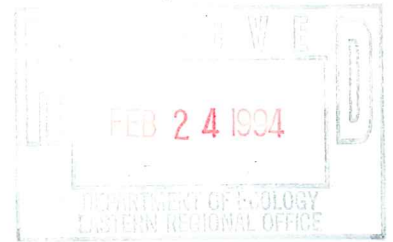


Job No: 193-2065-1
CNI1470R.ENV



**REPORT
OF**

**PHASE II ENVIRONMENTAL ASSESSMENT:
DETAILED HYDROCARBON INVESTIGATION
U S WEST Communications Facility
102 East Alder Street
Walla Walla, Washington 99336**

Prepared for:

**U S WEST Business Resources, Inc.
Mr. Randy Barr
1600 Seventh Avenue, Room 1501
Seattle, Washington 98191
(206) 623-4032**

Prepared by:

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

December, 1993

PHASE II ENVIRONMENTAL ASSESSMENT:
DETAILED HYDROCARBON INVESTIGATION
U S WEST COMMUNICATIONS FACILITY
WALLA WALLA, WASHINGTON
JOB NO. 193-2065-1
DECEMBER, 1993

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EXECUTIVE SUMMARY

At the request of Mr. Randy Barr of U S WEST Business Resources, Chen-Northern has completed detailed hydrocarbon investigation activities for the U S WEST Communications facility located at 102 East Alder Street in Walla Walla, Washington. This report presents the assessment findings on the extent and magnitude of subsurface petroleum hydrocarbon contamination discovered at the subject site during previous construction activities. This investigation is a continuation of assessment work performed by Chen-Northern on the subject site beginning in January of 1992.

The purpose of this project was to assist responsible parties in complying with the current Washington State Department of Ecology (WDOE) regulations and guidelines for an independent assessment of subsurface conditions impacted by petroleum hydrocarbons. Site specific objectives included: 1) reviewing previous assessment work and historical site data for characterization purposes, 2) drilling and installing four additional monitoring wells for a total of seven site wells, 3) verifying the extent and magnitude of environmental impact using field observations and confirmational laboratory sampling, and 4) evaluating possible remedial/ monitoring actions applicable to observed site conditions. These objectives were realized as follows:

Site assessment reports from the in-place closure of a UST located in the basement of the site building and initial plume characterization were examined for similarities and subsurface sampling information. Four UST systems were confirmed to have existed on the subject site. Interviews with upgradient property owners revealed only aboveground storage tanks in the basement of Cummins Athletic Supply and Walla Walla Motor Supply. Reviews of Sanborn Insurance Maps from 1930 showed five underground storage tanks located near the north corner of the intersection of Alder and Colville Streets. These USTs were approximately 170 yards from the subject site. Another UST was indicated on the north side of Alder Street south of the intersection of Alder and Colville Streets. This UST was approximately 100 yards from the subject site. Interviews with city authorities indicated several USTs are present at the National Guard Armory located approximately 150 yards east of the

subject site. Furthermore, an automobile service station formerly existed south of the subject site at the adjacent parking lot and lawyer's office property. This service station reportedly operated in the late 1950s or 1960s.

The nature and extent of contamination was assessed by collecting subsoil and groundwater samples from strategically placed groundwater monitoring wells. The monitoring wells were drilled and installed in accordance with WDOE guidelines. The borings were advanced through the overburden soils with a 6-inch I.D. air-rotary drilling tool. No subsoil discoloration or odor was detected in the monitoring well borings. Headspace screening of subsoil samples collected from the monitoring wells revealed volatile organic vapor concentrations of less than 74.5 ppm. To confirm field observations, groundwater samples were collected from the seven monitoring wells and basement sump for laboratory analysis of TRPH. Laboratory results indicated petroleum hydrocarbon concentrations exceeded WDOE Method A action levels at MW-2 and the basement sump.

The subsurface appears to have been impacted by a mixture of bunker C oil and aged #2 diesel fuel. Probable sources of the petroleum product release appear to be the UST system previously located near the southeast corner of the subject site and/or the UST located in the basement. Free product and high TRPH concentrations are found in areas beneath the basement floor and immediately adjacent to the subject site building. TRPH concentrations decrease in the downgradient groundwater flow direction away from the building and exceed WDOE Method A action levels only within the subject site property boundaries. The petroleum plume has not migrated off-site and appears confined to the basement subsurface and immediate downgradient areas. The migration of the petroleum contamination appears to be slow and limited. The assumed release sources were removed over 20 years ago and the contamination plume appears not to extend further 70 yards.

Remediation of the subsurface appears both monetarily and technically infeasible at

this time. To insure current plume conditions are constant, the subject site should be monitored to observe any significant changes in plume migration patterns and/or seasonal fluctuations in petroleum hydrocarbon concentrations.

In conclusion, the site specific objectives have been achieved for this project. The petroleum release was characterized and the extent of contamination was determined. Based on the results of this assessment, our professional opinion is that remedial actions are impractical at this time but the site should continue to be monitored for changes in subsurface conditions.

Chen-Northern recommends that the WDOE be notified as to the current conditions that exist at the subject site. Notification can be completed by filing this report with the WDOE Eastern Region. We also recommend that a quarterly groundwater monitoring plan be implemented for at least two years to observe any significant changes in plume migration patterns and/or seasonal fluctuations in petroleum hydrocarbon concentrations. At the end of this period, the collected subsurface sampling data should be reviewed and the site reevaluated. Finally, any building renovations or extensive excavation work done at the subject site should be carefully planned to include additional safety considerations and the remediation of any impacted subsoils removed.

1.0 PROJECT DESCRIPTION

1.1 Introduction

At the request of Mr. Randy Barr of U S WEST Business Resources, Chen-Northern has completed detailed hydrocarbon investigation activities for the U S WEST Communications facility located at 102 East Alder Street in Walla Walla, Washington. This report presents the assessment findings on the extent and magnitude of subsurface petroleum hydrocarbon contamination discovered at the subject site during previous construction activities. This investigation is a continuation of assessment work performed by Chen-Northern on the subject site beginning in January of 1992.

1.2 Purpose and Scope

The purpose of this project was to assist responsible parties in complying with the current Washington State Department of Ecology (WDOE) regulations and guidelines for an independent assessment of subsurface conditions impacted by petroleum hydrocarbons. Site specific objectives included: 1) reviewing previous assessment work and historical site data for characterization purposes, 2) drilling and installing four additional monitoring wells for a total of seven site wells, 3) verifying the extent and magnitude of environmental impact using field observations and confirmational laboratory sampling, and 4) evaluating possible remedial/ monitoring actions applicable to observed site conditions.

The following scope of services was performed for this assessment:

- ◆ An environmental professional and drill crew were mobilized to the subject site to drill four borings and install monitoring wells.
- ◆ The drill cuttings were examined 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 borings for laboratory analysis. These samples were selectively analyzed for total recoverable petroleum hydrocarbons (WTPH-418.1, EPA Method 418.1). Sampling locations were chosen based on field observations and at the pre-specified points.

- ◆ Groundwater samples were collected from the monitoring wells for laboratory analysis. These samples were selectively analyzed for total recoverable petroleum hydrocarbons (WTPH-418.1, EPA Method 418.1).
- ◆ Soil samples were collected from the containerized boring cuttings for laboratory analysis. These samples were selectively analyzed for total recoverable petroleum hydrocarbons (WTPH-418.1, EPA Method 418.1). Laboratory results were used for waste disposal characterization.
- ◆ This report was prepared to summarize the field activities performed and the findings of the environmental assessment. The report renders our evaluation concerning the extent and magnitude of petroleum hydrocarbon contamination at the subject site.

1.3 Project Background

In December of 1991, signs of free product were encountered in groundwater while excavating for an elevator shaft at the U S WEST Communications facility in Walla Walla, Washington. In response, groundwater and subsoil samples were collected from the elevator shaft excavation and from a boring drilled through the basement floor near an underground storage tank (UST). Laboratory results indicated that the observed product from the elevator shaft excavation was a mixture of #2 diesel fuel and bunker oil. Similarly, subsoil samples from the tank basin tested positive for diesel fuel. Subsoil drill cuttings collected during the elevator shaft construction were containerized in 55-gallon DOT approved drums and disposed of at a WDOE approved landfill by U S WEST representatives. Prior to disposal, the cuttings were analyzed and tested below WDOE Method A action levels for total recoverable petroleum hydrocarbons (TRPH).

Petroleum contaminated groundwater from a basement sump and elevator shaft was removed to allow completion of the elevator and avert water damage. In order to prevent contaminated groundwater from entering the City sewer system, an oil/water separator was installed to treat the groundwater before discharge. Initial separator effluent sampling results indicated this method of groundwater treatment was successful in reducing TRPH concentrations to below practical detection limits. The elevator shaft was completed and sealed but the basement sump is still utilized thus requiring the separator to continue operation. Unless special approval is granted, the City of Walla Walla requires a separator on any source of petroleum contaminated water regardless of discharge concentrations (City

Code 13.03.760(C)). The oil/water separator will continue to be employed until the signs of petroleum hydrocarbon contamination cease to exist. The discharge water is analyzed annually for TRPH to ensure the sewer discharge limit of 40 mg/l is met.

Based on the initial findings at the subject site, Chen-Northern conducted a subsurface investigation to characterize the confirmed hydrocarbon release as prescribed by Chapter 173-340 WAC, the Model Toxics Control Act -- Cleanup Regulations (Chen-Northern, 191-2065, October 1992). Three monitoring wells were installed around the subject site to determine the groundwater flow direction and initial plume concentrations. The subsoil and groundwater from the monitoring well west of the building had TRPH concentrations which exceeded WDOE Method A action levels. The source of contamination was unknown but was suspected to be from a UST system previously located on the southeast corner of the subject site. The contamination plume was presumed to extend from the northeast boundary of the subject site toward the southwest. Chen-Northern recommended the WDOE be notified as to the findings of this assessment and that the UST currently located in the basement of the building be formally decommissioned. Results of the UST site assessment conducted in March of 1993 indicated petroleum hydrocarbon contamination as free product to be present in subsoils and groundwater at the subject site (Chen-Northern, 193-2065-3, May 1993). We also recommended the limited subsurface assessment be expanded to a detailed hydrocarbon investigation to completely characterize the plume of contamination and to aid in the development of a remediation plan if such was warranted.

2.0 SITE CHARACTERISTICS

2.1 Site Description

The subject site is identified as the U S WEST Communications facility located at 102 East Alder Street in Walla Walla, Washington 99362. The present owner of the property is U S WEST Communications which may be contacted by mail at 1600 Seventh Avenue, Room 1501, Seattle, Washington 98191, or by phone at (206) 623-4032. The project contact is Mr. Randy Barr. An approximate legal description is the southeast quarter of the southwest quarter of Section 20, Township 7 North, Range 36 East, Walla Walla County, Washington. Based on the USGS 7.5 minute series topographic map of the area (Walla Walla Quadrangle), the latitude is 46 degrees 4 minutes 0 seconds and the longitude is 118 degrees 20 minutes 9 seconds. The approximate location is depicted in the Site Location Map (Figure 1). The subject site is bounded by East Alder Street to the north, South 1st Avenue to the west, an alley and parking lot to the south, and Cummins Athletic Supply to the east. The subject site hosts a three story, basemented building utilized as the central telephone operations center for U S WEST Communications. Specific aspects of the site are shown in the General Site Plan (Figure 2) while surrounding utilities are shown on the Utility Location Map (Figure 3).

2.2 Geology

The subject site is situated on the southwest portion of the Columbia Plateau geologic province northwest of the Blue Mountains in the southern margin of the Palouse region. The Columbia Plateau is comprised of a series of flood basalt which cover most of eastern Washington. The basalt flows of the Columbia Basalt Group are Miocene in age, forming an extensive volcanic plateau (Alt & Hyndman, 1984). The Columbia basalt in the Palouse region is overlain by eolian deposits of Palouse Loess (Alt & Hyndman, 1984). The subject site lies in an area where portions of the Palouse Loess were eroded and younger sedimentary units were deposited by Mill Creek and the Walla Walla River.

Area soils are classified as Yakima gravelly silt loam (Soil, 1993). Surface materials are asphalt pavement. Subsurface materials, as observed during excavating and drilling

activities, consist primarily of dark grey sandy gravel with cobbles. For more details on subsurface conditions, please refer to the Boring Logs in Appendix 1.

2.3 Hydrology

The subject site is located in the Mill Creek drainage basin. The average rainfall for the area is estimated to be 13 to 16 inches per year (Soil, 1993). Surface drainage is directed to the southwest where runoff empties into a storm sewer. Natural surface drainage is to the northwest toward Mill Creek. The nearest surface water is Mill Creek located approximately 170 yards to the north. Based on the information provided by installed monitoring wells, groundwater contact is 10 to 14 feet BGS but is subject to seasonal fluctuations. The groundwater flow direction, based on groundwater data collected August 21, 1993, is calculated to be towards the southwest and is shown on the Groundwater Flow Direction Map (Figure 4).

2.4 Site History

Based on reviews of a Sanborn Insurance Map dated 1905, the subject site was originally the location of several commercial businesses including a liquor store, a wood working/upholstery shop, a carpenter's shop, a warehouse, and several storage sheds. The Sanborn Insurance Map dated 1930 showed the same site as having the same types of commercial businesses with the addition of a plating works and a paint store. The Sherwood and Roberts Real Estate map of the principal retail section of Walla Walla, Washington, dated 1956, shows the original telephone company (Pacific Telephone and Telegraph Co.) building at the subject site. Interviews with telephone personnel indicate the original telephone building was built in the late 1940s (Hill, 1992). Building plans from 1955 shows the construction of a new addition to the original building. This building currently occupies the site. Copies of the Real Estate map and building plans are included in Appendix 2.

2.5 Regulated Material Issues

As discussed in the previous section, the subject site has been utilized as a telephone operations center for over 45 years. USTs are of major concern as point sources for

petroleum hydrocarbon contamination and were the main targets of the historical records search and site survey. U S WEST officials, City of Walla Walla officials and property owners in the upgradient groundwater flow direction were interviewed for the possible existence of USTs. Historical records such as Sanborn Insurance Maps and building plans were also reviewed for the presence of USTs.

