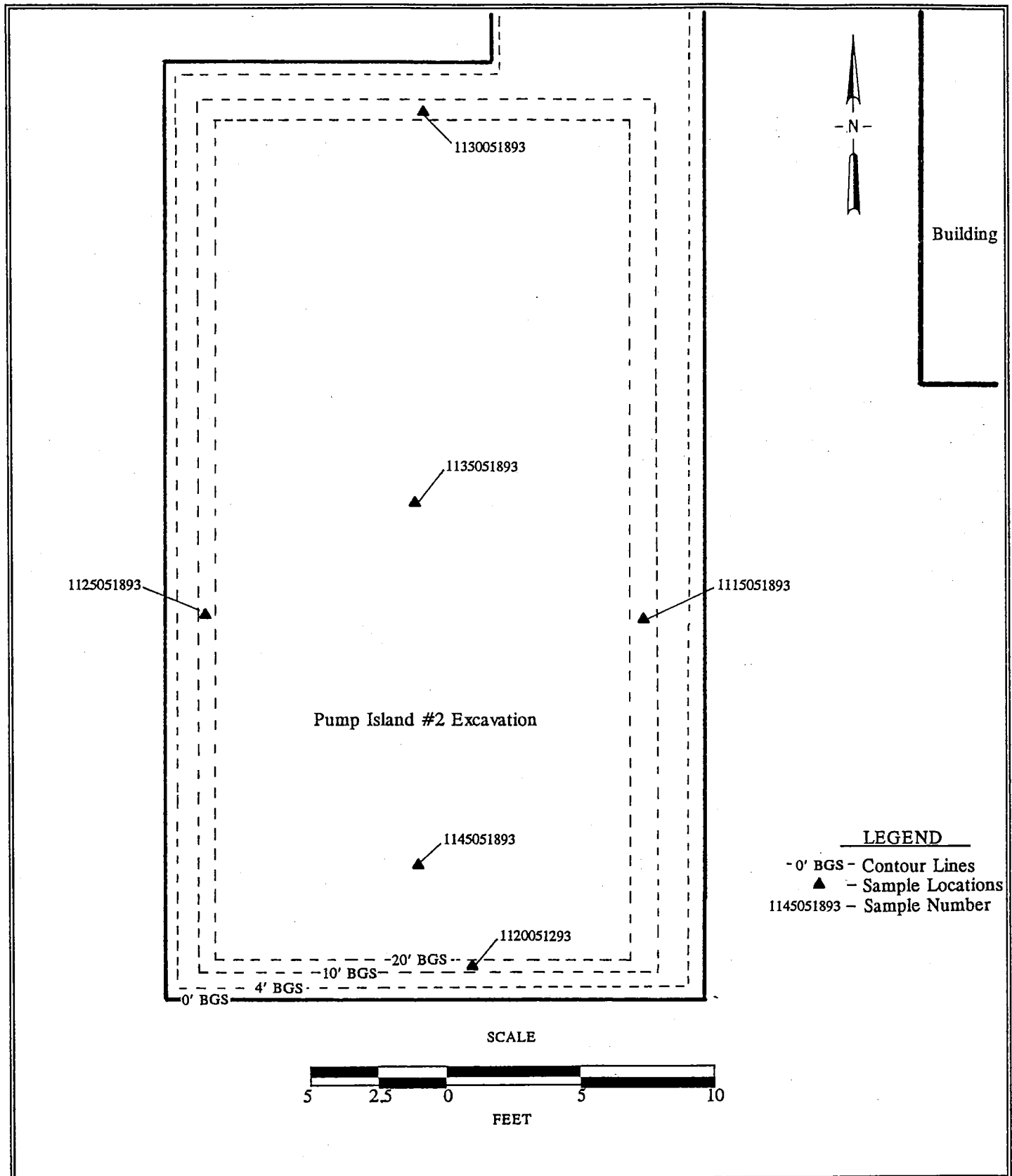
DATE:
6/4/93

DRAWN BY:
GT

REVIEWED BY:
GH

SCALE:
1:120

FIGURE NO.
3



CHEN-NORTHERN, INC.

Job No.: 193-2004-1

EXCAVATION SITE DIAGRAM - (5/18/93)

LUCKY'S SERVICE
14579 HWY 97
ENTIAT, WASHINGTON

DATE:
5/27/93

DRAWN BY:
GT

REVIEWED BY:
GH

SCALE:
1:60

FIGURE NO.
4

Table 1
Summary of Analytical Results
Pump Island #1 Excavation Samples

Sample No.	Location ¹	Matrix	Analysis	Concentration ²					
				Gasoline (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)
1715051293	North/East Wall Composite, 10'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1720051293	South/West Wall Composite, 10'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1725051293	Center Base, 14'	Soil	WTPH-G BTX ICP-Lead	< 0.6	<0.006	< 0.006	< 0.006	< 0.006	< 21

¹ Sample locations are characterized by area from which the sample was obtained and the depth (in feet) below ground surface.

² Soil sample results are reported as a dry weight basis in milligrams per kilogram (mg/kg).

A < sign indicates concentrations, if present, were below practical detection limits calculated for the analytical method.

A N/A indicates constituent was not analyzed for.

Table 2
Summary of Analytical Results
Pump Island #2 Excavation Samples (5/13/93)

Sample No.	Location ¹	Matrix	Analysis	Concentration ²					
				Gasoline (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)
1215051393	South Wall, 10'	Soil	WTPH-G	< 0.7	N/A	N/A	N/A	N/A	N/A
1216051393	North Wall, 10'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1217051393	East Wall, 10'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1218051393	West Wall, 10'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1219051393	North Base, 14'	Soil	WTPH-G BTX ICP-Lead	< 0.6	< 0.006	< 0.006	< 0.006	< 0.017	< 21
11220051393	South Base, 14'	Soil	WTPH-G BTX ICP-Lead	730 *	< 0.5	1.5	< 0.5	58 *	26

¹ Sample locations are characterized by area from which the sample was obtained and the depth (in feet) below ground surface.

² Soil sample results are reported as a dry weight basis in milligrams per kilogram (mg/kg).

* Exceed Action Levels established by the Washington State Department of Ecology. See Appendix 2.

A < sign indicates concentrations, if present, were below practical detection limits calculated for the analytical method.

A N/A indicates constituent was not analyzed for.

Laboratory results confirmed that petroleum hydrocarbon concentrations in the final excavation boundaries of pump island #1 were below practical detection limits. These concentrations were below the WDOE Method A action levels set for gasoline, lead, and BTEX compounds. On the other hand, gasoline and xylene concentrations in the south end of the pump island #2 excavation exceeded WDOE Method A action levels. Action levels established by the WDOE may be found in Appendix 2.

Representative subsoil samples were also collected on May 18, 1993, from the expanded excavation boundaries of pump island #2. These samples were collected in the same manner as previously described. Sample locations are depicted in the Excavation Site Diagram - 5/18/93 (Figure 4). Laboratory results are summarized in Table 3 while the actual laboratory report and chain-of-custody documentation can be found in Appendix 1.

Table 3
Summary of Analytical Results
Pump Island #2 Excavation Samples (5/18/93)

Sample No.	Location ¹	Matrix	Analysis	Concentration ²					
				Gasoline (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)
1115051893	East Wall, 12.5'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1120051893	South Wall, 12.5'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1125051893	West Wall, 12.5'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1130051893	North Wall, 12.5'	Soil	WTPH-G	< 0.6	N/A	N/A	N/A	N/A	N/A
1135051893	North Base, 19.5'	Soil	WTPH-G BTEX ICP-Lead	< 0.6	< 0.006	< 0.006	< 0.006	< 0.017	N/A
1145051893	South Base, 19.5'	Soil	WTPH-G BTEX ICP-Lead	< 0.6	< 0.006	< 0.006	< 0.006	< 0.008	N/A

¹ Sample locations are characterized by area from which the sample was obtained and the depth (in feet) below ground surface.

