SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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March 12, 1999

Abide International, Inc.
P.O. Box 1631
Richland, Washington 99352

Attn: Mr. Craig Frantz

RE: SUPPLEMENTAL PHASE 2 ENVIRONMENTAL SITE ASSESSMENT, CLOSED UNDERGROUND STORAGE TANK (UST), FEDERAL BUILDING, RICHLAND, WASHINGTON

The attached report is a supplement to our October 13, 1998, report "Preliminary Phase 2 Environmental Site Assessment, Closed UST at Federal Building, Richland, Washington." The information provided herein describes the results of additional evaluation of groundwater at the site. The initial assessments included soil and groundwater sampling and analysis at the location of a closed-in-place diesel fuel UST. The current exploration included the installation and sampling of two additional groundwater monitoring wells near the downgradient site boundary. The objective was to determine if contaminants detected at the UST location have migrated with the groundwater to the property boundary.

We appreciate the opportunity to work with you on this project. Please contact us if you have any questions about the report or recommendations.

Sincerely,

SHANNON & WILSON, INC.

Dee J. Burrie, P.E.
Vice President

Enclosure: Supplemental Phase 2 ESA Report, Federal Building, Richland, Washington

DJB/drp

V-1075-03

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CLOSED UNDERGROUND STORAGE TANK (UST)
FEDERAL BUILDING
RICHLAND, WASHINGTON

1.0 FIELD EXPLORATION AND SAMPLING

Environmental West Exploration, Inc., under subcontract to Shannon & Wilson, Inc., installed two groundwater monitoring wells on December 5, 1998, at the Richland Federal Building, 825 Jadwin Avenue, Richland, Washington. Locations of the monitoring wells are shown on Figure 2, and well logs are included in Appendix A. The depth to groundwater was measured at each of the wells, and a summary of the water elevation data is on Table 1. The relative elevations of the groundwater surface indicated that the flow gradient at the site is east northeast (measurement dates 12/5/98 and 12/9/98). Therefore, MW-01 is upgradient of MW-02 and, most likely, cross-gradient of MW-03.

Groundwater samples were collected from the new wells (MW-02 and MW-03) and from the existing well (MW-01) on December 9, 1998. Three well volumes from each well were purged using disposable polyethylene bailers prior to sample collection. Groundwater samples were transferred to laboratory-clean bottles using disposable, slow-emptying devices to minimize the loss of volatiles. Sample containers were placed on ice in a cooler, logged on the chain-of-custody form, and shipped by overnight delivery to OnSite Environmental, Inc., in Redmond, Washington.

2.0 ANALYTICAL TESTING

The testing suite included the following analyses:

Extractable petroleum hydrocarbons (EPH)
Volatile petroleum hydrocarbons (VPH)
Polycyclic aromatic hydrocarbons (PAH) by EPA 8270C, Selective Ion Monitoring (SIM)
Volatile Organic Compounds by EPA 8260B

A summary of the analytical results is included on Table 2, and the laboratory report and chain-of-custody are in Appendix B.

PAH and VPH, if present, were not detected at greater than the test practical quantitation limit (PQL) in any of the groundwater samples. EPH (aliphatic fraction C12-C16) were detected at a concentration of 100 micrograms per liter (μg/L) in the sample from MW-01. This concentration was significantly less than concentrations of EPH aliphatic and aromatic fractions detected in the MW-01 sample collected in September 1998. Total aliphatic EPH were 2,900 μg/L, and aromatic EPH were 1,700 μg/L in the earlier sample. EPH were not detected in samples from MW-02 or MW-03 collected in December.

Of the volatile compounds analyzed for by EPA Method 8260B, four halogenated organic compounds were detected in the groundwater samples (Table 2). Tetrachloroethene (PCE) was detected in all three samples at concentrations of 130, 22, and 3.9 μg/L from MW-03, MW-02, and MW-01, respectively. Chloroform was detected in samples from MW-01 and MW-03 at concentrations of 24 and 9.9 μg/L, respectively. Trichloroethene (TCE) and (cis)1,2-dichloroethene were detected in the sample from MW-02 at concentrations of 3.1 and 4.5 μg/L, respectively. Concentrations of PCE and chloroform exceeded potential regulatory criteria, or drinking water standards maximum contaminant levels (MCLs), in some of the samples. The State of Washington Model Toxics Control Act (MTCA) Method B risk-based concentration formula value for PCE (as a carcinogen) is 0.858 μg/L, and the MCL is 5 μg/L. The MTCA Method B formula value for chloroform is 7.17 μg/L. Establishment of actual MTCA Method B cleanup levels requires considering applicable laws, site-specific information, cross-media impacts, and other factors in addition to formula risk-based calculations.

The highest concentration of PCE detected was in the sample from MW-03, located closest to former solvent USTs at the site. However, PCE was also detected in samples from MW-01 and MW-02. MW-03 is crossgradient of MW-02, and crossgradient as well as slightly downgradient of MW-01. Whereas it is possible that contamination originating from the former UST location could impact MW-02, it is unlikely that it could impact MW-01.

3.0 ENVIRONMENTAL RECORDS REVIEW

In an attempt to determine the source or sources of halogenated organic compounds that were detected in groundwater samples from the site, we reviewed information regarding former solvent USTs at the site, and potential off-site contaminant sources. The locations of several businesses and other facilities discussed in this section are shown on Figure 1.