Four UST systems were confirmed to have existed on the subject site and are depicted on the UST Location Map (Figure 5). Two of these systems are still in existence. First, a 1,000-gallon emergency generator UST is currently located in the parking area adjacent to South 1st Avenue. The second system, which had been closed in-place (Chen-Northern, 193-2065-3, May 1993), consists of a single UST located beneath the basement floor of the existing building. The size and former contents of this tank could not be determined.

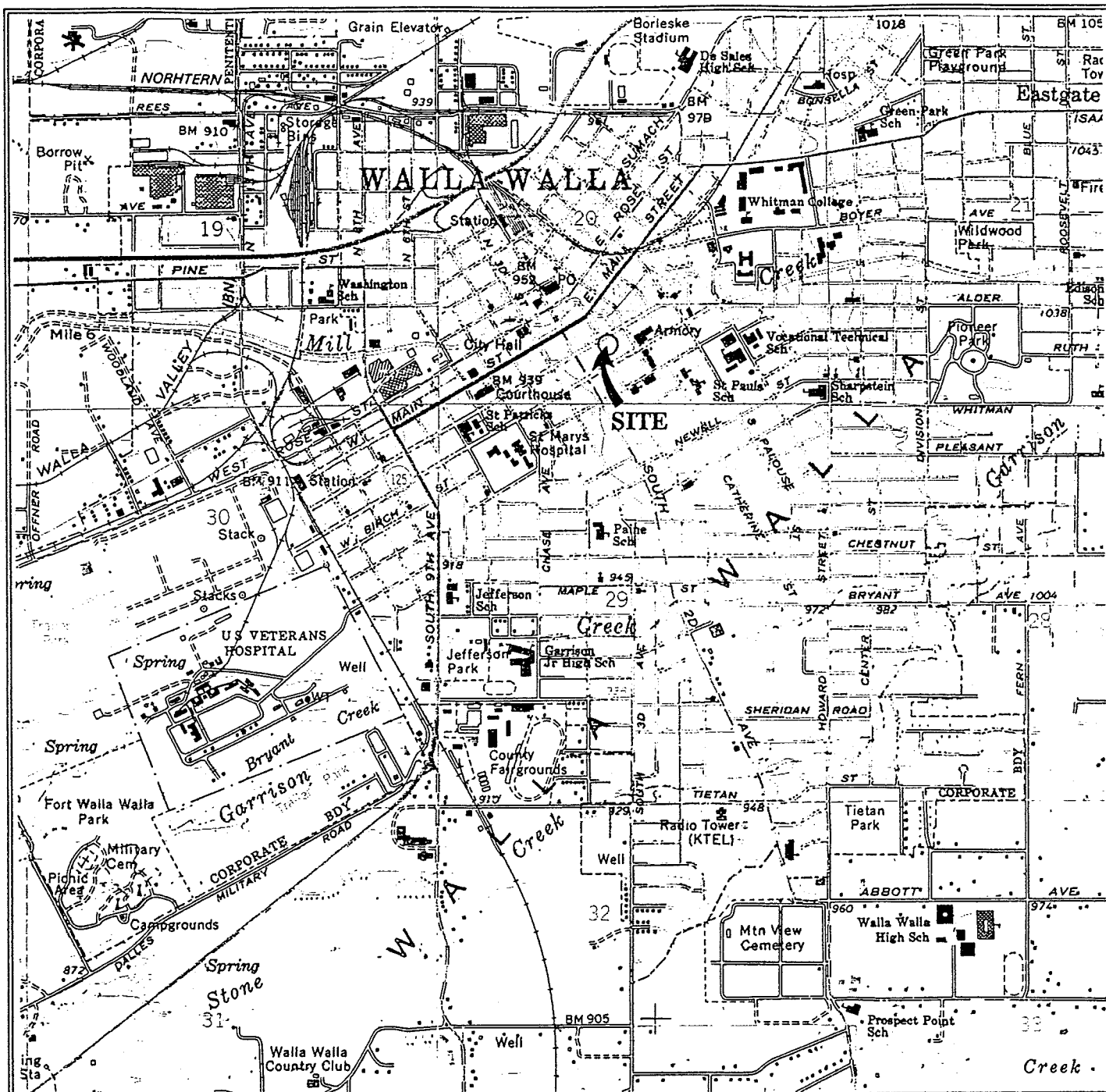
The third UST system was identified by U S WEST officials as having existed on the southeast corner of the subject site (Hill, 1992). One 2,000-gallon fuel oil tank and one 400-gallon diesel fuel tank were located where the electrical grounding grid is now present. These tanks were assumed to be removed when the grid was built. To confirm the presence or absence of the USTs, Chen-Northern excavated in the reported area of the tanks. Although excavating was limited due to the electrical grounding grid, no evidence, such as tanks, piping or discolored soil, was discovered.

The fourth UST system was indicated on building plans dated 1955 (Appendix 2). Two 4,000-gallon fuel oil tanks were located east and adjacent to the original building. The plans indicated these tanks were to be removed when the new addition was built. Inspections in the basement area revealed no evidence that would indicate these tanks were still present. Due to the nature and depth of the basement in the building addition, these tanks were likely removed during construction.

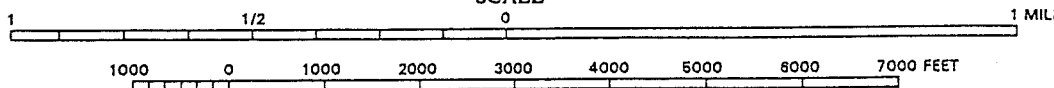
Interviews with upgradient property owners revealed only aboveground storage tanks in the basement of Cummins Athletic Supply and Walla Walla Motor Supply. Reviews of Sanborn Insurance Maps from 1930 showed five underground storage tanks located near the north

corner of the intersection of Alder and Colville Streets (Figure 5). These USTs were approximately 170 yards from the subject site. Another UST was indicated on the north side of Alder Street west of the intersection of Alder and Colville Streets. This UST was approximately 100 yards from the subject site. Finally, the Sanborn Insurance Map showed a small circle marked "G" in the street near the northeast corner of the subject site. This may indicate the former existence of another UST but no legend was present on the map defining this type of symbol. In addition to these USTs, interviews with city authorities indicated several USTs are present at the National Guard Armory located approximately 150 yards east of the subject site (Prouty, 1992). Furthermore, an automobile service station formerly existed south of the subject site at the adjacent parking lot and lawyer's office property. This service station reportedly operated in the late 1950s or 1960s (Prouty, 1992). In all cases with, the exception of the National Guard Armory and the on-site emergency generator UST, vent or fill pipes, which may indicate the presence of USTs were not observed.

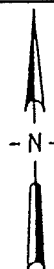
In regards to known petroleum releases, interviews with authorities at the city wastewater treatment facility revealed a petroleum hydrocarbon release was present in the vicinity of the subject site in the early 1970s. According to the Wastewater/Landfill Superintendent, a large influx of petroleum product was detected entering the wastewater treatment facility via the city sewer system in 1973 (Prouty, 1992). The source of the influx was traced back to the sewer line located in the alley adjacent to the subject site. During the course of the investigation, U S West officials apparently removed the USTs (identified in this report as the third UST system) located adjacent to this alley. Petroleum contaminated soil (PCS) was discovered indicating that the UST system had been leaking. The USTs and PCS were removed and the excavation backfilled with non-contaminated fill. Reportedly, the petroleum product influx into the wastewater treatment facility ceased after these USTs were removed (Prouty, 1992). The hypothesis was that petroleum product from the leaking UST system impacted the groundwater and was drawn beneath the building under the influence of the operating sump pumps. These sump pumps in turn discharged the petroleum contaminated groundwater into the city sewer system.



WALLA WALLA QUADRANGLE
 WASHINGTON - OREGON
 SCALE



CONTOUR INTERVAL 10 FEET
 DATUM IS MEAN SEA LEVEL



CHEN-NORTHERN, INC.

Job No.: 193-2065-1

SITE LOCATION MAP

U S WEST COMMUNICATIONS FACILITY
 102 EAST ALDER STREET
 WALLA WALLA, WASHINGTON

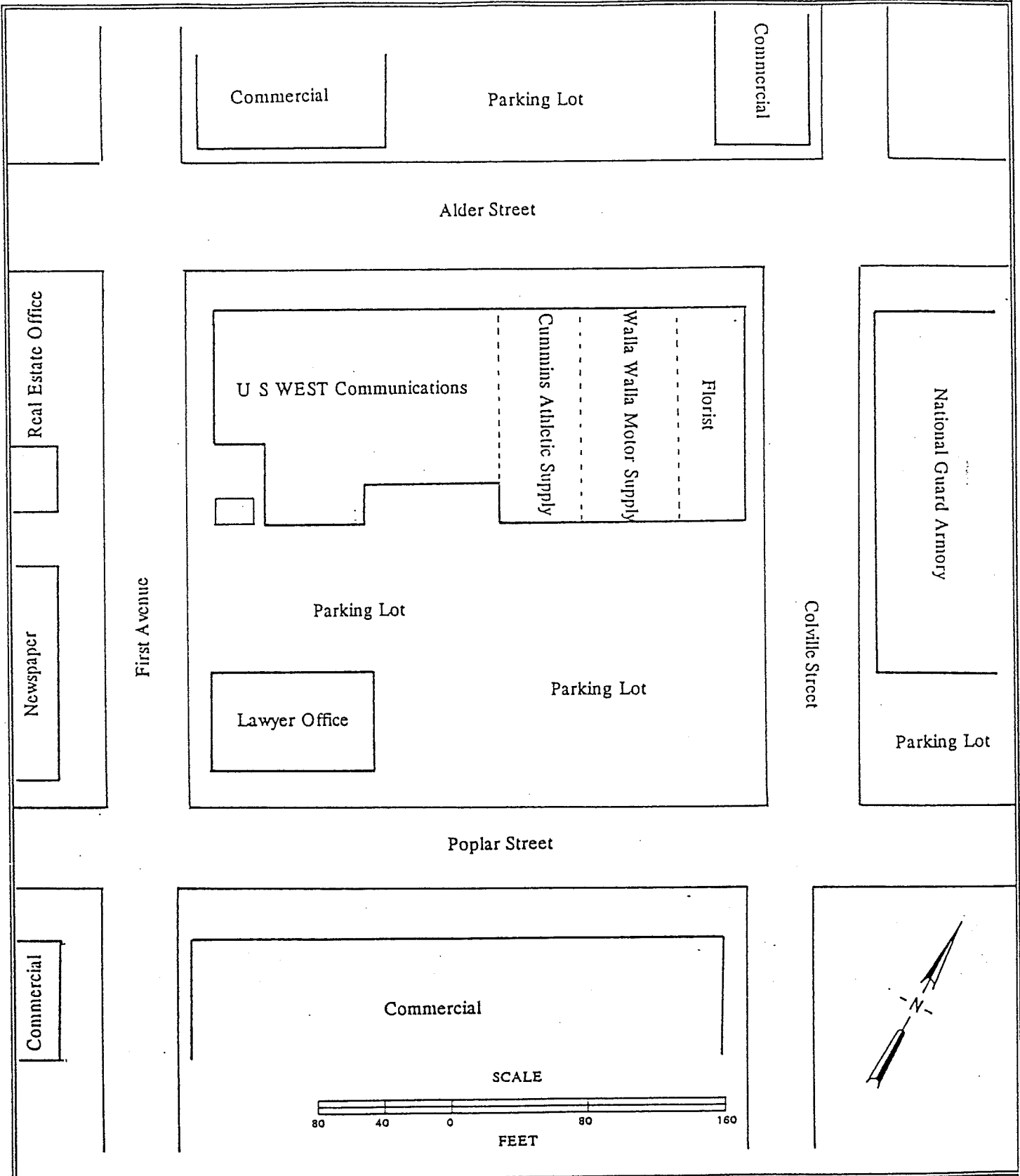
DATE:
1978

DRAWN BY:
U S Geological Survey

REVIEWED BY:
GT

SCALE:
1:24000

FIGURE NO.
1



CHEN-NORTHERN, INC.

Job No.: 193-2065-1

GENERAL SITE PLAN

U S WEST COMMUNICATIONS FACILITY
 102 EAST ALDER STREET
 WALLA WALLA, WASHINGTON

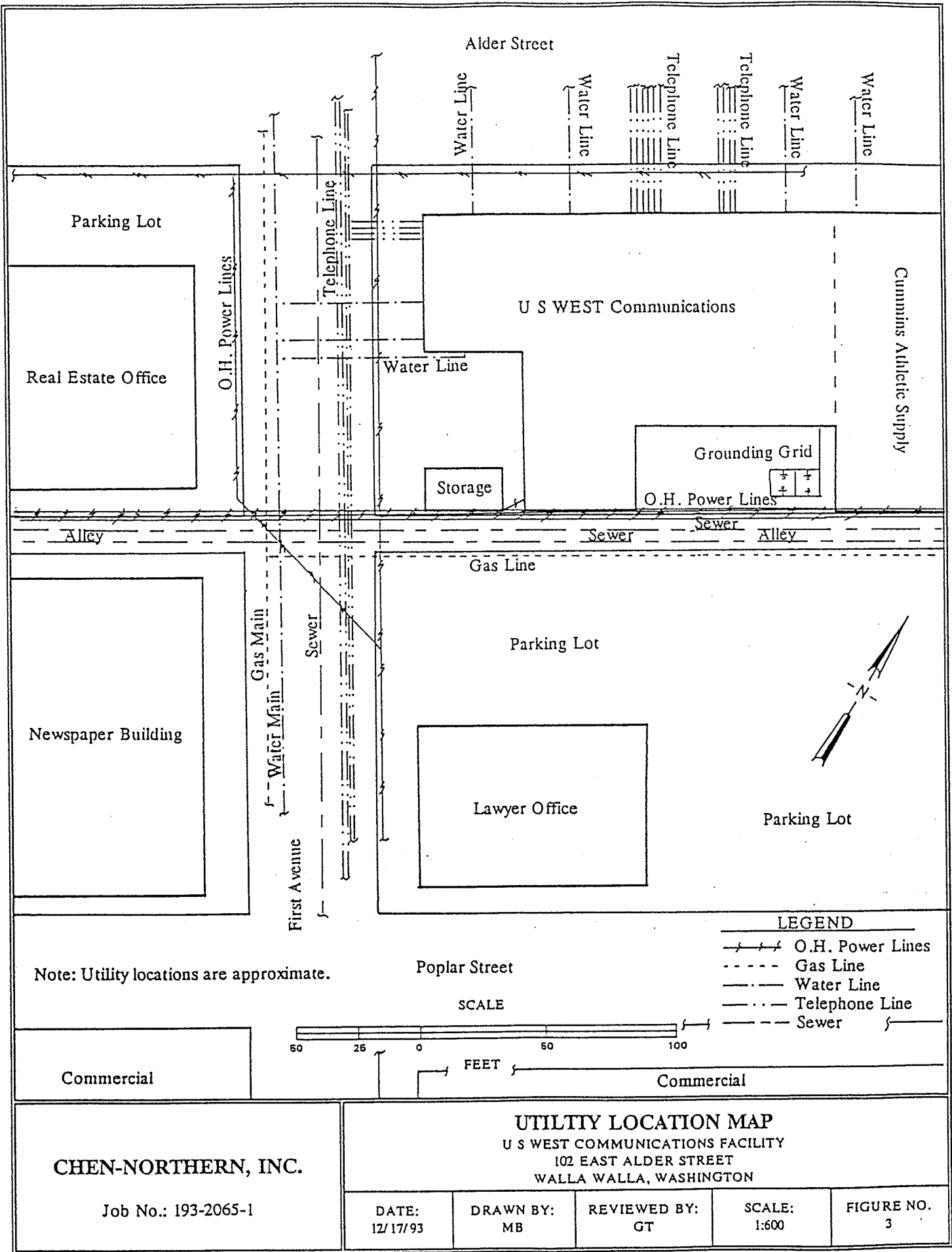
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12/17/93

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MB

REVIEWED BY:
GT

SCALE:
1:960

FIGURE NO.
2



Parking Lot

Real Estate Office

U S WEST Communications

Cummins Athletic Supply

Storage

Grounding Grid

O.H. Power Lines

Alley

Sewer

Sewer

Alley

Gas Line

Parking Lot

Newspaper Building

Lawyer Office

Parking Lot

First Avenue

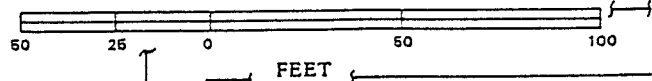
Note: Utility locations are approximate.