² Soil sample results are reported as a dry weight basis in milligrams per kilogram (mg/kg).

A < sign indicates concentrations, if present, were below practical detection limits calculated for the analytical method.

A N/A indicates constituent was not analyzed for.

Laboratory results confirmed that petroleum hydrocarbon concentrations in the final excavation boundaries were below the practical detection limits. These results indicated

gasoline concentrations were reduced from 730 mg/kg to <0.6 mg/kg and xylene concentrations were reduced from 58 mg/kg to <0.008 mg/kg for the south end of the excavation. These concentrations were below the WDOE Method A action levels set for gasoline and xylenes.

In order to characterize the stockpiled PCS for on-site landfarming, representative subsoil samples were obtained from the stockpile. These samples were collected in the same manner as previously described. Laboratory results are summarized in Table 4 while the actual laboratory report and chain-of-custody documentation can be found in Appendix 1.

Table 4
Summary of Analytical Results
Stockpile Samples

Sample No.	Location ¹	Matrix	Analysis	Concentration ²					
				Gasoline (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)
1205051293	Stockpile	Soil	WTPH-G BTEX ICP-Lead	2.2	< 0.006	< 0.006	< 0.006	< 0.017	132
1210051293	Stockpile	Soil	WTPH-G BTEX ICP-Lead	< 0.6	< 0.006	< 0.006	< 0.006	< 0.017	120
1215051293	Stockpile	Soil	WTPH-G BTEX ICP-Lead	< 0.6	< 0.006	< 0.006	< 0.006	< 0.017	110
0920051393	Stockpile	Soil	WTPH-G BTEX ICP-Lead	2700*	< 0.380	6.20	0.950	190.0*	38
1100051393	Stockpile	Soil	WTPH-G BTEX ICP-Lead	8.3	< 0.006	< 0.006	< 0.006	< 0.018	26
1450051293	Stockpile	Soil	WTPH-G BTEX ICP-Lead	3.2	< 0.006	< 0.006	< 0.006	< 0.006	38
1535051293	Stockpile	Soil	WTPH-G BTEX ICP-Lead	< 0.6	< 0.006	< 0.006	< 0.006	< 0.018	47
1730051293	Stockpile	Soil	WTPH-G BTEX ICP-Lead	1900*	< 0.480	8.00	< 0.480	230.0*	145

¹ Sample locations are characterized by area from which the sample was obtained and the depth (in feet) below ground surface.

² Soil sample results are reported as a dry weight basis in milligrams per kilogram (mg/kg).

* Exceed Action Levels established by the Washington State Department of Ecology. See Appendix 2.

A < sign indicates concentrations, if present, were below practical detection limits calculated for the analytical method.

Laboratory results indicated petroleum hydrocarbon concentrations in the stockpiled PCS exceeded WDOE Method A action levels. Gasoline and xylene concentrations greatly exceeded action levels in two of the eight subsoil samples analyzed. Although trace levels of benzene, ethylbenzene, toluene, and lead were discovered, action levels were not exceeded for these constituents in any of the subsoil samples collected. Table 5 is a summary of statistical data calculated for the PCS stockpile.

Table 5
Summary of Analytical Results
Statistical Data of PCS Stockpile

Constituent	Mean ¹	Standard Deviation ²	Upper Confidence Level ³	WDOE Method A Action Levels
Gasoline	580 mg/kg	1100 mg/kg	1100 mg/kg	100 mg/kg
Benzene	0.056 mg/kg	0.099 mg/kg	0.11 mg/kg	0.5 mg/kg
Ethylbenzene	1.8 mg/kg	3.3 mg/kg	3.5 mg/kg	20 mg/kg
Toluene	0.15 mg/kg	0.33 mg/kg	0.32 mg/kg	40 mg/kg
Xylenes	53 mg/kg	99 mg/kg	103 mg/kg	20 mg/kg
Lead	82 mg/kg	50 mg/kg	107 mg/kg	250 mg/kg

¹ Mean (average) of concentrations calculated from information provided by Table 4.

² Standard deviation, or sample standard deviation, is an estimate of the variability among the collected sample data.

³ Upper confidence level - i.e. any given sample from this stockpile has a 5% possibility of exceeding this concentration.

The statistical information provided by Table 5 confirmed WDOE Method A action levels were exceeded. Although the data contained a large margin of error, as indicated by the significant standard deviation calculated for each constituent, the upper confidence level data affirmed that gasoline and xylene concentrations exceeded established action levels. Information from Table 5 also affirmed that benzene, ethylbenzene, toluene, and lead concentrations were below action levels.

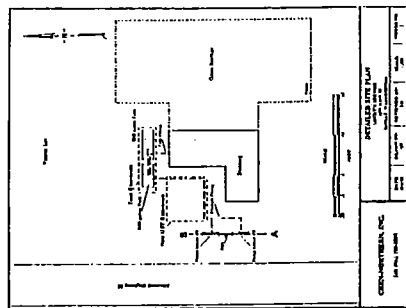
3.0 DISCUSSION

Results of the underground storage tank site assessment indicated petroleum hydrocarbon contamination was present in subsoils at the subject site (Chen-Northern, 193-2004). Field observations from the original UST decommissioning indicated that gasoline may have originated from beneath the pump islands, possibly at product piping couplings.