Poplar Street

LEGEND

- / / / — O.H. Power Lines
- - - - - Gas Line
- · - · - Water Line
- · · · · Telephone Line
- - - - - Sewer

SCALE



Commercial

Commercial

CHEN-NORTHERN, INC.

UTILITY LOCATION MAP

U S WEST COMMUNICATIONS FACILITY
102 EAST ALDER STREET
WALLA WALLA, WASHINGTON

Job No.: 193-2065-1

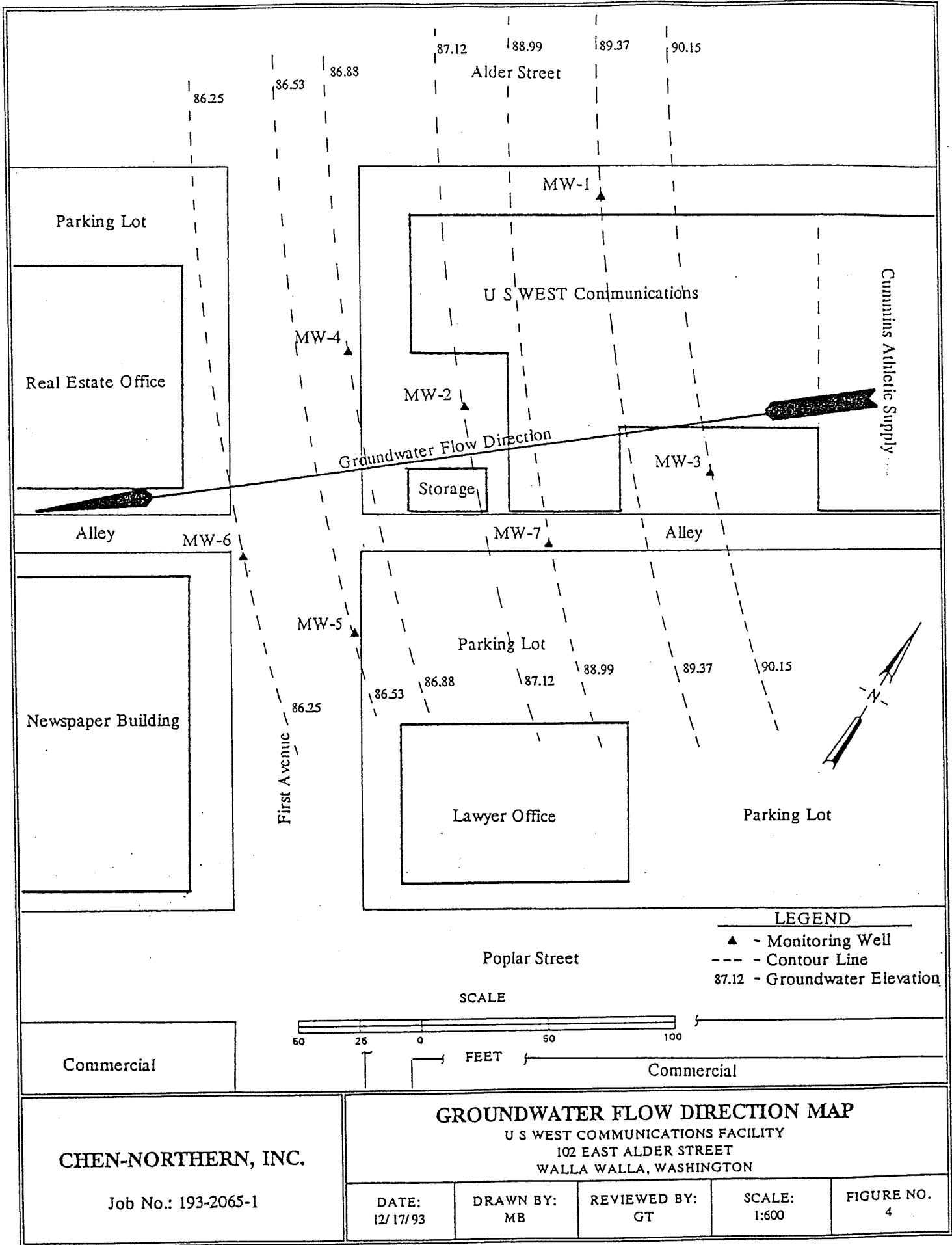
DATE:
12/17/93

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MB

REVIEWED BY:
GT

SCALE:
1:600

FIGURE NO.
3



CHEN-NORTHERN, INC.

Job No.: 193-2065-1

GROUNDWATER FLOW DIRECTION MAP

U S WEST COMMUNICATIONS FACILITY
 102 EAST ALDER STREET
 WALLA WALLA, WASHINGTON

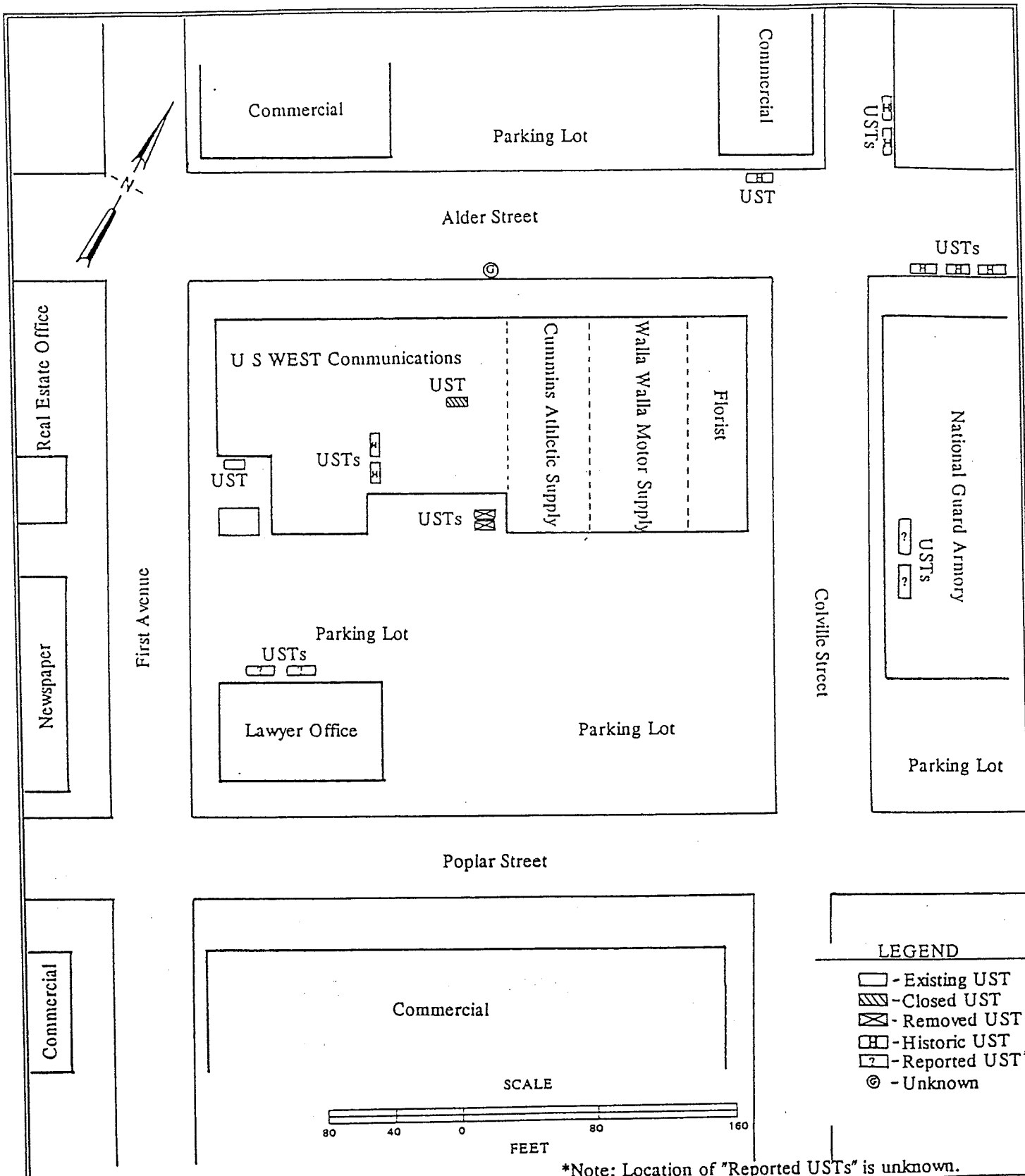
DATE:
12/17/93

DRAWN BY:
MB

REVIEWED BY:
GT

SCALE:
1:600

FIGURE NO.
4



*Note: Location of "Reported USTs" is unknown.

CHEN-NORTHERN, INC. Job No.: 193-2065-1	UST LOCATION MAP U S WEST COMMUNICATIONS FACILITY 102 EAST ALDER STREET WALLA WALLA, WASHINGTON			
	DATE: 12/ 17/ 93	DRAWN BY: GT	REVIEWED BY: GT	SCALE: 1:960

3.0 ASSESSMENT FINDINGS

3.1 Field Methods

The nature and extent of contamination was assessed by collecting subsoil and groundwater samples from strategically placed groundwater monitoring wells. The monitoring wells were drilled and installed in accordance with WDOE guidelines. The borings were advanced through the overburden soils with a 6-inch I.D. air-rotary drilling tool. Subsoil samples were collected using a 3 inch I.D. split spoon sampler driven into the subsurface strata using a 140-pound hammer falling 30 inches. The split spoon sampler was decontaminated with an Alconox wash between sampling events to prevent possible cross-contamination of subsoil samples. Subsoil samples retained for laboratory analysis were placed in coolers with ice until received by our state certified laboratory.

The collected subsoil samples were examined for discoloration and/or odors and for the presence of volatile organic vapors. Dark grey or green discoloration is suggestive of soil impacted by petroleum products. Volatile organic vapor screening procedures consisted of scanning excavated subsoil samples with a photoionization detector (PID), Microtip Model 102, to determine if volatile organic compounds were present. 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.

Groundwater samples were obtained using pre-cleaned disposable bailers after well development. The wells were developed by purging three well volumes of water and allowing the groundwater level to return to its approximate original height. Groundwater samples were collected between groundwater contact and 2 feet below the water's surface. Groundwater samples retained for laboratory analysis were placed in coolers with ice until

received by our state certified laboratory. The collected groundwater samples and purge water were examined for evidence of petroleum hydrocarbons. The presence of petroleum sheens and/or odors are suggestive of water impacted by petroleum products.

3.2 Field Observations

An environmental professional from Chen-Northern and a drilling crew were mobilized to the subject site to install four additional downgradient monitoring wells on August 6, 1993, for total of seven site wells. The monitoring wells were sited based on petroleum hydrocarbon plume predictions estimated from previously collected site data (Chen-Northern, 191-2065, October 1992). Field observations for each boring are summarized in Table 1, while more detailed information is provided on the Boring Logs (Appendix 1).

Table 1
Summary of Field Observations
Soil Borings

Boring No.	Soil Discoloration / Depth (ft) ¹	Max. Volatile Organic Vapor / Depth (ft) ²	Laboratory Sample Depth (ft) ¹
MW-4	None / NA	74.5 ppm ² / 10-12	11
MW-5	None / NA	0.0 ppm / 10-12	11
MW-6	None / NA	43.9 ppm / 5-7	11
MW-7	None / NA	0.0 ppm / 10-12	11

¹ Depth is in feet below ground surface.

² Volatile organic vapor concentrations are reported in parts per million or ppm.

A NA signifies "not applicable".

Field observations (Table 1) showed that subsoil discoloration was not detected. The PID registered low to moderate volatile organic vapor concentrations in subsoil samples collected from borings MW-4 and MW-6. As discussed in section 3.1, this screening methodology is dependent upon field conditions. Screening results are used to assist field personnel in evaluating subsoil conditions and should not be interpreted as actual contaminant concentrations. Subsoil samples obtained near groundwater contact were retained for laboratory analysis.

All seven monitoring wells located at the subject site were purged and sampled on August

21, 1993. Petroleum sheens and slight odors were detected in the purge water from MW-2 and MW-6. For more details on field observations and well construction, please refer to the Boring Logs (Appendix 1) and the Well Sampling Reports in Appendix 3. The locations of the monitoring wells are shown on the Detailed Site Plan (Figure 6).