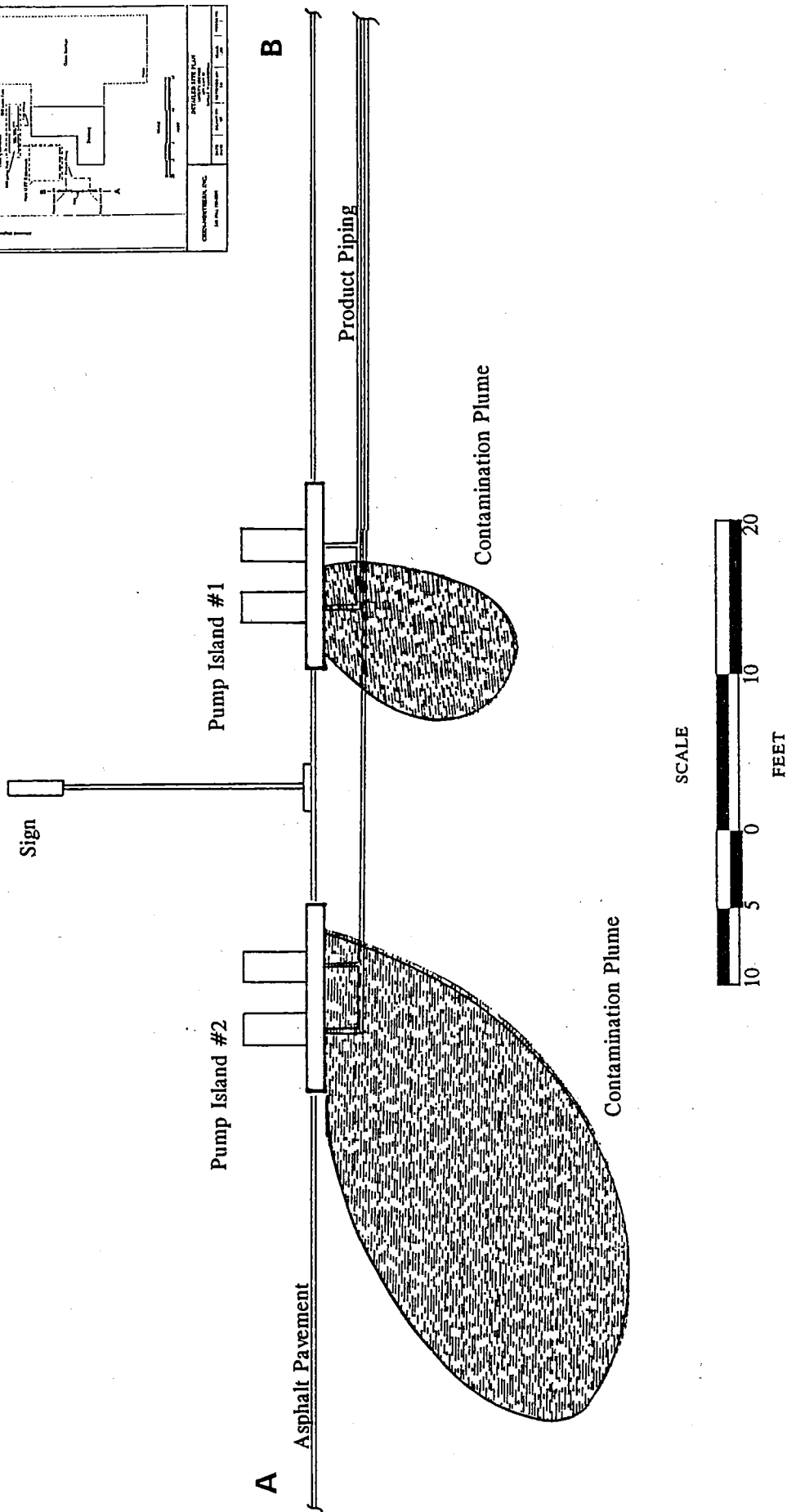
Beneath pump island #1, the released gasoline appeared to have migrated vertically through the subsoil to a depth of approximately 12 feet BGS. The zone of contamination appeared confined horizontally to an area approximately 10 feet by 8 feet. A cross-section of the estimated contamination zone for pump island #1 is depicted in the Pump Island Contamination Cross-Section Diagram (Figure 5).

On the other hand, the zone of contamination beneath pump island #2 was much more extensive. Based on field observations, the released gasoline from this pump island was traced to a depth of approximately 18 feet BGS at the deepest point. In addition, the released gasoline migrated approximately 20 feet south of the pump island. The sand seams discovered in the native subsoils have been migration pathways for the released gasoline. An alternate explanation may be that the original pump island backfill contacted the backfill for the water line and this backfill material allowed the gasoline to migrate further south than would otherwise have occurred. A cross-section of the estimated contamination zone for pump island #2 is also depicted in the Pump Island Contamination Cross-Section Diagram (Figure 5).

Excavating activities conducted at the subject site appeared successful in removing the PCS from both pump island releases. Cross-sections of the estimated contamination zones transposed with the remediation excavations are depicted in the Excavation Cross-Section Diagram (Figures 6). Laboratory analysis of subsoil samples collected from the boundaries of both excavations indicated contaminant concentrations were below practical detection limits for gasoline, lead, and BTEX compounds.



A **B**



PUMP ISLAND CONTAMINATION CROSS-SECTION DIAGRAM

LUCKY'S SERVICE
14579 HWY 97
ENTIAT, WASHINGTON

CHEN-NORTHERN, INC.

Job No.: 193-2004-1

View is toward the west from service station.
Please note that this is an approximation based on field observations and laboratory analysis.

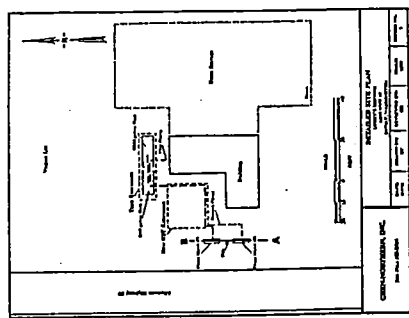
DATE:
6/4/93

DRAWN BY:
GT

REVIEWED BY:
GH

SCALE:
1:120

FIGURE NO.
5



A

Pump Island #2
Excavation

B

Pump Island #1
Excavation

SCALE



FEET

View is toward the west from service station.

Please note that this is an approximation based on field observations and laboratory analysis.

PUMP ISLAND EXCAVATION CROSS-SECTION DIAGRAM

LUCKY'S SERVICE
14579 HWY 97
ENTIAT, WASHINGTON

CHEN-NORTHERN, INC.

Job No.: 193-2004-1

DATE:
6/4/93

DRAWN BY:
GT

REVIEWED BY:
GH

SCALE:
1:120

FIGURE NO.
6

Approximately 410 yds³ of PCS was removed and placed on the adjacent vacant lot. This material was spread out on plastic to a thickness of one to three feet and enclosed with plastic safety fencing. Based on past experience, the PCS appeared suitable for remediation by landfarming (soil aeration) without presenting a significant health hazard to local residents or endangering water resources. Laboratory analysis of subsoil samples collected from the stockpile indicated gasoline concentrations averaged 580 mg/kg and xylene concentrations averaged 52.5 mg/kg. The highest concentrations found in the stockpile for gasoline and xylenes were 2700 mg/kg and 280 mg/kg, respectively. Groundwater was estimated to be approximately 50 feet BGS and the nearest surface water was the Columbia River located over 400 yards to the east. Mr. Dave Prosch of the Chelan-Douglas Health District was contacted by phone on May 14, 1993, and informed of plans to landfarm this material on-site. On his recommendation, Chen-Northern prepared a written notice to be distributed with local residents informing them of the landfarming activities being conducted at the subject site and to warn parents that children should not play in this material. Reportedly, the subject site owner distributed these notices to surrounding residents. Although Chelan County does not have an official procedure for establishing PCS landfarm sites, laboratory results and pertinent information pertaining to the subject site were forwarded to Mr. Prosch for his review.

4.0 CONCLUSIONS/RECOMMENDATIONS

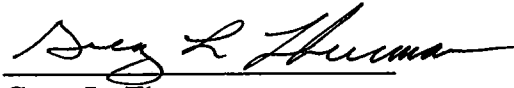
Phase II/ III assessment activities including excavating, analytical testing, and site evaluations have been completed for the subject site. Field observations and laboratory results indicated the petroleum hydrocarbon contamination has been successfully removed from the former pump island sites. Petroleum hydrocarbon concentrations in subsoil samples obtained from the final boundaries of the excavations were below WDOE Method A action levels. Based on the results of this assessment, Chen-Northern's professional opinion is that this site has been successfully remediated and meets the criteria for permanent closure.

Chen-Northern recommends that the WDOE be notified as to the conditions that exist at the subject site. We also recommend the stockpiled PCS currently being landfarmed on-site be sampled in six to eight months to monitor the effectiveness of aeration and to determine the need for soil turning or removal.

5.0 LIMITATIONS

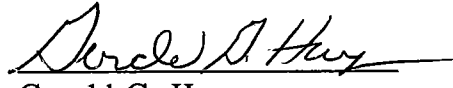
This work was performed in accordance with the generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. Chen-Northern observed a degree of care and skill generally exercised by other consultants under similar circumstances and conditions.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

Prepared and submitted by:



Greg L. Thurman
Assistant Project Engineer

Reviewed by:



Gerald G. Harper
Division Manager

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 12 of 32

Laboratory No.: 140838
Sample Name: PUMP ISLAND 1, N/E WALL, 10' 1715051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1715
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS:		
Moisture	19.3 %	05/26/93
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Raq79	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 mg/kg	05/26/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6 mg/kg	05/26/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 14 of 32

Laboratory No.: 140840
Sample Name: PUMP ISLAND 1, BASE, 14' 1725051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1725
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	16.0	%	05/27/93
METALS:			
Lead as Pb (Total)	<21	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq42		
Data File Number-TPH Gasoline	Raq81		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 *	mg/kg	05/27/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/27/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/24/93
Benzene dry basis	<6	µg/kg	05/24/93
Ethylbenzene as rec'd	<5	µg/kg	05/24/93
Ethylbenzene dry basis	<6	µg/kg	05/24/93
Toluene as rec'd	<5	µg/kg	05/24/93
Toluene dry basis	<6	µg/kg	05/24/93
Xylenes as rec'd	<5	µg/kg	05/24/93
Xylenes dry basis	<6	µg/kg	05/24/93

* This analysis was performed after the recommended 14-day holding time.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 15 of 32

Laboratory No.: 140841
Sample Name: PUMP ISLAND 2, S WALL, 10' 1215051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 1215
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
<hr/>		
INORGANICS:		
Moisture	19.0 %	05/27/93
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Raq98	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	0.6 mg/kg	05/27/93
Petroleum Hydrocarbons as Gasoline dry basis	0.7 mg/kg	05/27/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 16 of 32

Laboratory No.: 140842
Sample Name: PUMP ISLAND 2, N WALL, 10' 1216051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 1216
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS:		
Moisture	12.5 %	05/27/93
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Raq99	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 mg/kg	05/27/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6 mg/kg	05/27/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 17 of 32

Laboratory No.: 140843
Sample Name: PUMP ISLAND 2, E WALL, 10' 1217051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 1217
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS:		
Moisture	14.0 %	05/25/93
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Rar01	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 * mg/kg	05/25/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6 mg/kg	05/25/93

* This analysis was performed after the recommended 14-day holding time.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 18 of 32

Laboratory No.: 140844
Sample Name: PUMP ISLAND 2, W WALL, 10' 1218051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 1218
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS:		
Moisture	14.0 %	05/28/93
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Rar02	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 * mg/kg	05/28/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6 mg/kg	05/28/93

* This analysis was performed after the recommended 14-day holding time.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 19 of 32

Laboratory No.: 140845
Sample Name: PUMP ISLAND 2, NORTH BASE, 14' 1219051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 1219
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	19.9	%	05/25/93
METALS:			
Lead as Pb (Total)	<21	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq62		
Data File Number-TPH Gasoline	Rar03		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 *	mg/kg	05/27/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/27/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/25/93
Benzene dry basis	<6	µg/kg	05/25/93
Ethylbenzene as rec'd	<5	µg/kg	05/25/93
Ethylbenzene dry basis	<6	µg/kg	05/25/93
Toluene as rec'd	<5	µg/kg	05/25/93
Toluene dry basis	<6	µg/kg	05/25/93
Xylenes as rec'd	<15	µg/kg	05/25/93
Xylenes dry basis	<17	µg/kg	05/25/93

* The surrogate spike recovery was below established limits; however these results were confirmed by reanalysis of the sample on 6-2-93.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 20 of 32

Laboratory No.: 140846
Sample Name: PUMP ISLAND 2, SOUTH BASE, 14' 1220051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 1220
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	21.0	%	05/26/93
METALS:			
Lead as Pb (Total)	26	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq77		
Data File Number-TPH Gasoline	Rar85		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	580 *	mg/kg	06/01/93
Petroleum Hydrocarbons as Gasoline dry basis	730	mg/kg	06/01/93
VOLATILE AROMATICS:			
Benzene as rec'd	<395	µg/kg	05/26/93
Benzene dry basis	<500	µg/kg	05/26/93
Ethylbenzene as rec'd	1200	µg/kg	05/26/93
Ethylbenzene dry basis	1500	µg/kg	05/26/93
Toluene as rec'd	<395	µg/kg	05/26/93
Toluene dry basis	<500	µg/kg	05/26/93
Xylenes as rec'd	46,000	µg/kg	05/26/93
Xylenes dry basis	58,000	µg/kg	05/26/93

* This analysis was performed after the recommended 14-day holding time.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 21 of 32

Laboratory No.: 140847
Sample Name: STOCKPILE A 1205051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1205
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	9.9	%	05/25/93
METALS:			
Lead as Pb (Total)	132	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq43		
Data File Number-TPH Gasoline	Raq62		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	2.0	mg/kg	05/25/93
Petroleum Hydrocarbons as Gasoline dry basis	2.2	mg/kg	05/25/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/25/93
Benzene dry basis	<6	µg/kg	05/25/93
Ethylbenzene as rec'd	<5	µg/kg	05/25/93
Ethylbenzene dry basis	<6	µg/kg	05/25/93
Toluene as rec'd	<5	µg/kg	05/25/93
Toluene dry basis	<6	µg/kg	05/25/93
Xylenes as rec'd	<15	µg/kg	05/25/93
Xylenes dry basis	<17	µg/kg	05/25/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 22 of 32

Laboratory No.: 140848
Sample Name: STOCKPILE A 1210051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1210
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	10.7	%	05/25/93
METALS:			
Lead as Pb (Total)	120	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq45		
Data File Number-TPH Gasoline	Raq63		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	05/25/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/25/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/25/93
Benzene dry basis	<6	µg/kg	05/25/93
Ethylbenzene as rec'd	<5	µg/kg	05/25/93
Ethylbenzene dry basis	<6	µg/kg	05/25/93
Toluene as rec'd	<5	µg/kg	05/25/93
Toluene dry basis	<6	µg/kg	05/25/93
Xylenes as rec'd	<15	µg/kg	05/25/93
Xylenes dry basis	<17	µg/kg	05/25/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 23 of 32

Laboratory No.: 140849
Sample Name: STOCKPILE A 1215051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1215
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	10.7	%	05/25/93
METALS:			
Lead as Pb (Total)	110	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq46		
Data File Number-TPH Gasoline	Rar86		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	06/01/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	06/01/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/25/93
Benzene dry basis	<6	µg/kg	05/25/93
Ethylbenzene as rec'd	<5	µg/kg	05/25/93
Ethylbenzene dry basis	<6	µg/kg	05/25/93
Toluene as rec'd	<5	µg/kg	05/25/93
Toluene dry basis	<6	µg/kg	05/25/93
Xylenes as rec'd	<15	µg/kg	05/25/93
Xylenes dry basis	<17	µg/kg	05/25/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 24 of 32

Laboratory No.: 140850
Sample Name: STOCKPILE B 0920051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 0920
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	21.3	%	05/26/93
METALS:			
Lead as Pb (Total)	38	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq78		
Data File Number-TPH Gasoline	Rar87		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	2100 *	mg/kg	06/01/93
Petroleum Hydrocarbons as Gasoline dry basis	2700	mg/kg	06/01/93
VOLATILE AROMATICS:			
Benzene as rec'd	<380	µg/kg	05/26/93
Benzene dry basis	<480	µg/kg	05/26/93
Ethylbenzene as rec'd	4900	µg/kg	05/26/93
Ethylbenzene dry basis	6200	µg/kg	05/26/93
Toluene as rec'd	750	µg/kg	05/26/93
Toluene dry basis	950	µg/kg	05/26/93
Xylenes as rec'd	150,000	µg/kg	05/26/93
Xylenes dry basis	190,000	µg/kg	05/26/93