3.3 Analytical Results

Representative subsoil samples were obtained from near groundwater contact at 11 feet BGS in each of the four monitoring well borings. Groundwater samples were collected after developing all seven subject site monitoring wells. These samples were collected in laboratory supplied containers, labelled, and were placed in coolers with ice for temporary storage until received by our state accredited laboratory in Billings, Montana. Analytical results are summarized in Table 2 and the laboratory reports are contained in Appendix 4. The sample locations are shown on Figure 6.

Table 2
Summary of Analytical Results
Monitoring Wells

Sample No.	Location ¹	Matrix	Analysis	Concentration ²	
				TRPH ³	HCID ⁴
1350082193	MW-1, 10.63'	Water	WTPH-418.1	0.3 mg/l	N/A
1530082193	MW-2, 11.87'	Water	WTPH-418.1	2 mg/l*	I/S
1645082193	MW-3, 10.31'	Water	WTPH-418.1	0.3 mg/l	N/A
1730082193	MW-4, 11.95'	Water	WTPH-418.1	< 0.2 mg/l	N/A
1940082193	MW-5, 12.06'	Water	WTPH-418.1	0.3 mg/l	N/A
1900082193	MW-6, 10.84'	Water	WTPH-418.1	0.4 mg/l	I/S
1810082193	MW-7, 10.59'	Water	WTPH-418.1	< 0.2 mg/l	N/A
1640080693	MW-4, 11'	Soil	WTPH-418.1	13 mg/kg	N/A
0715080793	MW-5, 11'	Soil	WTPH-418.1	< 4 mg/kg	N/A
0930080793	MW-6, 11'	Soil	WTPH-418.1	16 mg/kg	N/A
1145080793	MW-7, 11'	Soil	WTPH-418.1	11 mg/kg	N/A

¹ Sample locations are characterized by area and depth from which the sample was obtained.

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

³ TRPH = Total Recoverable Petroleum Hydrocarbons

⁴ HCID = Hydrocarbon Identification.

A N/A signifies "not analyzed" while an I/S signifies "insufficient sample" for analysis.

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

* Exceeds WDOE Method A action level of 200 mg/kg for TRPH. See Appendix 5.

3000 mg/l
2000 mg/l
3000 mg/l
3000 mg/l
4000 mg/l

Alder Street

Parking Lot

Real Estate Office

MW-4 ▲

UST

MW-2 ▲

Storage

MW-1 ▲

U S WEST Communications

Elevator Shaft

UST UST Boring

Sump-1 ●

Sump-2 ●

Cummins Athletic Supply

MW-3 ▲

Alley

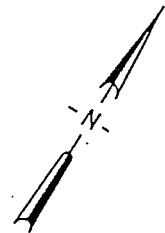
MW-6 ▲

MW-7 ▲

Alley

MW-5 ▲

Parking Lot



Newspaper Building

Lawyer Office

Parking Lot

First Avenue

LEGEND

- ▲ - Monitoring Well
- - Sump
- - UST

Poplar Street

SCALE



Commercial

Commercial

CHEN-NORTHERN, INC.

Job No.: 193-2065-1

DETAILED SITE PLAN

U S WEST COMMUNICATIONS FACILITY
102 EAST ALDER STREET
WALLA WALLA, WASHINGTON

DATE:
12/17/93

DRAWN BY:
MB

REVIEWED BY:
GT

SCALE:
1:600

FIGURE NO.
6

Laboratory results (Table 2) show that TRPH concentrations in subsurface samples exceeded WDOE Method A action levels in only one of the seven monitoring wells. The groundwater sample from MW-2 had a TRPH concentration of 2 mg/l which exceeds the WDOE Method A action level of 1 mg/l for TRPH. Laboratory results also show that petroleum hydrocarbon concentrations were insufficient in the groundwater samples collected from MW-2 and MW-6 to identify the type of petroleum product present. Action levels established by the WDOE are presented in Appendix 5.

4.0 RELEASE CHARACTERIZATION

The purpose of this section is to provide information about the extent and magnitude of environmental impact observed at the subject site.

4.1 Type of Release

During the course of this project, several subsurface samples have been collected for petroleum product identification purposes. First, the petroleum product observed during elevator shaft construction activities was identified as a mixture of #2 diesel fuel and bunker C oil (#6 fuel oil) (Chen-Northern, 191-2065, October 1992). Second, the petroleum product observed during in-place closure activities conducted on the UST located in the basement of the site building was identified as #2 diesel fuel (Chen-Northern, 193-2065-2, May 1993). Third, the petroleum product observed in a boring placed near this same UST was identified as kerosene (#1 fuel oil) (Chen-Northern, 191-2065, October 1992). Insufficient petroleum hydrocarbon concentrations in subsurface samples collected from monitoring wells located east and southeast of the subject site building have prevented product identification in these areas. Review of site history indicates #2 diesel fuel, heating oil, and bunker C oil have been used and stored at the subject site. The presence of product identified as kerosene may actually be aged #2 diesel fuel. Based on the collected data and until information can be provided indicating otherwise, the subject site appears to have been impacted by a mixture of bunker C oil and aged #2 diesel fuel.

4.2 Source of Release

The source of the contamination has not been confirmed and can only be speculated upon. First, the existing UST system contains #2 diesel fuel but does not show signs of leakage such as product loss. In addition, this tank is located approximately 50 yards in the downgradient groundwater flow direction from the elevator shaft where petroleum product was first discovered. Second, no information was discovered indicating that the UST system located in the center of the subject site and present before the building addition was added in the late 1950s is still in existence or was leaking when it was removed. Third, interviews with adjacent property owners and reviews of historic Sanborn Insurance Maps do not indicate the existence of additional USTs on the subject site property or less than 100 yards

in the upgradient groundwater flow direction. Fourth, the UST located in the basement of the building had been grouted and closed in-place. Additional information was not available indicating this UST, which was for a generator and probable contained diesel fuel, had been leaking. Finally, and most important, interviews with city authorities indicated that the UST system located near the alley adjacent to the subject site was leaking when it was removed in 1974. As shown on building plans from 1955 (Appendix 2), this UST system was used for the storage of both fuel oil, which may have included bunker C oil, and diesel fuel. Based on this information, the most probable source of the petroleum product release appears to be the UST system previously located on southeast corner of the subject site near the alleyway and/or the UST which was closed in-place located in the basement.

4.3 Magnitude of Release

In view of the physical restrictions and artificial changes in the groundwater flow direction, the area of contamination is difficult to define with collected sample data. However, certain facts can be ascertained from the existing data. Table 3 is a summary of subsoil sample data collected from the subject site. The sample locations are shown on Figure 6.

Table 3
Summary of Analytical Results
Subsoil Samples

Sample No.	Location ¹	Matrix	Analysis	Concentration ²	
				TRPH ³	HCID ⁴
1000121791	UST Boring, 4'	Soil	WTPH-418.1	1,610 mg/kg *	#1 Diesel
1300061892	MW-1, 12'	Soil	WTPH-418.1	53 mg/kg	N/A
1100032592	MW-2, 12'	Soil	WTPH-418.1	2,300 mg/kg *	N/A
1200032792	MW-3, 10'	Soil	WTPH-418.1	1,990 mg/kg *	N/A
1640080693	MW-4, 11'	Soil	WTPH-418.1	13 mg/kg	N/A
0715080793	MW-5, 11'	Soil	WTPH-418.1	< 4 mg/kg	N/A
0930080793	MW-6, 11'	Soil	WTPH-418.1	16 mg/kg	N/A
1145080793	MW-7, 11'	Soil	WTPH-418.1	11 mg/kg	N/A

¹ Sample locations are characterized by area and depth from which the sample was obtained.

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

³ TRPH = Total Recoverable Petroleum Hydrocarbons ⁴ HCID = Hydrocarbon Identification.

A N/A signifies "not analyzed" while an I/S signifies "insufficient sample" for analysis.

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

* Exceeds WDOE Method A action level of 200 mg/kg for TRPH. See Appendix 5.

Table 3 shows that the highest petroleum hydrocarbon concentrations in collected subsurface samples are found in areas immediately adjacent to the site building in the downgradient groundwater flow direction. Table 4 is a summary of groundwater sample data collected from the subject site. The sample locations are shown on Figure 6.

Table 4
Summary of Analytical Results
Groundwater Samples

Sample No.	Location ¹	Matrix	Analysis	Concentration ²	
				TRPH ³	HCID ⁴
1005121791 **	Elevator Shaft, 3'	Water	WTPH-418.1	Free Product	Bunker C #2 Diesel
1305012192 **	Sump #1, 3'	Water	WTPH-418.1	4.5 mg/l*	N/A
1200071793	Sump #1, 3'	Water	WTPH-418.1	3.8 mg/l*	N/A
1300062992 **	MW-1, 10.61'	Water	WTPH-418.1	<0.5 mg/l	N/A
1350082193	MW-1, 10.63'	Water	WTPH-418.1	0.3 mg/l	N/A
1650073192 **	MW-2, 11.88'	Water	WTPH-418.1	120 mg/l*	N/A
1530082193	MW-2, 11.87'	Water	WTPH-418.1	2 mg/l*	I/S
1350032992 **	MW-3, 10.30'	Water	WTPH-418.1	<0.5 mg/l	N/A
1645082193	MW-3, 10.31'	Water	WTPH-418.1	0.3 mg/l	N/A
1730082193	MW-4, 11.95'	Water	WTPH-418.1	<0.2 mg/l	N/A
1940082193	MW-5, 12.06'	Water	WTPH-418.1	0.3 mg/l	N/A
1900082193	MW-6, 10.84'	Water	WTPH-418.1	0.4 mg/l	I/S
1810082193	MW-7, 10.59'	Water	WTPH-418.1	<0.2 mg/l	N/A

¹ Sample locations are characterized by area and depth from which the sample was obtained.

² Groundwater sample results are reported in milligrams per liter (mg/l).

³ TRPH = Total Recoverable Petroleum Hydrocarbons

⁴ HCID = Hydrocarbon Identification.

A N/A signifies "not analyzed while an I/S signifies "Insufficient sample for analysis".

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

* Exceeds WDOE Method A action level of 1 mg/l for TRPH. See Appendix 5.

** Samples collected from previous projects (Chen-Northern, 191-2065, October 1992).

Table 4 shows the highest TRPH concentrations in groundwater samples collected from areas in the basement and at monitoring well MW-2. TRPH concentrations continue to exceed WDOE Method A action levels of 1 mg/l for MW-2 and Sump #1. Table 4 also shows a decrease in TRPH concentrations between groundwater samples collected in 1992 and groundwater samples collected in 1993 for Sump #2 and MW-2. Although the groundwater sample data may indicate TRPH concentrations are decreasing, this trend can

not be confirmed with the limited historical data collected. This decreasing trend may have been influenced by seasonal fluctuations in the groundwater level or changes in local contaminant plume migration patterns. Additional groundwater sampling information will need to be obtained and documented to substantiate TRPH concentration decreases.

4.4 Extent of Release

Certain interpretations can be made that would fit the existing data. Assuming the source of contamination is the UST system previously located on southeast corner of the subject site or the UST which was closed in-place, petroleum hydrocarbons migration may have been partially controlled by molecular diffusion, artificially induced gradients created by the sump pumps, and/or boundary effects caused by the building foundation having contact with the aquifer. This may explain the petroleum hydrocarbon contamination observed in the elevator shaft and Sump #1.

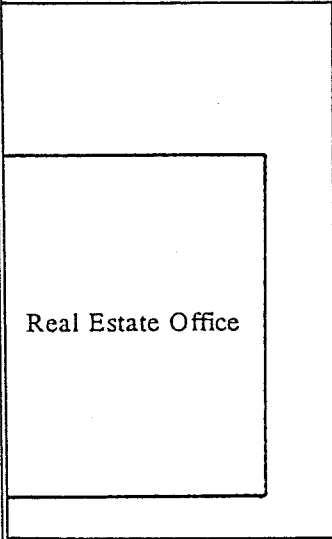
Chen-Northern has attempted to define the extent of impact in the subsurface based on subsoil and groundwater sample data. Two plume diagrams were developed to show the correlation between the observed groundwater and subsoil contamination data. Using contour lines to represent contaminant concentrations, the Soil TRPH Plume Diagram (Figure 7) and Groundwater TRPH Plume Diagram (Figure 8) show the possible extent of impact based on hydrogeologic information, analytical results, and potential release sources.

As seen in the two plume diagrams, free product and high TRPH concentrations are found in areas beneath the basement floor and immediately adjacent to the subject site building. TRPH concentrations decrease in the downgradient groundwater flow direction away from the building. WDOE Method A action levels are exceeded only within the subject site property boundaries. This indicates the petroleum plume has not migrated off-site and appears confined to the basement subsurface and immediately downgradient.

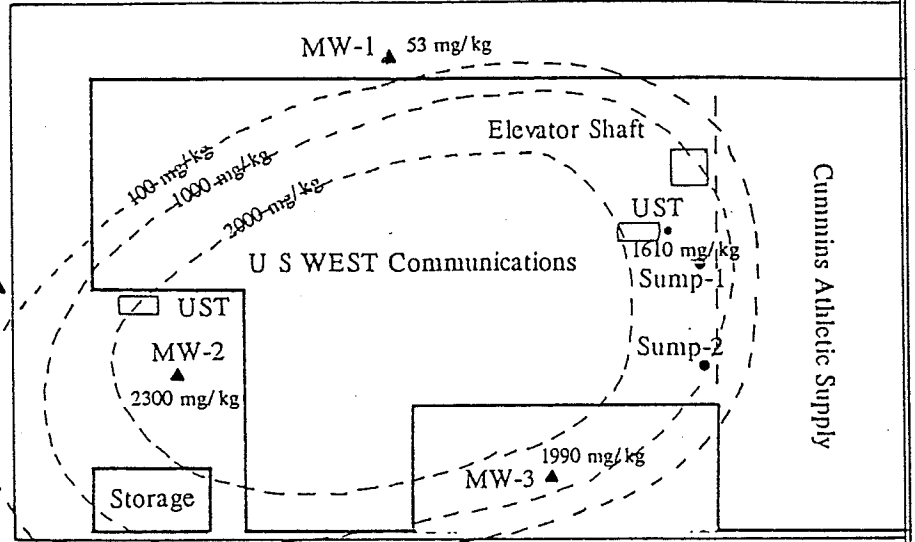
The migration of the petroleum contamination appears to be slow and limited. The assumed release sources were removed over 20 years ago and the contamination plume appears not to extend beyond 70 yards. Field observations indicate the petroleum product

in the subsurface has a tendency to adhere to the gravelly soils above the groundwater saturation zone (Chen-Northern, 191-2065, October 1992, & Chen-Northern, 193-2065-2, May 1993). This tendency explains the higher TRPH concentrations detected in the subsoil samples when compared to groundwater samples collected at or near the same location. The high viscosity of Bunker C oil may have impeded migration and the foundation footings appear to be acting as a migration barrier by disrupting groundwater flow and confining insoluble petroleum hydrocarbons beneath the basement slab.