* The sample was extracted with methanol before the 14-day holding time had expired.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 25 of 32

Laboratory No.: 140851
Sample Name: STOCKPILE B 1100051393
Sample Date: 05/13/93
Collected by: GREG THURMAN
Time Sampled: 1100
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	17.7	%	05/25/93
METALS:			
Lead as Pb (Total)	26	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq63		
Data File Number-TPH Gasoline	Rar95		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	6.8 *	mg/kg	06/02/93
Petroleum Hydrocarbons as Gasoline dry basis	8.3	mg/kg	06/02/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/25/93
Benzene dry basis	<6	µg/kg	05/25/93
Ethylbenzene as rec'd	<5	µg/kg	05/25/93
Ethylbenzene dry basis	<6	µg/kg	05/25/93
Toluene as rec'd	<5	µg/kg	05/25/93
Toluene dry basis	<6	µg/kg	05/25/93
Xylenes as rec'd	<15	µg/kg	05/25/93
Xylenes dry basis	<18	µg/kg	05/25/93

* This analysis was performed after the recommended 14-day holding time.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 26 of 32

Laboratory No.: 140852
Sample Name: STOCKPILE B 1450051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1450
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	10.4	%	05/27/93
METALS:			
Lead as Pb (Total)	38	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq47		
Data File Number-TPH Gasoline	Raq90		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	2.9 *	mg/kg	05/27/93
Petroleum Hydrocarbons as Gasoline dry basis	3.2	mg/kg	05/27/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/25/93
Benzene dry basis	<6	µg/kg	05/25/93
Ethylbenzene as rec'd	<5	µg/kg	05/25/93
Ethylbenzene dry basis	<6	µg/kg	05/25/93
Toluene as rec'd	<5	µg/kg	05/25/93
Toluene dry basis	<6	µg/kg	05/25/93
Xylenes as rec'd	<5	µg/kg	05/25/93
Xylenes dry basis	<6	µg/kg	05/25/93

* The analysis was performed after the recommended 14-day holding time.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 27 of 32

Laboratory No.: 140853
Sample Name: STOCKPILE B 1535051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1535
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	16.9	%	05/26/93
METALS:			
Lead as Pb (Total)	47	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq48		
Data File Number-TPH Gasoline	Raq78		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	05/26/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/26/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/25/93
Benzene dry basis	<6	µg/kg	05/25/93
Ethylbenzene as rec'd	<5	µg/kg	05/25/93
Ethylbenzene dry basis	<6	µg/kg	05/25/93
Toluene as rec'd	<5	µg/kg	05/25/93
Toluene dry basis	<6	µg/kg	05/25/93
Xylenes as rec'd	<15	µg/kg	05/25/93
Xylenes dry basis	<18	µg/kg	05/25/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 28 of 32

Laboratory No.: 140854
Sample Name: STOCKPILE B 1730051293
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1730
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	12.8	%	05/27/93
METALS:			
Lead as Pb (Total)	145	mg/kg	05/28/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq79		
Data File Number-TPH Gasoline	Raq82		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	1700 *	mg/kg	05/27/93
Petroleum Hydrocarbons as Gasoline dry basis	1900	mg/kg	05/27/93
VOLATILE AROMATICS:			
Benzene as rec'd	<420	µg/kg	05/26/93
Benzene dry basis	<480	µg/kg	05/26/93
Ethylbenzene as rec'd	7000	µg/kg	05/26/93
Ethylbenzene dry basis	8000	µg/kg	05/26/93
Toluene as rec'd	<420	µg/kg	05/26/93
Toluene dry basis	<480	µg/kg	05/26/93
Xylenes as rec'd	200,000	µg/kg	05/26/93
Xylenes dry basis	230,000	µg/kg	05/26/93

* The sample was extracted with methanol before the 14-day holding time had expired.

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 29 of 32

Laboratory No.: 140855
Sample Name: DUPLICATE OF 140828 EAST/N WALL TANK 1,8'
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: NOT APPLICABLE
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
-----------	-------------------	------------------

Not run - past holding time

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 30 of 32

Laboratory No.: 140856
Sample Name: SPIKE OF 140837 Piping 35'x4.5'
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1520
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
METALS:		
Lead as Pb (Total)	90 %	05/28/93
MISCELLANEOUS:		
Data File Number-Volatiles	Faq41	
VOLATILE AROMATICS:		
Benzene as rec'd	96 %	05/24/93
Ethylbenzene as rec'd	95 %	05/24/93
Toluene as rec'd	86 %	05/24/93
Xylenes as rec'd	92 %	05/24/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 31 of 32

Laboratory No.: 140857
Sample Name: DUPLICATE OF 140838 PUMP ISLAND 1 N/E WALL 10'
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1715
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
<hr/>		
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Raq80	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 mg/kg	05/26/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6 mg/kg	05/26/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004)

June 4, 1993
Sheet 32 of 32

Laboratory No.: 140858
Sample Name: SPIKE OF 140847 STOCKPILE A
Sample Date: 05/12/93
Collected by: GREG THURMAN
Time Sampled: 1205
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
METALS:		
Lead as Pb (Total)	91 %	05/28/93
MISCELLANEOUS:		
Data File Number-Volatiles	Faq61	
VOLATILE AROMATICS:		
Benzene as rec'd	92 %	05/25/93
Ethylbenzene as rec'd	81 %	05/25/93
Toluene as rec'd	80 %	05/25/93
Xylenes as rec'd	78 *	05/25/93

* This spike recovery is slightly below our acceptance limits of 80-120%.
The spike was analyzed twice with similar results, indicating a possible
matrix interference.

CHAIN OF CUSTODY RECORD

Huntingdon

Consulting Engineers
Environmental Scientists

Lucky's Service

Project or Site Name

193-2004-1

Project Number

Greg Thurman

Sampler Name (Printed)

☒ Chen-Northern, Inc., Division

☐ Thomas-Hartig & Associates, Inc., Division

☐ Schaefer Dixon Associates, Inc., Division

☐ Herzog Associates, Inc., Division

Greg Thurman

Contact or Report to

Tr. Cities Office

Contact Address or Location

Greg Thurman

Sampler Signature

DATE COLLECTED	TIME COLLECTED	SAMPLE LOCATION OR DESCRIPTION	COMP OR GRAB	SAMPLE MATRIX	NO. OF CONTAINERS	ANALYSIS REQUIRED				NOTES	LAB NUMBER
						LEAD	CAD	COPPER	CHLORIDE		
5/12	1715	Pump Island 1, Base, 10'	G	Soil	1	X	X	X	X	1715051293	140838
5/12	1720	Pump Island 1, S/Wall, 10'	G	Soil	1	X				1720051293	859
5/12	1725	Pump Island 1, Base, 14'	G	Soil	1	X	X	X	X	1725051293	840
5/13	1215	Pump Island 2, S/Wall, 10'	G	Soil	1	X				1215051393	841
5/13	1216	Pump Island 2, N/Wall, 10'	G	Soil	1	X				1216051393	842
5/13	1217	Pump Island 2, E/Wall, 10'	G	Soil	1	X				1217051393	843
5/13	1218	Pump Island 2, W/Wall, 10'	G	Soil	1	X				1218051393	844
5/13	1219	Pump Island 2, Base, 14'	G	Soil	1	X	X	X	X	1219051393	845
5/13	1220	Pump Island 2, Base, 14'	G	Soil	1	X	X	X	X	1220051393	846
Relinquished by:		Date		Time		Received by:		Time		Remarks:	
Relinquished by:		Date		Time		Received by:		Time			
Relinquished by:		Date		Time		Received by:		Time			
Relinquished by:		Date		Time		Received by:		Time			