Alder Street



Real Estate Office



MW-1 ▲ 53 mg/kg

Elevator Shaft

100 mg/kg
1000 mg/kg
2000 mg/kg

UST

1610 mg/kg

Sump-1

U S WEST Communications

Sump-2

UST

MW-2

2300 mg/kg

Storage

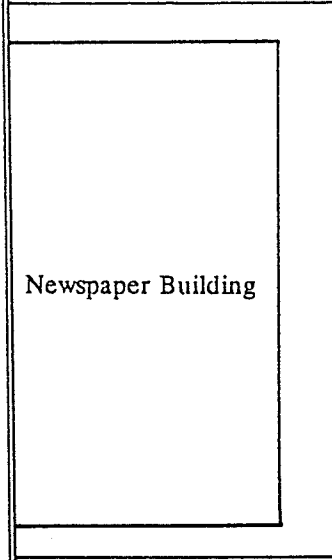
MW-3 ▲ 1990 mg/kg

Cummins Athletic Supply

Alley

MW-6

▲ 16 mg/kg



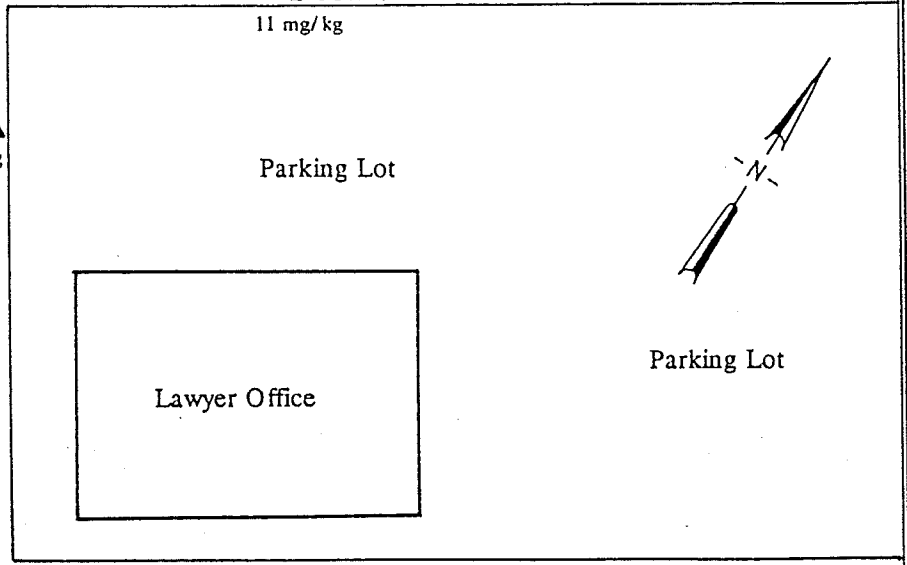
Newspaper Building

MW-5

▲ <4 mg/kg

MW-7

▲ 11 mg/kg

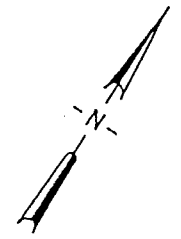


Parking Lot

Lawyer Office

Parking Lot

First Avenue



Poplar Street

LEGEND

▲ - Monitoring Well

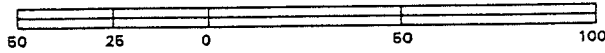
● - Sump

▭ - UST

11 mg/kg - TRPH Concentration

----- TRPH Plume Estimate

SCALE



FEET

Commercial

CHEN-NORTHERN, INC.

Job No.: 193-2065-1

SOIL TRPH PLUME DIAGRAM

U S WEST COMMUNICATIONS FACILITY

102 EAST ALDER STREET

WALLA WALLA, WASHINGTON

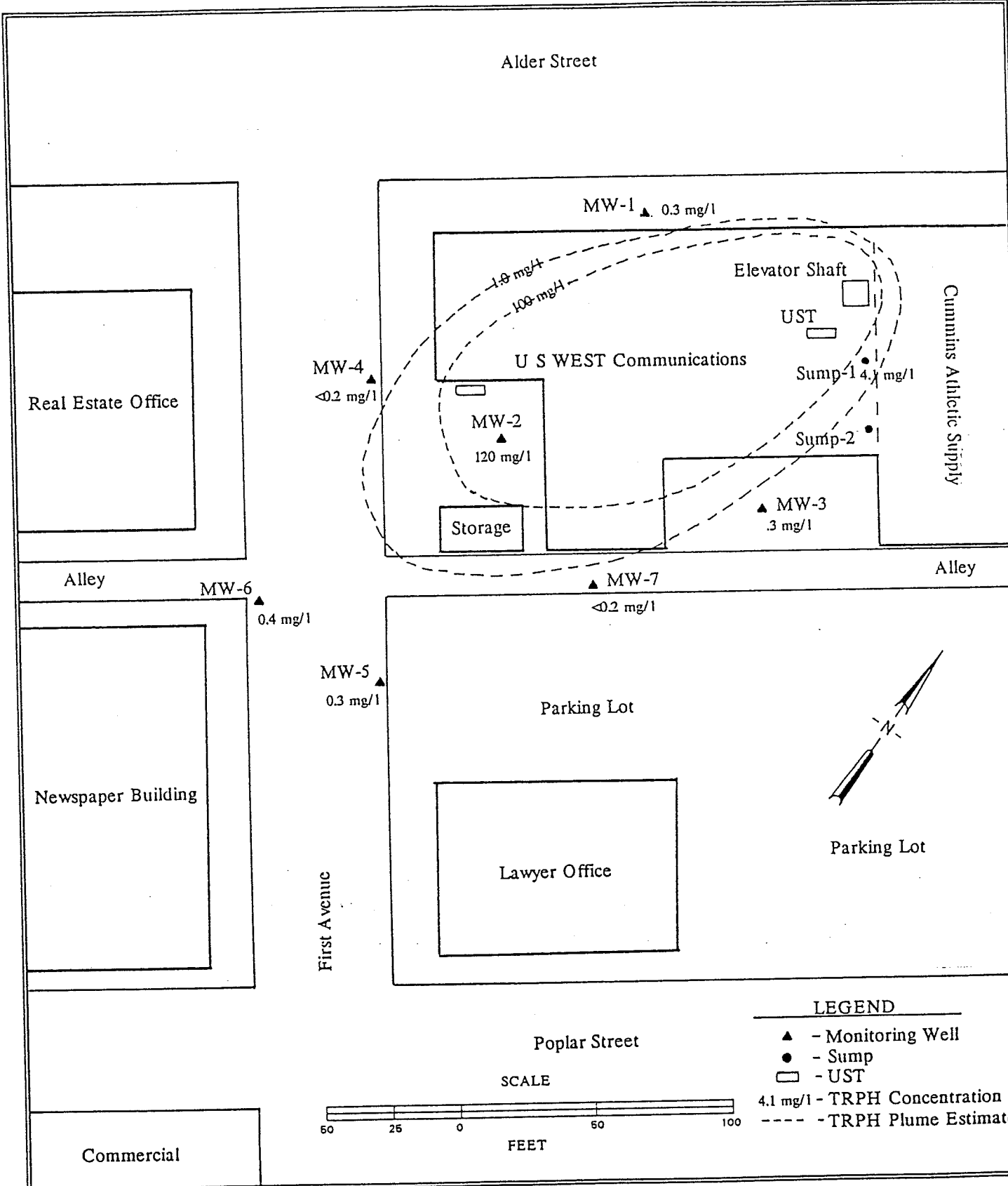
DATE:
12/17/93

DRAWN BY:
MB

REVIEWED BY:
GT

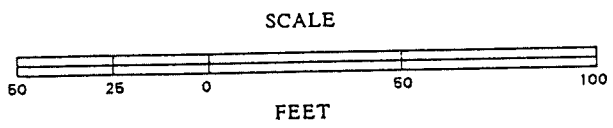
SCALE:
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FIGURE NO.
7



LEGEND

- ▲ - Monitoring Well
- - Sump
- - UST
- 4.1 mg/l - TRPH Concentration
- - TRPH Plume Estimate



CHEN-NORTHERN, INC.

Job No.: 193-2065-1

GROUNDWATER TRPH PLUME DIAGRAM

U S WEST COMMUNICATIONS FACILITY
102 EAST ALDER STREET
WALLA WALLA, WASHINGTON

DATE:
12/17/93

DRAWN BY:
MB

REVIEWED BY:
GT

SCALE:
1:600

FIGURE NO.
8

5.0 REMEDIAL/MONITORING ACTIONS

The petroleum hydrocarbon contamination described in the preceding sections appears limited to the subject site and concentrated beneath the subject site building foundation. Remediation of the subsurface appears both monetarily and technically impractical at this time. Traditional pump and treat groundwater remediation methods would apparently be ineffective in removing the bulk of the petroleum hydrocarbons which have impacted the site. This is apparent from the high TRPH concentrations detected in the subsoils located above the groundwater saturation zone and the relatively low concentrations detected in the groundwater at or near the same sampling points. Furthermore, groundwater discharged from the basement sump does not appear to be substantially reducing the petroleum hydrocarbons in its area of influence. Free product and high TRPH concentrations were detected less than 6 yards away in the elevator shaft excavation and at the UST which was closed in-place. Physical removal of the petroleum hydrocarbon contamination through excavating will not be feasible until the subject site building is removed. Based on past experience, vapor extraction and sparging are ineffective with bunker C oil and have only limited effects on #2 diesel fuel. Remediation of the subject site using induced steam may have adverse effects on the surrounding subsurface utilities and is not advised. In-situ bioremediation may be the best remedial option available but may be monetarily expensive and difficult to manage. The sump pumps operating in the basement may remove any induced microorganisms.

Public exposure to the subsurface contamination appears minimal if not improbable. The surface of the site is covered with asphalt pavement and concrete. Open excavations and other unsecured accesses to the subsurface are not present. Groundwater drinking wells are not currently present near the site and the petroleum hydrocarbon plume does not appear to be migrating rapidly in any direction. To insure current plume conditions are constant, the subject site should be monitored to observe any significant changes in plume migration patterns and/or seasonal fluctuations in petroleum hydrocarbon concentrations.

6.0 CONCLUSIONS

Chen-Northern has completed detailed hydrocarbon investigation activities for the U S WEST Communications facility located at 102 East Alder Street in Walla Walla, Washington. This investigation is a continuation of assessment work performed by Chen-Northern on the subject site beginning in January of 1992.

The purpose of this project was to assist responsible parties in complying with the current Washington State Department of Ecology (WDOE) regulations and guidelines for an independent assessment of subsurface conditions impacted by petroleum hydrocarbons. Site specific objectives were realized as follows:

Objective 1

Review previous assessment work and historical site data for characterization purposes.

- ◆ Site assessment reports from the in-place closure of a UST located in the basement of the site building and initial plume characterization were examined for similarities and subsurface sampling information.
- ◆ Four UST systems were confirmed to have existed on the subject site.
- ◆ Interviews with upgradient property owners revealed only aboveground storage tanks in the basement of Cummins Athletic Supply and Walla Walla Motor Supply.
- ◆ Reviews of Sanborn Insurance Maps from 1930 showed five underground storage tanks located near the north corner of the intersection of Alder and Colville Streets. These USTs were approximately 170 yards from the subject site. Another UST was indicated on the north side of Alder Street south of the intersection of Alder and Colville Streets. This UST was approximately 100 yards from the subject site.
- ◆ Interviews with city authorities indicated several USTs are present at the National Guard Armory located approximately 150 yards east of the subject site. Furthermore, an automobile service station formerly existed south of the subject site at the adjacent parking lot and lawyer's office property. This service station reportedly operated in the late 1950s or 1960s.

Objective 2

Drill and install four additional monitoring wells, for a total of seven, to determine the boundaries of environmental impact.

- ◆ The nature and extent of contamination was assessed by collecting subsoil and groundwater samples from strategically placed groundwater monitoring wells.

- ◆ The monitoring wells were drilled and installed in accordance with WDOE guidelines.
- ◆ The borings were advanced through the overburden soils with a 6-inch I.D. air-rotary drilling tool.
- ◆ No subsoil discoloration or odor was detected in the monitoring well borings.
- ◆ Headspace screening of subsoil samples collected from the monitoring wells revealed volatile organic vapor concentrations of less than 74.5 ppm.
- ◆ To confirm field observations, subsurface samples were collected from the seven monitoring wells for laboratory analysis of TRPH. Laboratory results indicated petroleum hydrocarbon concentrations exceeded WDOE Method A action levels at MW-2 and the basement sump.

Objective 3

Verify the extent and magnitude of environmental impact using field observations and confirmational laboratory sampling.

- ◆ The subsurface appears to have been impacted by a mixture of bunker C oil and aged #2 diesel fuel.
- ◆ The most probable source of the petroleum product release appears to be the UST system previously located on southeast corner of the subject site near the alleyway and/or the UST which was closed in-place located in the basement.
- ◆ Free product and high TRPH concentrations are found in areas beneath the basement floor and immediately adjacent to the subject site building.
- ◆ TRPH concentrations decrease in the downgradient groundwater flow direction away from the building and exceed WDOE Method A action levels only within the subject site property boundaries.
- ◆ The petroleum plume has not migrated off-site and appears confined to beneath the basement and immediately downgradient.
- ◆ The migration of the petroleum contamination appears to be slow and limited. The assumed release sources were removed over 20 years ago and the contamination plume appears not to extend beyond 70 yards.

Objective 4

Evaluate possible remedial/ monitoring actions applicable to observed site conditions.