CHAIN OF CUSTODY RECORD

Lucky's Service

Project or Site Name

193-2004-1

Project Number

Greg Thurman

Sampler Name (Printed)

Huntingdon
Consulting Engineers & Environmental Scientists

- ☒ Chen-Northern, Inc., Division
☐ Thomas-Hartig & Associates, Inc., Division
☐ Schaefer Dixon Associates, Inc., Division
☐ Herzog Associates, Inc., Division

Greg Thurman

Contact of Report to

Tri-Cities WA Office

Contact Address or Location

Greg Thurman

Sampler Signature

DATE COLLECTED	TIME COLLECTED	SAMPLE LOCATION OR DESCRIPTION	COMP OR GRAB	SAMPLE MATRIX	NO. OF CONTAINERS	ANALYSIS REQUIRED				NOTES	LAB NUMBER
						MPH-6	BTEX	Lead			
5/12	1205	Stockpile A	G	Soil	1	X	X	X		1205051293	1105-847
5/12	1210	Stockpile A	G	Soil	1	X	X	X		1210051293	848
5/12	1215	Stockpile A	G	Soil	1	X	X	X		1215051293	848
5/13	0920	Stockpile B	G	Soil	1	X	X	X		0920051393	84850
5/13	1100	Stockpile B	G	Soil	1	X	X	X		1100051393	84851
5/13	1450	Stockpile B	G	Soil	1	X	X	X		1450051293	84852
5/13	1535	Stockpile B	G	Soil	1	X	X	X		1535051293	853
5/13	1730	Stockpile B	G	Soil	1	X	X	X		1730051293	854
										Dup 828	855
Relinquished by: <u>Greg Thurman</u>						Received by: <u>Shiged WPS</u>					
Date: <u>5/17</u>						Time: <u>1500</u>					
Relinquished by:						Received by:					
Date:						Time:					
Relinquished by:						Received by:					
Date:						Time:					
Relinquished by:						Received by:					
Date:						Time:					

Remarks: Spike 837
DUP 838
Spike 847

Huntingdon

Chen-Northern, Inc.

600 SOUTH 25TH STREET
P.O. BOX 30615
BILLINGS, MT 59107
(406) 248-9161
FAX (406) 248-9282

TECHNICAL REPORT

REPORT TO: ATTN: MR. GREG THURMAN
CHEN-NORTHERN, INC.
P O BOX 2601
TRI-CITIES WA 99302

DATE: June 7, 1993
JOB NUMBER: 87-921
SHEET: 1 of 9
INVOICE NO.: 23388

REPORT OF: Soil Analysis - Lucky's Service (193-2004-1)

SAMPLE IDENTIFICATION:

On May 21, 1993, these soil samples (laboratory numbers 140928 through 140935) were received in our laboratory for analysis. The samples were analyzed for volatile organics in accordance with Environmental Protection Agency Manual SW-846, Test Methods for Evaluating Solid Waste, Third Edition, November 1986; Method 8020.

The total petroleum hydrocarbon determinations were made in accordance with the State of Washington Department of Ecology, Method WTPH-G. The lead analysis was conducted in accordance with SW-846, Method 6010.

The test results are shown on the following pages. Chromatograms are attached for your reference.

A < sign indicates the value reported was the practical quantitation limit for this sample using the method described. Concentrations of analyte, if present, below this were not quantifiable.

Reviewed by

Kathleen A. Smith

Attachments (chromatograms)

rmr

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 2 of 9

Laboratory No.: 140928
Sample Name: 1130051893 PUMP ISLAND 2, N WALL 12.6'
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1130
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
<hr/>			
INORGANICS:			
Moisture	19.4	%	05/29/93
MISCELLANEOUS:			
Data File Number-TPH Gasoline	Rar40		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	05/29/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/29/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 3 of 9

Laboratory No.: 140929
Sample Name: 1120051893 PUMP ISLAND 2, S. WALL 12.6'
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1120
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	15.9	%	05/29/93
MISCELLANEOUS:			
Data File Number-TPH Gasoline	Rar42		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	05/29/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/29/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 4 of 9

Laboratory No.: 140930
Sample Name: 1125051893 PUMP ISLAND 2, W. WALL 12.6'
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1125
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	18.9	%	05/30/93
MISCELLANEOUS:			
Data File Number-TPH Gasoline	Rar43		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	05/30/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/30/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 5 of 9

Laboratory No.: 140931
Sample Name: 1115051893 PUMP ISLAND 2, E. WALL 12.6'
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1115
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS:		
Moisture	18.2 %	05/30/93
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Rar44	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 mg/kg	05/30/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6 mg/kg	05/30/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 6 of 9

Laboratory No.: 140932
Sample Name: 1145051893 PUMP ISLAND 2, S. BASE 19.6'
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1145
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	18.3	%	05/30/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq83		
Data File Number-TPH Gasoline	Rar45		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	05/30/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	05/30/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/27/93
Benzene dry basis	<6	µg/kg	05/27/93
Ethylbenzene as rec'd	<5	µg/kg	05/27/93
Ethylbenzene dry basis	<6	µg/kg	05/27/93
Toluene as rec'd	<5	µg/kg	05/27/93
Toluene dry basis	<6	µg/kg	05/27/93
Xylenes as rec'd	<15	µg/kg	05/27/93
Xylenes dry basis	<8	µg/kg	05/27/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 7 of 9

Laboratory No.: 140933
Sample Name: 1135051893 PUMP ISLAND 2, N BASE 19.6'
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1135
Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS:			
Moisture	19.3	%	06/01/93
MISCELLANEOUS:			
Data File Number-Volatiles	Faq87		
Data File Number-TPH Gasoline	Rar74		
PETROLEUM HYDROCARBONS (8015):			
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5	mg/kg	06/01/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6	mg/kg	06/01/93
VOLATILE AROMATICS:			
Benzene as rec'd	<5	µg/kg	05/27/93
Benzene dry basis	<6	µg/kg	05/27/93
Ethylbenzene as rec'd	<5	µg/kg	05/27/93
Ethylbenzene dry basis	<6	µg/kg	05/27/93
Toluene as rec'd	<5	µg/kg	05/27/93
Toluene dry basis	<6	µg/kg	05/27/93
Xylenes as rec'd	<15	µg/kg	05/27/93
Xylenes dry basis	<19	µg/kg	05/27/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 8 of 9

Laboratory No.: 140934
Sample Name: DUPLICATE 140928 1130051893 PUMP ISLAND 2
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1130
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS:		
Moisture	19.9 %	05/29/93
MISCELLANEOUS:		
Data File Number-TPH Gasoline	Rar41	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	<0.5 mg/kg	05/29/93
Petroleum Hydrocarbons as Gasoline dry basis	<0.6 mg/kg	05/29/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Project Name: Lucky's Service (193-2004-1)