- ◆ Remediation of the subsurface appears both monetarily and technically impractical at this time.
- ◆ To insure current plume conditions are constant, the subject site should be monitored to observe any significant changes in plume migration patterns and/or seasonal fluctuations in petroleum hydrocarbon concentrations.

In conclusion, the site specific objectives have been achieved for this project. The petroleum release was characterized and the extent of contamination was determined. Based on the results of this assessment, our professional opinion is that remedial actions are impractical at this time but the site should continue to be monitored for changes in subsurface conditions.

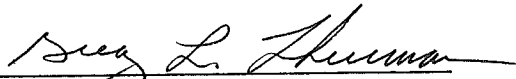
7.0 RECOMMENDATIONS

Chen-Northern recommends that the WDOE be notified as to the current conditions that exist at the subject site. Notification can be completed by filing this report with the WDOE Eastern Region. We also recommend that a quarterly groundwater monitoring plan be implemented for at least two years to observe any significant changes in plume migration patterns and/or seasonal fluctuations in petroleum hydrocarbon concentrations. At the end of this period, the collected subsurface sampling data should be reviewed and the site reevaluated. Finally, any building renovations or extensive excavation work done at the subject site should be carefully planned to include additional safety considerations and the remediation of any impacted subsoils removed.

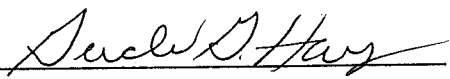
8.0 LIMITATIONS

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

REFERENCES:

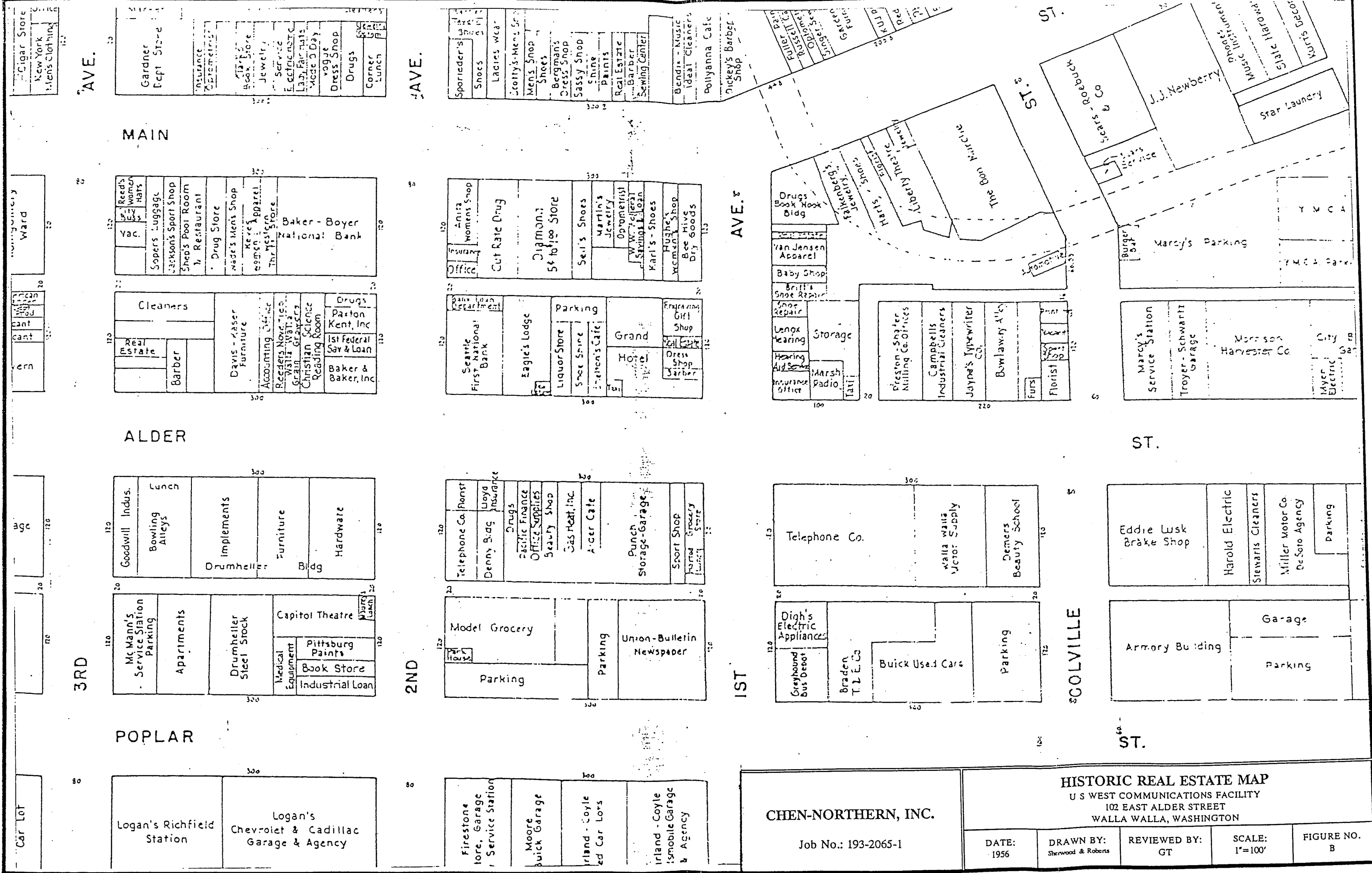
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- Soil Conservation Service (1993), Personal interviews with Greg Thurman of Chen-Northern, Inc.

APPENDIX 1

Boring Logs

APPENDIX 2

Historic Maps



Cigar Store
 New York
 Men's Clothing

AVE.

Gardner Dept Store
 Insurance
 Stationery
 Book Store
 Jewelry
 Service
 Electric
 Laundry
 Made to Order
 Dress Shop
 Drugs
 Corner Lunch

MAIN

Reed's
 Women's Hats
 Vac.
 Sopers Luggage
 Jackson's Sport Shop
 Shep's Pool Room
 Restaurant
 Drug Store
 Wade's Men's Shop
 Men's Apparel
 Thrift Store
 Baker - Boyer
 National Bank
 Cleaners
 Davis - Kaser
 Furniture
 Accounting Office
 Readers Novels
 Wall's
 Grain
 Christian Science
 Reading Room
 Drugs
 Paxton
 Kent, Inc
 1st Federal
 Sav & Loan
 Baker &
 Baker, Inc

ALDER

Goodwill Indus.
 Bowling Alleys
 Lunch
 Implements
 Drumheller
 Furniture
 Hardware
 Mc Mann's
 Service Station
 Parking
 Apartments
 Drumheller
 Steel Stock
 Medical
 Equipment
 Capitol Theatre
 Pittsburg
 Paints
 Book Store
 Industrial Loan
 Industrial Loan

POPLAR

Logan's Richfield
 Station
 Logan's
 Chevrolet & Cadillac
 Garage & Agency

AVE.

Sporieder's
 Shoes
 Ladies wear
 Jettys - Men's
 Shoes
 Men's Shop
 Shoes
 Bergman's
 Dress Shop
 Sassy Shop
 Shine
 Paints
 Real Estate
 Barber
 Sewing Center
 Bendis - Music
 Ideal Cleaners
 Pollyanna Cafe
 Dickey's Barber
 Shop

Anita
 Women's Shop
 Office
 Cut Rate Drug
 Diamond
 54 to 100 Store
 Sell's Shoes
 Martin's
 Jewelry
 Opometrist
 Savings Loan
 Karl's - Shoes
 Hughes's
 Women's Shop
 Bee Hive
 Dry Goods
 Seattle
 First National
 Bank
 Eagle's Lodge
 Liquor Store
 Shoe Shine
 Men's Cafe
 Grand
 HO
 Dress
 Shop
 Barber
 Engraving
 Gift
 Shop
 Tailor

2ND

Telephone Co.
 Denny Bldg
 Lloyd
 Insurance
 Drugs
 Pacific Finance
 Office Supplies
 Beauty Shop
 Gas Heat, Inc.
 Alder Cafe
 Punch
 Storage-Garage
 Sport Shop
 Model Grocery
 Parking
 Union-Bulletin
 Newspaper

Firestone
 tire, Garage
 Service Station
 Moore
 Buick Garage
 Ireland - Coyle
 ed Car Lovers
 Ireland - Coyle
 Automobile Garage
 & Agency

AVE.

1ST

Drugs
 Book Hook
 Bldg
 Van Jensen
 Apparel
 Baby Shop
 Britt's
 Shoe Repair
 Shoe
 Repair
 Long
 Hearing
 Aid
 Insurance
 Office
 Storage
 Marsh
 Radio
 Taxi
 Preston - Snyder
 Milling Co. Offices
 Campbell's
 Industrial Cleaners
 Jayne's
 Typewriter
 Co.
 Bowlawry Alley
 Furs
 Florist
 Shop
 The Don
 Kirtle
 Liberty Theatre
 Harris - Shoes
 Sankberg's
 Jewelry

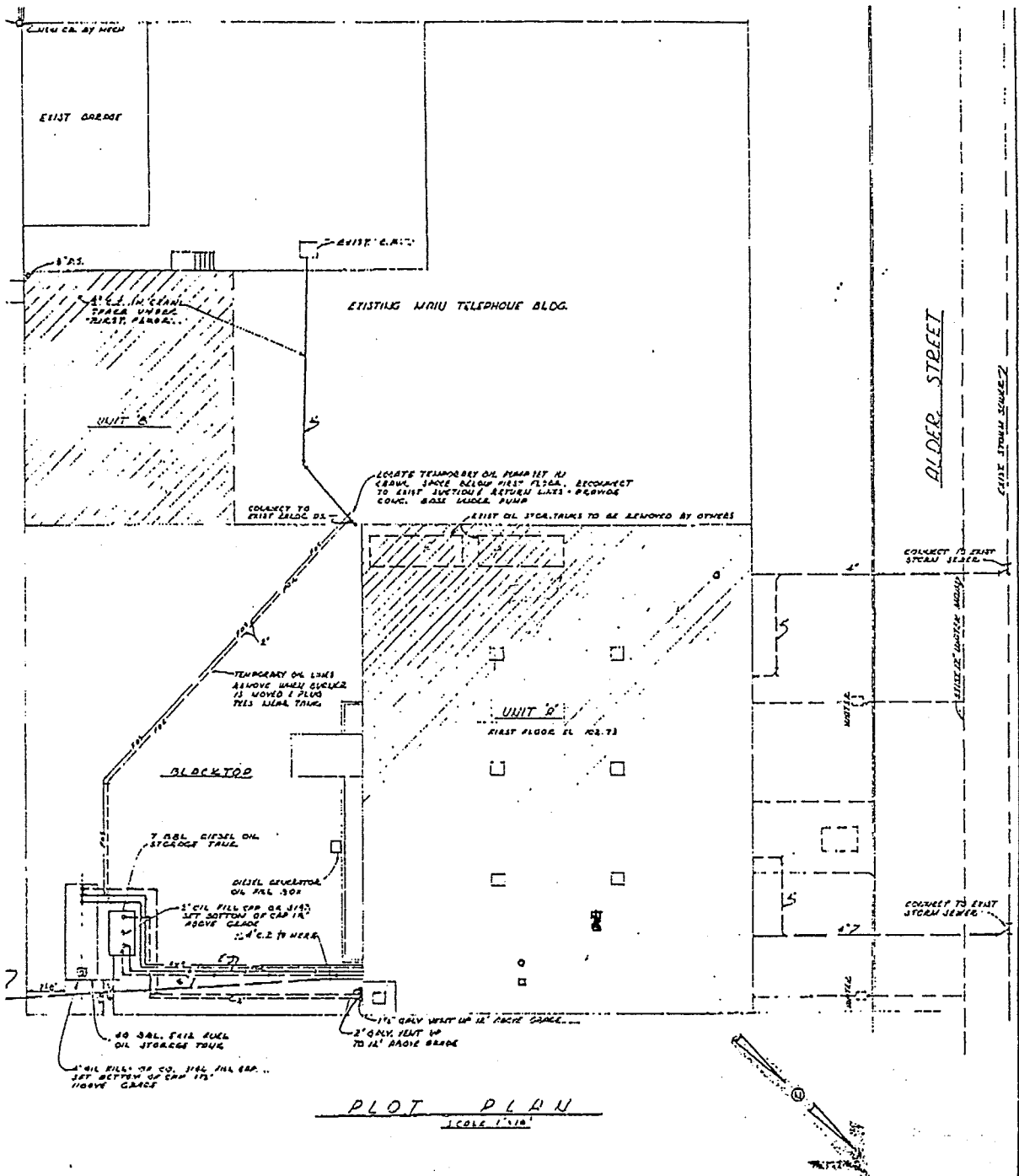
Telephone Co.
 Walla Walla
 Motor Supply
 Demers
 Beauty School
 Digh's
 Electric
 Appliances
 Greyhound
 Bus Depot
 Braden
 T.L.E.Co
 Buick Used Cars
 Parking

COLVILLE

Stars - Roback
 J.J. Newberry
 Music Programs
 Music Program
 Star Laundry
 Y M C A
 Y M C A
 Marcy's
 Service Station
 Troyer - Schwartz
 Garage
 Morrison
 Harvester Co.
 City
 Electric

Eddie Lusk
 Brake Shop
 Harold Electric
 Stewart's
 Cleaners
 Miller Motor Co.
 DeSoto Agency
 Parking
 Armory Building
 Garage
 Parking

ST.



PLOT PLAN
SCALE 1"=10'

WALLA WALLA, 70707, 1955, ELEV. N-02143,
LIN 1628 - Plot Plan

4TH ADDITION

N 3143



REVISIONS		
ITEM	ISSUE	DATE



THE PACIFIC TELEPHONE & TELEGRAPH CO.
OFFICE OF THE CHIEF ENGINEER
102 EAST ALDER STREET BUILDING
WALLA WALLA WASHINGTON

DRAWN BY: [Signature]
CHECKED BY: [Signature]
DATE: [Signature]

DECKER & CHRISTENSON, A. I. A.
ARCHITECTS
1411 FOURTH AVE. BLDG. SEATTLE (1)

SHEET NO. ME-1
53-21

CHEN-NORTHERN, INC.

Job No.: 193-2065-1

HISTORIC BUILDING PLANS

U S WEST COMMUNICATIONS FACILITY
102 EAST ALDER STREET
WALLA WALLA, WASHINGTON

DATE: 1955	DRAWN BY: Decker & Christenson	REVIEWED BY: GT	SCALE: 1"=25'	FIGURE NO. A
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APPENDIX 3

Well Sampling Reports

CHEN-NORTHERN, INC.