June 7, 1993
Sheet 9 of 9

Laboratory No.: 140935
Sample Name: SPIKE 140932 1145051893 PUMP ISLAND 2, S
Sample Date: 05/18/93
Collected by: DON GECK
Time Sampled: 1145
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
MISCELLANEOUS:		
Data File Number-Volatiles	Far93	
Data File Number-TPH Gasoline	Rar75	
PETROLEUM HYDROCARBONS (8015):		
Petroleum Hydrocarbons as Gasoline as rec'd	95 %	06/01/93
VOLATILE AROMATICS:		
Benzene as rec'd	102 %	06/02/93
Ethylbenzene as rec'd	93 %	06/02/93
Toluene as rec'd	96 %	06/02/93
Xylenes as rec'd	88 %	06/02/93

CHAIN OF CUSTODY RECORD

Lucky's Service

Project or Site Name

193-2004

Project Number

Dan Geck

Sampler Name (Printed)

Huntingdon
Consulting Engineers
Environmental Scientists

☒ Chen-Northern, Inc., Division

☐ Thomas-Hartig & Associates, Inc., Division

☐ Schaefer Dixon Associates, Inc., Division

☐ Herzog Associates, Inc., Division

Greg Thurman

Contact or Report to

Tri-Cities WA

Contact Address or Location

Dan Geck

Sampler Signature

DATE COLLECTED	TIME COLLECTED	SAMPLE LOCATION OR DESCRIPTION	COMP OR GRAB	SAMPLE MATRIX	NO. OF CONTAINERS	ANALYSIS REQUIRED				NOTES	LAB NUMBER	
						Asst	BTEX	Lead	9dm			
5/18	1130	Burr Island, N wall, 12.6'	G	Soil	1	X					1130051893	140928
5/18	1120	" " " " " " " " " "	G	Soil	1	X					1120051893	29
5/18	1125	" " " " " " " " " "	G	Soil	1	X					1125051893	30
5/18	1115	" " " " " " " " " "	G	Soil	1	X					1115051893	31
5/18	1145	" " " " " " " " " "	G	Soil	1	X	X	X			1145051893	32
5/18	1135	" " " " " " " " " "	G	Soil	1	X	X	X			1135051893	33
											1140051893 Pump & Leach, 2, N Wall 7/8	1130 34
											1145051893 " " " " " " " " " "	1145 35
<p>Relinquished by: <u>Dan Geck</u> Date: <u>5/19</u> Time: <u>1500</u></p> <p>Relinquished by: <u>Greg Thurman</u> Date: <u>5/20</u> Time: <u>1500</u></p> <p>Relinquished by: <u>Greg Thurman</u> Date: <u>5/21/93</u> Time: <u>1500</u></p> <p>Relinquished by: <u>Greg Thurman</u> Date: <u>5/21/93</u> Time: <u>1500</u></p>												

APPENDIX 2

Washington State Department of Ecology Action Levels

**Washington Department of Ecology
Action Levels for Petroleum Releases***

Constituent	CAS No.	Groundwater	Soil
Benzene	71-43-2	1.0 ug/L	0.5 mg/kg
Toluene	108-88-3	40.0 ug/L	40.0 mg/kg
Ethylbenzene	100-41-4	30.0 ug/L	20.0 mg/kg
Xylenes	1330-20-7	20.0 ug/L	20.0 mg/kg
TPH (gasoline)	--	1000.0 ug/L	100.0 mg/kg
TPH (other)	--	1000.0 ug/L	200.0 mg/kg
Lead	7439-92-1	5.0 ug/L	250.0 mg/kg

* Adapted from Guidance for Remediation of Releases from Underground Storage Tanks, Washington State Department of Ecology, Toxics Cleanup Program, p.74

SUMMARY OF WASHINGTON STATE DEPARTMENT OF ECOLOGY ACTION LEVELS

In March 1989, a toxic waste cleanup law went into effect in Washington. Passed as Initiative 97, this law is known as the Model Toxics Control Act (MTCA), Chapter 70.105D RCW. In developing the Act's cleanup regulation, the Washington State Department of Ecology established cleanup standards and requirements for cleanup actions.

Cleanup levels are established for carcinogenic and noncarcinogenic substances. MTCA provides three options for establishing site-specific cleanup levels or action levels. The following summarizes the options or methods outlined in the Act.

METHOD A Defines action levels for 25 of the most common hazardous substances found at sites. This method is designated for cleanups that are relatively straightforward or involve only a few hazardous substances, all of which must be listed on the Method A tables. Method A action levels are the most stringent.

METHOD B Levels are established using site risk assessments which are dependent upon site specific characteristics, i.e. how hazardous substances interact, the combined health effects of the substances, and how their movement on-site and off-site could threaten human health and the environment.

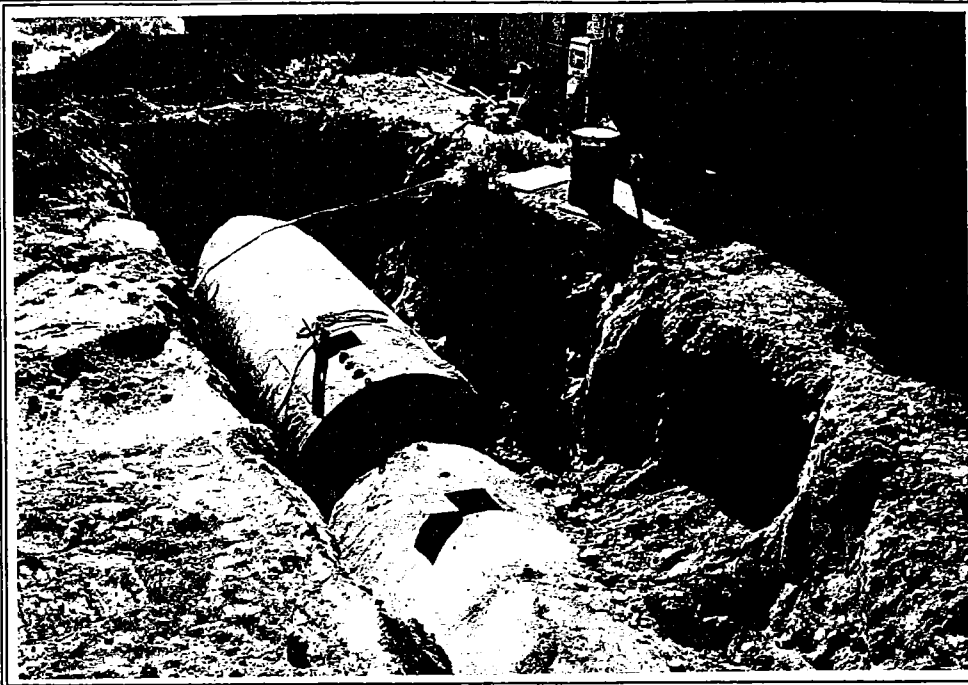
The risk level for individual carcinogens cannot exceed one-in-a-million. When more than one type of substance is present, the total risk at the site may not exceed 1 in 100,000. Noncarcinogenic substances may not exceed levels at which human illness may result. This method is generally used when sites are impacted by substances not listed under Method A. It is considered less stringent than Method A.

METHOD C Levels are similar to Method B, but the lifetime cancer risk is set at 1 in 100,000 for both individual substances and for the total risk caused by all site substances. Method C is used when cleanup levels under Method A or B are not achievable, or may cause more harm to the environment. When this method is used, data must be provided that cleanup levels will protect both human health and the environment. It is considered less stringent than Method A or Method B and is usually reserved for industrial sites.

In some cases, action levels are set at concentrations lower than what can be reliably measured using sampling and analytical methods. When these cases occur, the lowest reliable measurement is used (WAC 173-340, 1991). Method A action levels were used in this study and are the most stringent.

APPENDIX 3

Photographic Records

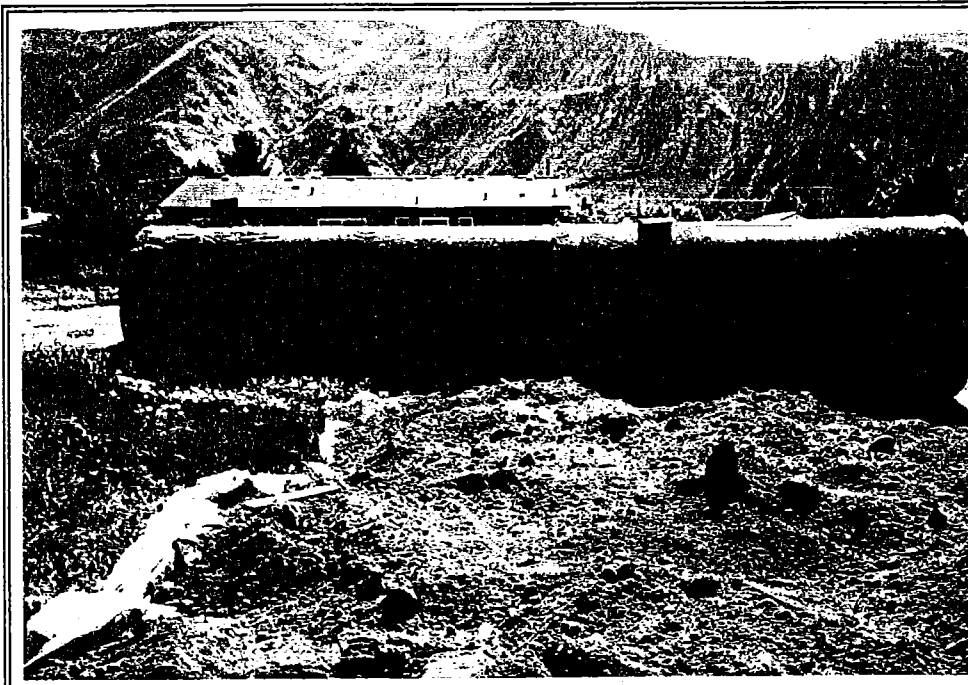


PHOTOGRAPHER: Greg Thurman

DATE: 5/12/93

VIEW: Exposed Tops of Tanks

DIRECTION: Looking East



PHOTOGRAPHER: Greg Thurman

DATE: 5/12/93

VIEW: Removed Tanks

DIRECTION: South Side of Tanks

CHEN-NORTHERN, INC.

Job No.: 193-2004

PHOTOGRAPHIC RECORDS

LUCKY'S SERVICE STATION

14579 ALT. HWY 97

ENTIAT, WASHINGTON

DATE:
6/14/93

MOUNTED BY:
GT

REVIEWED BY:
GH

EXHIBIT NO.
A

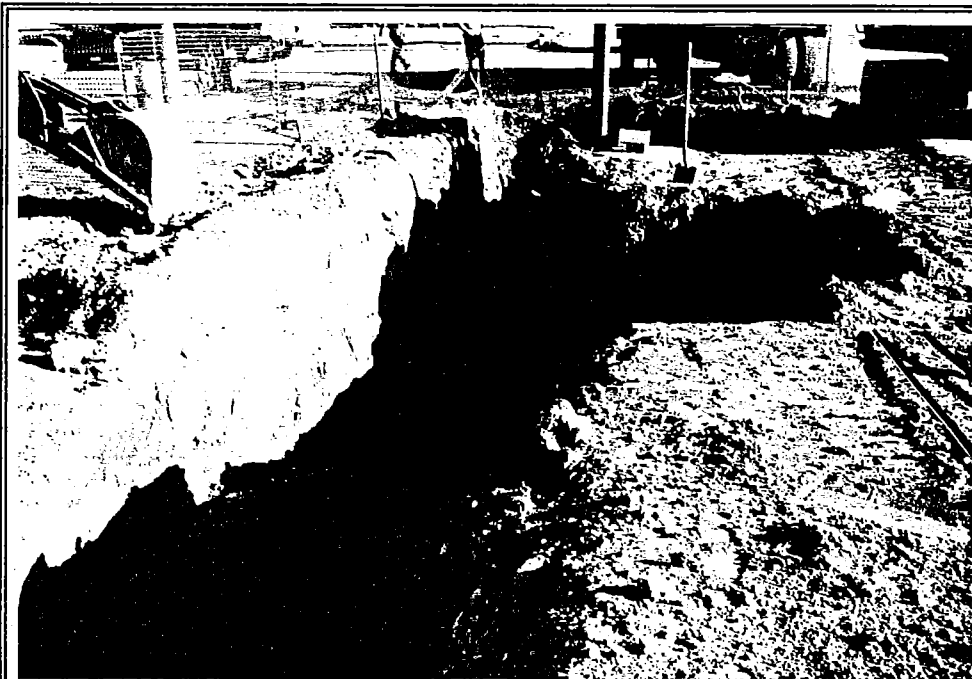


PHOTOGRAPHER: Greg Thurman

DATE: 5/12/93

VIEW: Subject Site

DIRECTION: Looking South



PHOTOGRAPHER: Greg Thurman

DATE: 5/12/93

VIEW: Pump Island Excavation

DIRECTION: Looking South

CHEN-NORTHERN, INC.

Job No.: 193-2004

PHOTOGRAPHIC RECORDS

LUCKY'S SERVICE STATION

14579 ALT. HWY 97

ENTIAT, WASHINGTON

DATE:
6/14/93

MOUNTED BY:
GT

REVIEWED BY:
GH

EXHIBIT NO.
B

APPENDIX 4

References

REFERENCES:

- American Petroleum Institute, Recommended Practice for Abandonment or Removal of Used Underground Service Station Tanks, API Bulletin 1604, 1987, 8p.
- Camp, V.E., P.R. Hopper, D.A. Swanson, and T.L. Wright. "1982 Columbia River Basalt in Idaho: Physical and Chemical Characteristics, Flow Distribution, and Tectonic Implications." Cenozoic Geology of Idaho: Idaho Bureau of Mines and Geology Bulletin 26 (1982): 55-75.
- Chen-Northern, Inc. Underground Storage Tank Site Assessment: Lucky's Service, Job Number 193-2004. Report completed for Joe Hall Construction by Chen-Northern, Inc.; Tri-Cities, Washington, June, 1993.
- New England Interstate Water Pollution Control Commission, Tank Closure Without Tears: An Inspector's Safety Guide, Boston, Massachusetts, 1988.
- Washington State. Department of Ecology. Dangerous Waste Regulations, Chapter 173-303 WAC. Toxics Cleanup Program. Olympia, Washington: State document. April 1991.
- Washington State. Department of Ecology. Guidance for Remediation of Releases from Underground Storage Tanks. Toxics Cleanup Program. Olympia, Washington: State document. July 1991.
- Washington State. Department of Ecology. Guidance for Site Checks and Site Assessments for Underground Storage Tanks. Underground Storage Tank Program. Olympia, Washington: State document. October 1992.
- Washington State. Department of Ecology. The Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC. Toxics Cleanup Program. Olympia, Washington: State document. February 1991.
- Washington State. Department of Ecology. Underground Storage Tank Regulations, Chapter 173-360 WAC. Underground Storage Tank Program. Olympia, Washington: State document. October 1991.
- Uniform Fire Code, Abandonment and Status of Tanks, 1988, Sec. 79.115.