WELL SAMPLING REPORT

PROJECT: Phase II Environmental Assessment: Detailed Hydrocarbon Investigation

JOB NO.: 193-2065-1

DATE: 8/21/93

LOCATION: 18 WEST Communications, 102 East Alder St., Wall, WA

SAMPLERS: Thurman

METHOD: Boiler

WEATHER: Sunny & Partly Cloudy

TEMP.: 75° HUMIDITY: Low

8.67'
.65
<u>4335</u>
5202
<u>5635.5</u>
5.6 gal
<u>x 3</u>
16.8 gal

GROUNDWATER

WELL NO.: MW-1

WELL DIA.: 4"

WATER IN COVER: None

DEPTH TO WATER: 10.63'

WELL DEPTH: 19.30'

HEIGHT OF WATER: 8.67'

WATER VOLUME: 5.6 gal

PURGE WATER

CALC: 16.8 gal

MULT. FACTOR

2" CASING = 0.16

4" CASING = 0.65

5" CASING = 1.02

6" CASING = 1.47

Calculations

Time	Sample/Purge	Volume (Gals)	Temp. (°C)	pH	Cond. (mhos)	Odor	Appearance
1250	Purge	0	18°C	7.1	210µS	None	Clear
1310	Purge	5	17°C	7.2	200µS	None	Cloudy, Yellowish Brown
1330	Purge	10	17°C	7.0	190µS	None	Cloudy, Yellowish Brown
1345	Purge	15	17°C	7.0	180µS	None	Cloudy, Yellowish Brown
1350	Sample	16	17°C	6.9	180µS	None	Cloudy, Yellowish Brown

SAMPLES COLLECTED: 1 lt. glass - WJPH-415.1

REMARKS: Dropped cord board line spool into well but was able to pull it out with the bailer. Purge water placed in 55 gal drum rear of building.

CHEN-NORTHERN, INC.

WELL SAMPLING REPORT

PROJECT: Phase II Environmental Assessment: Detailed Hydrocarbon Investigation

JOB NO.: 193-2065-1

DATE: 8/21/93

LOCATION: 102 S WEST Communications, 102 East Alder St., Walla Walla, WA

SAMPLERS: Thurman

METHOD: Bailer

WEATHER: Partly Cloudy

TEMP: 75° HUMIDITY: Low

7.83
.65
3915
4698
50845
5.09
x 3
15.28

Calculations

GROUNDWATER
 WELL NO.: MW-2
 WELL DIA.: 4"
 WATER IN COVER: None
 DEPTH TO WATER: 11.87
 WELL DEPTH: 19.70
 HEIGHT OF WATER: 7.83
 WATER VOLUME: 5.09

PURGE WATER
 CALC: 15.3
 MULT. FACTOR
 2" CASING = 0.16
 4" CASING = 0.65
 5" CASING = 1.02
 6" CASING = 1.47

Time	Sample/Purge	Volume (Gals)	Temp. (°C)	pH	Cond. (mhos)	Odor	Appearance
1440	Purge	0	20°C	7.1	290 μs	None	Clear with suspended particles
1455	Purge	5	21°C	7.0	320 μs	Very Slight	Slightly Cloudy, suspended particles
1510	Purge	10	21°C	7.0	340 μs	Slight	Slightly Cloudy, suspended particles
1520	Purge	15	20°C	7.0	340 μs	Slight	Slightly Cloudy, suspended particles
1530	Sample	15.5	20°C	7.0	340 μs	Slight	Slightly Cloudy, suspended particles

SAMPLES COLLECTED: WTOH-418.1 - 1 lt glass

REMARKS: Sheen, slight, developed on 5 gal purge, 10 gal purge & 15 gal purge

CHEN-NORTHERN, INC.

WELL SAMPLING REPORT

PROJECT: Phase II Environmental Assessment: Detailed Hydrocarbon Investigation

JOB NO.: 193-2065-1

DATE: 8/21/93

LOCATION: U.S. WEST Communications, 102 East Alder St, Walla Walla, WA

SAMPLERS: Thurman

METHOD: Basler

WEATHER: Partly Cloudy

TEMP.: 75°

HUMIDITY: Low

7.30
0.65
36.50
43.80
47.450
4.7
x 3
14.1

GROUNDWATER

WELL NO.: MW-3

WELL DIA.: 4"

WATER IN COVER: None

DEPTH TO WATER: 10.31'

WELL DEPTH: 17.61'

HEIGHT OF WATER: 7.30'

WATER VOLUME: 4.7 gal

PURGE WATER

CALC: 4.1 gal

MULT. FACTOR

2" CASING = 0.16

4" CASING = 0.65

5" CASING = 1.02

6" CASING = 1.47

Calculations

Time	Sample/Purge	Volume (Gals)	Temp. (°C)	pH	Cond. (mhos)	Odor	Appearance
1600	Purge	0	20°C	6.7	280 µs	None	Cloudy, Yellowish-Brown
1615	Purge	5	19°C	6.7	280 µs	None	Very Cloudy, Yellowish Brown
1625	Purge	10	19°C	6.7	280 µs	None	Very Cloudy, Yellowish Brown
1635	Purge	14	19°C	6.7	280 µs	None	Very Cloudy, Yellowish Brown
1645	Sample	14.5	19°C	6.7	280 µs	None	Very Cloudy, Yellowish Brown

SAMPLES COLLECTED: 1 lt glass - WPH-418.1

REMARKS: No stems were observed.

CHEN-NORTHERN, INC.

WELL SAMPLING REPORT

PROJECT: Phase II Environmental Assessment: Detailed Hydrocarbon Investigation
 JOB NO.: 193-2065-1 DATE: 8/21/93
 LOCATION: US WEST Communication, 102 East Adler St., Walk Walli, WA
 SAMPLERS: Thurman
 METHOD: Bailer
 WEATHER: Cloudy
 TEMP.: 75° HUMIDITY: Low to med

GROUNDWATER WELL NO.: <u>MN-4</u> WELL DIA.: <u>2"</u> WATER IN COVER: <u>1"</u> DEPTH TO WATER: <u>11.95</u> WELL DEPTH: <u>16.62</u> HEIGHT OF WATER: <u>4.67</u> WATER VOLUME: <u>.75</u>	PURGE WATER CALC: <u>2.25</u> MULT. FACTOR 2" CASING = 0.16 4" CASING = 0.65 5" CASING = 1.02 6" CASING = 1.47
---	--

$$\begin{array}{r}
 4.67 \\
 + .16 \\
 \hline
 2802 \\
 467 \\
 \hline
 7472 \\
 .75 \\
 \times 3 \\
 \hline
 2.25
 \end{array}$$

Calculations

Time	Sample/Purge	Volume (Gals)	Temp. (°C)	pH	Cond. (mhos)	Odor	Appearance
1705	Purge	0	19°C	6.6	1550 μs	None	Very Cloudy, Dark Brown
1710	Purge	1	19°C	6.7	1470 μs	None	Very Cloudy, Dark Brown
1715	Purge	2	19°C	6.7	1370 μs	None	Very Cloudy, Dark Brown
1720	Purge	3	19°C	6.7	1350 μs	None	Very Cloudy, Dark Brown
1730	Sample	3.5	19°C	6.7	1290 μs	None	Very Cloudy, Dark Brown

SAMPLES COLLECTED: 1 lt glass - WTOPH-418.1

REMARKS: No sheen was observed.

CHEN-NORTHERN, INC.

WELL SAMPLING REPORT

PROJECT: Phase II Environmental Site Assessment: Detailed Hydrocarbon Investigation

JOB NO.: 193-2065-1

DATE: 8/21/93

LOCATION: 102 East Alder St., Well: Well WA

SAMPLERS: Thurman

METHOD: Backer

WEATHER: Partly Cloudy

TEMP: 75° HUMIDITY: Low

5.65
.16
<u>3390</u>
565
<u>9040</u>
.9
<u>x 3</u>
2.7

Calculations

GROUNDWATER

WELL NO.: MW5

WELL DIA.: 2"

WATER IN COVER: None

DEPTH TO WATER: 12.06

WELL DEPTH: 17.65'

HEIGHT OF WATER: 5.65

WATER VOLUME: 0.90

PURGE WATER

CALC: 2.7

MULT. FACTOR

- 2" CASING = 0.16
- 4" CASING = 0.65
- 5" CASING = 1.02
- 6" CASING = 1.47

Time	Sample/Purge	Volume (Gals)	Temp. (°C)	pH	Cond. (mhos)	Odor	Appearance
1920	Purge	0	19°C	6.6	420	None	Slightly Cloudy
1930	Purge	3	19°C	6.6	370	None	Very Cloudy, ^{Dark} Brown
1940	Sample	4	19°C	6.6	410	None	Very Cloudy, ^{Dark} Brown

SAMPLES COLLECTED: 1 lt glass - WTH-418.1

REMARKS: No sheen observed on purge water.

CHEN-NORTHERN, INC.

WELL SAMPLING REPORT

PROJECT: Phase II Environmental Site Assessment: Detailed Hydrocarbon Investigation

JOB NO.: 193-2065-1

DATE: 8/21/93

LOCATION: U.S.WEST Communications: 1002 East Alder St., Walla Walla, WA

SAMPLERS: Thurman

METHOD: Bailer

WEATHER: Partly Sunny

TEMP.: 75°

HUMIDITY: Low

7.02
.16
<hr/>
42.12
702
<hr/>
1.1232
1.12
x 3
<hr/>
3.36

GROUNDWATER

WELL NO.: MW-6

WELL DIA.: 2"

WATER IN COVER: None

DEPTH TO WATER: 10.84'

WELL DEPTH: 17.86'

HEIGHT OF WATER: 7.02'

WATER VOLUME: 1.12 gal

PURGE WATER

CALC: 3.36

MULT. FACTOR

2" CASING = 0.16

4" CASING = 0.65

5" CASING = 1.02

6" CASING = 1.47

Calculations

Time	Sample/Purge	Volume (Gals)	Temp. (°C)	pH	Cond. (mhos)	Odor	Appearance
1840	Purge	0	19°C	6.7	330 μs	Very Slight	Clear
1845	Purge	2	19°C	6.6	320 μs	Very Slight	Very Cloudy, Yellowed
1850	Purge	3.5	19°C	6.6	320 μs	Slight	Very Cloudy, Yellow Brown
1900	Sample	4.0	19°C	6.6	320 μs	Slight	Very Cloudy, Yellowish

SAMPLES COLLECTED: 1 (1 gal - WTOP-418.1)

REMARKS: Slight foam on Purge Water.

CHEN-NORTHERN, INC.

WELL SAMPLING REPORT

PROJECT: Phase II Environmental Site Assessment: Detailed Hydrocarbon Investigation

JOB NO.: 193-2065-1

DATE: 8/21/93

LOCATION: US West Communications - 102 East Alder St., Wall, WA, WA

SAMPLERS: Tharman

METHOD: Bailer

WEATHER: Partly Sunny

TEMP.: 75 HUMIDITY: Low

7.41
 + .16

 7.41
 4446

 11856
 1.2 gal
 x 3

 3.6

Calculations

GROUNDWATER

WELL NO.: MW-7

WELL DIA.: 2"

WATER IN COVER: 1"

DEPTH TO WATER: 10.59'

WELL DEPTH: 18.00'

HEIGHT OF WATER: 7.41

WATER VOLUME: 1.2 gal

PURGE WATER

CALC: 3.6

MULT. FACTOR

2" CASING = 0.16

4" CASING = 0.65

5" CASING = 1.02

6" CASING = 1.47

Time	Sample/Purge	Volume (Gals)	Temp. (°C)	pH	Cond. (mhos)	Odor	Appearance
1750	Purge	0	19°C	6.9	250 μS	None	Clear
1800	Purge	2	19°C	6.7	280 μS	None	Very Cloudy, Yellowish Brown
1805	Purge	3.5	19°C	6.7	270 μS	None	Very Cloudy, Yellowish Brown
1810	Sample	4	19°C	6.8	270 μS		

SAMPLES COLLECTED: 1 Lt glass - WTPH-418.1

REMARKS: No sheen was observed on purge water.

APPENDIX 4

Laboratory Results

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: August 27, 1993
JOB NUMBER: 87-921
SHEET: 1 of 3
INVOICE NO.: 24356

REPORT OF: Soil Analysis - U.S. West - Alder St Facility 193-2065-1

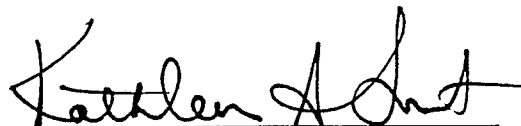
SAMPLE IDENTIFICATION:

On August 12, 1993, these soil samples (laboratory numbers 143621 through 143624) were received in our laboratory for analysis. The total petroleum hydrocarbon determinations were made in accordance with Environmental Protection Agency Method 418.1.

The test results are shown on the following pages.

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



rnr

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
 Project No.: 87-921
 Laboratory No.: 143621
 Sample Name: MW-6 11' BGS
 Sample Date: 08/07/93
 Collected by: GREG THURMAN
 Time Sampled: 0930
 Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS			
Moisture	3.7	%	08/18/93
PETROLEUM HYDROCARBONS (418.1)			
Recoverable Petroleum Hydrocarbons as rec'd	15	mg/kg	08/19/93
Recoverable Petroleum Hydrocarbons dry basis	16	mg/kg	08/19/93

Laboratory No.: 143622
 Sample Name: MW-4
 Sample Date: 08/06/93
 Collected by: GREG THURMAN
 Time Sampled: 1640
 Sample Type: SOIL

PARAMETER	MEASURED VALUE		DATE ANALYZED
INORGANICS			
Moisture	2.7	%	08/17/93
PETROLEUM HYDROCARBONS (418.1)			
Recoverable Petroleum Hydrocarbons as rec'd	12	mg/kg	08/19/93
Recoverable Petroleum Hydrocarbons dry basis	13	mg/kg	08/19/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
 Project No.: 87-921
 Laboratory No.: 143623
 Sample Name: MW-7 11' BGS
 Sample Date: 08/07/93
 Collected by: GREG THURMAN
 Time Sampled: 1145
 Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS		
Moisture	3.4 %	08/17/93
PETROLEUM HYDROCARBONS		
Recoverable Petroleum Hydrocarbons as rec'd	11 mg/kg	08/19/93
Recoverable Petroleum Hydrocarbons dry basis	11 mg/kg	08/19/93

Laboratory No.: 143624
 Sample Name: MW-5 11' BGS
 Sample Date: 08/07/93
 Collected by: GREG THURMAN
 Time Sampled: 0715
 Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
INORGANICS		
Moisture	10.4 %	08/17/93
PETROLEUM HYDROCARBONS (418.1)		
Recoverable Petroleum Hydrocarbons as rec'd	<4 mg/kg	08/19/93
Recoverable Petroleum Hydrocarbons dry basis	<4 mg/kg	08/19/93

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: September 10, 1993
JOB NUMBER: 87-921
SHEET: 1 of 5
INVOICE NO.: 24555

REPORT OF: Water and Soil Analysis - U.S. West - Alder St. 193-2065-1

SAMPLE IDENTIFICATION:

On August 24, 1993, these water and soil samples (laboratory numbers 144099 through 144106) were delivered to our laboratory for analysis.

The total petroleum hydrocarbon determinations were made in accordance with Environmental Protection Agency Method 418.1. Sample 144106, Basement Soil, was extracted and analyzed using a gas chromatograph with a flame ionization detector. Reference fuels were analyzed in a similar manner. By comparing the resultant chromatograms, it is our opinion this soil contained diesel fuel.

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

David Connell

Attachments (chromatograms)

ymr

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
 Project No.: 87-921
 Laboratory No.: 144099
 Sample Name: MW-1 1350082193
 Sample Date: 08/21/93
 Collected by: GREG THURMAN
 Time Sampled: 1350
 Sample Type: WATER

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PARAMETER	MEASURED VALUE	DATE ANALYZED
PETROLEUM HYDROCARBONS		
Recoverable Petroleum Hydrocarbons (418.1)	0.3 mg/l	09/02/93

Laboratory No.: 144100
 Sample Name: MW-2 1530082193
 Sample Date: 08/21/93
 Collected by: GREG THURMAN
 Time Sampled: 1530
 Sample Type: WATER

PARAMETER	MEASURED VALUE	DATE ANALYZED
ORGANICS		
Hydrocarbon Identification	Insufficient sample for analysis	
PETROLEUM HYDROCARBONS		
Recoverable Petroleum Hydrocarbons (418.1)	2 mg/l	09/02/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Laboratory No.: 144101
Sample Name: MW-3 1645082193
Sample Date: 08/21/93
Collected by: GREG THURMAN
Time Sampled: 1645
Sample Type: WATER

Page 3

PARAMETER	MEASURED VALUE	DATE ANALYZED
PETROLEUM HYDROCARBONS Recoverable Petroleum Hydrocarbons (418.1)	0.3 mg/l	09/02/93

Laboratory No.: 144102
Sample Name: MW-4 1730082193
Sample Date: 08/21/93
Collected by: GREG THURMAN
Time Sampled: 1730
Sample Type: WATER

PARAMETER	MEASURED VALUE	DATE ANALYZED
PETROLEUM HYDROCARBONS Recoverable Petroleum Hydrocarbons (418.1)	<0.2 mg/l	09/02/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
 Project No.: 87-921
 Laboratory No.: 144103
 Sample Name: MW-5 1940082193
 Sample Date: 08/21/93
 Collected by: GREG THURMAN
 Time Sampled: 1940
 Sample Type: WATER

PARAMETER	MEASURED VALUE	DATE ANALYZED
PETROLEUM HYDROCARBONS		
Recoverable Petroleum Hydrocarbons (418.1)	0.3 mg/l	09/02/93

Laboratory No.: 144104
 Sample Name: MW-6 190082193
 Sample Date: 08/21/93
 Collected by: GREG THURMAN
 Time Sampled: 1900
 Sample Type: WATER

PARAMETER	MEASURED VALUE	DATE ANALYZED
ORGANICS		
Hydrocarbon Identification	Insufficient sample for analysis	
PETROLEUM HYDROCARBONS		
Recoverable Petroleum Hydrocarbons (418.1)	0.4 mg/l	09/02/93

Client Name: CHEN-NORTHERN, INC. TRI-CITIES, WA
Project No.: 87-921
Laboratory No.: 144105
Sample Name: MW-7 1810082193
Sample Date: 08/21/93
Collected by: GREG THURMAN
Time Sampled: 1810
Sample Type: WATER

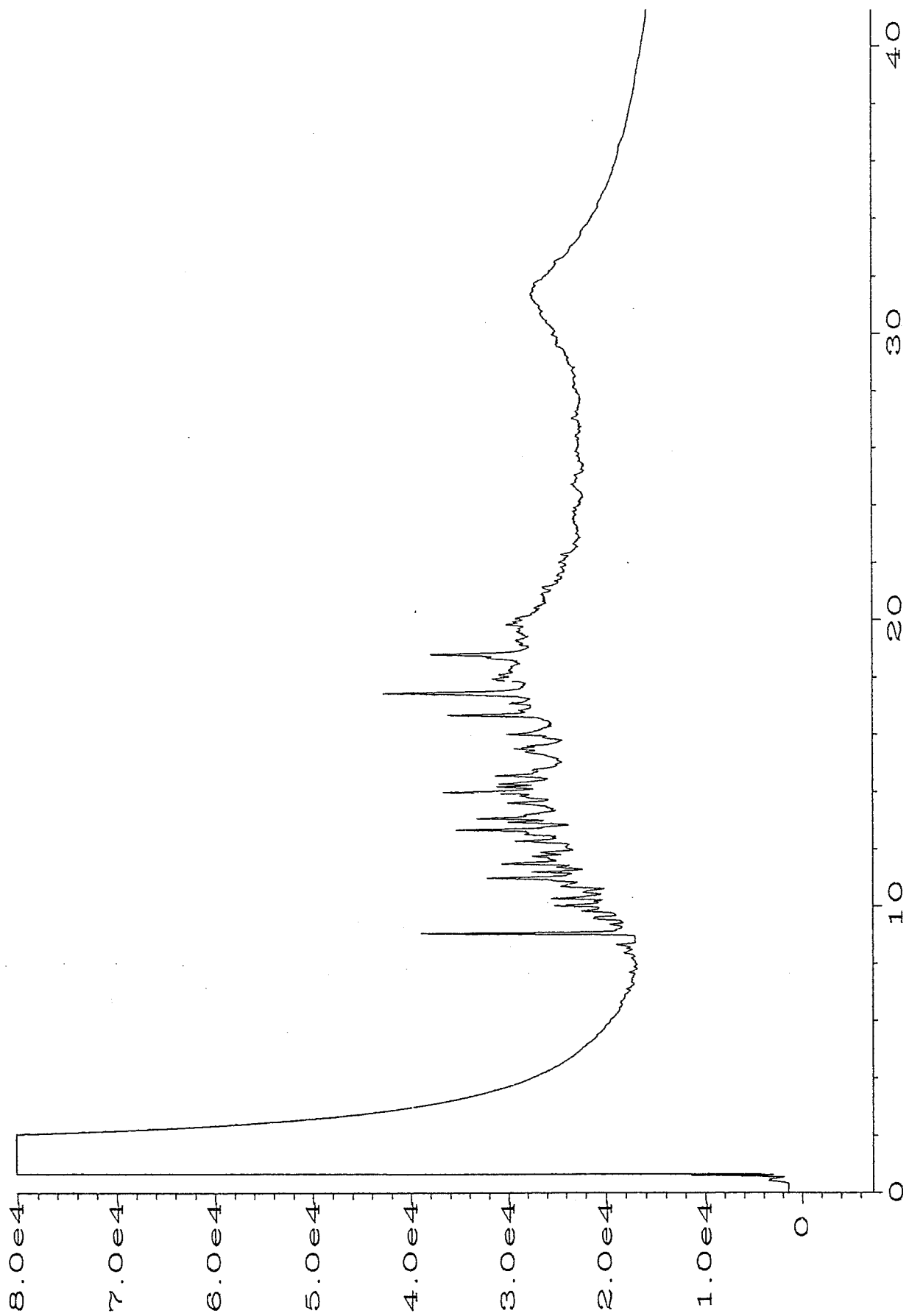
Page 5

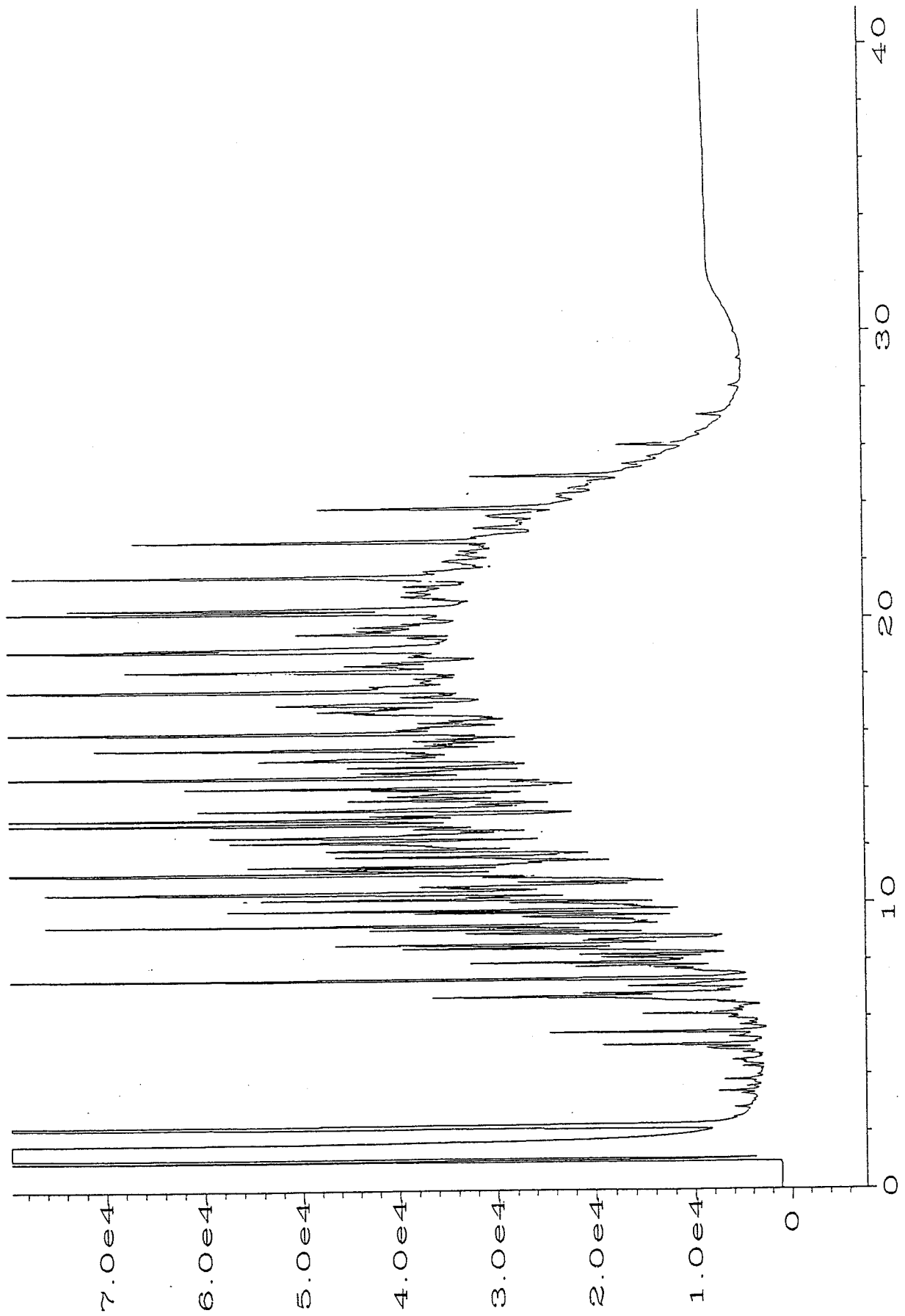
PARAMETER	MEASURED VALUE	DATE ANALYZED
PETROLEUM HYDROCARBONS		
Recoverable Petroleum Hydrocarbons (418.1)	<0.2 mg/l	09/02/93

Laboratory No.: 144106
Sample Name: BASEMENT SOIL 2010082193
Sample Date: 08/21/93
Collected by: GREG THURMAN
Time Sampled: 2010
Sample Type: SOIL

PARAMETER	MEASURED VALUE	DATE ANALYZED
ORGANICS		
Hydrocarbon Identification	Diesel Fuel	09/03/93
Data File Number	090393\003	

ATTACHMENTS





US WEST: Alder St. Facility
Project or Site Name

193-2065-1
Project Number

Greg Thurman
Sampler Name (Printed)

CHAIN OF CUSTODY RECORD

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 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	
						W/ TOP-4181	W/ HOLD											
8/21	1350	MW-1	G	Water	1 - 1lt glass	X											1350082193	144099
8/21	1530	MW-2	G	Water	1 - 1lt glass	X	X										1530082197	100
8/21	1645	MW-3	G	Water	1 - 1lt glass	X											1645082193	101
8/21	1730	MW-4	G	Water	1 - 1lt glass	X											1730082193	102
8/21	1940	MW-5	G	Water	1 - 1lt glass	X											1940082193	103
8/21	1900	MW-6	G	Water	1 - 1lt glass	X	X										1900082193	104
8/21	1810	MW-7	G	Water	1 - 1lt glass	X											1810082193	105
8/21	2000	Wastewater Drain #1	G	Water	1 - 1lt glass	X											2000082193	106
8/21	2005	Wastewater Drain #2	G	Water	1 - 1lt glass	X											2005082193	107
8/21	2010	Basement Soil	G	Soil	1 - 45 gm		X										2010082193	106
Relinquished by: Greg Thurman			Date: 8/23	Time: 1500	Received by: Shipped UPS			(Barcode) 144100 MW-2 8/21 1530 102 144105 MW-7 8/21 1810 105										
Relinquished by: Carrier/UPS ReQ			Date: 8/24/23	Time: 1000	Received by: CMT Lab Site K. E. ...													
Relinquished by:			Date:	Time:	Received by:													
Relinquished by:			Date:	Time:	Received by:			Cooler temp 11.1°C										

APPENDIX 5

Washington State Department of Ecology Action Levels

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.

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