3.1 On-Site Environmental Records

Three USTs formerly located to the east of the Federal Building (Figure 2) had, in the past, reportedly contained solvents that were used in the maintenance of printing equipment. During a 1995 facilities inventory and evaluation, PBS Environmental of Portland, Oregon, collected a liquid sample from UST No. 6, the waste solvent tank. The analysis of the sample for volatile organics (EPA Method 8240) indicated the presence of acetone and TCE at concentrations of 22 and 36 μg/L, respectively. Methylene chloride was detected at a concentration of 3 μg/L. The analyte was also found in the associated laboratory blank, indicating that its presence may have been caused by laboratory error. PCE, if present, was less than the test method reporting limit (MRL) of 1.0 μg/L. A copy of the laboratory report is in Appendix C.

PBS Environmental sampled subsurface soils during removal of the three solvent USTs in July 1997. The UST closure report indicated that the USTs and piping appeared to be in very good condition, and that no visual or olfactory evidence of leakage from the UST system was apparent during closure activities. The report indicated that soil samples were collected from about one foot below the bottom of the USTs, or about 9.5 feet below the ground surface (bgs). The samples were analyzed by North Creek Analytical for volatile organic compounds by EPA Method 8260; none of the compounds were detected at concentration greater than the MRL. A copy of PBS Environmental's report is in Appendix D.

3.2 Off-Site Environmental Records

Information regarding potential off-site source(s) of halogenated organic compounds in the groundwater was obtained from the State of Washington Department of Ecology (Ecology) and from the City of Richland. New City Cleaners and the City of Richland Wellsian Way Well Field are included on Ecology's Hazardous Sites List as locations where halogenated organic compounds (typically solvents) have been detected in the groundwater. New City Cleaners at 747 Stevens Drive is located approximately 1,500 feet southwest of the Federal Building property. The Wellsian Way Well Field, along the west side of Wellsian Way, is between 3,200 and 6,000 feet southwest of the Federal Building. The locations of the well field and the dry cleaner are shown on Figure 1.

3.2.1 New City Cleaners

Records regarding the New City Cleaners site were reviewed at Ecology's Central Region Office in Yakima, Washington. Information in a report titled "Site History Report" (April 23, 1997) prepared by EMCON of Spokane, Washington, indicated that the dry cleaner facility was

constructed in about 1949 or 1950. Four USTs at the site, probably installed with the initial construction, were removed in April 1992. Tank contents included Bunker C oil, kerosene, and stoddard solvents. Reportedly, the dry cleaner began using PCE in 1974, which was stored in 55-gallon drums. The drums were stored outside until 1975 when vandalism caused a release, after which the drums were stored inside the facility. Prior to the early 1980s, the reported waste handling method involved placing filtrate cake and carbon canisters in dumpsters at the site. The PCE-containing waste was included in materials disposed of at the local landfill.

E.P. Johnson Construction, Inc., conducted a groundwater assessment in late 1991 and early 1992 at a site adjacent to the south side of the dry cleaners' property. Water samples collected from wells located along the north side of the property contained TCE and PCE. E.P. Johnson's report indicated that the maximum concentrations of TCE and PCE in groundwater samples were 12 and 1,900 μg/L, respectively.

In April 1992 when USTs were removed from the dry cleaner's site, halogenated organic compounds were detected in soil and groundwater samples collected during the UST closure site assessment. Additional sampling in June 1992 confirmed the earlier results.

In July 1996, Ecology issued an enforcement order to the owners of New City Cleaners requiring that a remedial investigation (RI) be performed at the site. EMCON performed a RI to evaluate the nature and extent of dry cleaning chemicals and petroleum products in soil and groundwater at the site. The final RI report, dated June 11, 1998, was reviewed by Ecology. The agency's review letter dated January 4, 1999, indicated that the owners will be required to perform additional work to determine if groundwater contamination has migrated off-site, specifically to the north of the dry cleaner property. The letter also indicated that Ecology is in the process of preparing an enforcement order requiring the completion of a feasibility study to support the selection of a cleanup action for the site.

EMCON's RI report (June 1998) presented the results of four groundwater sampling events in 1997. One set of groundwater samples was collected in March (Geoprobe™ samples), and the other three were collected from monitoring wells. The report indicated that the depth to groundwater is approximately 8 to 9 feet bgs, and the flow gradient is toward the northeast under both high and low groundwater elevation conditions. Halogenated organic compounds in groundwater samples collected at the New City Cleaners site, and the maximum concentrations detected during the 1992 and 1997 sampling events are summarized as follows:

Parameter, μg/L	1992 [1]	1997	
		Geoprobe™ Samples	Monitoring Well Samples [2]
Tetrachloroethene (PCE)	23,200	4,300	210
Trichloroethene (TCE)	982	3,500	7.9
cis-1,2-Dichloroethene	34	2,300	2.5
cis-1,2-Dichloroethane [3]	842	--	--

μg/L Micrograms per liter
(1) Test pit samples
(2) Chloroform was detected in two off-site wells (south); maximum concentration 0.9 μg/L.
(3) One sample in 1992 and none in 1997 had greater than the test detection limit.

EMCON performed slug tests at two monitoring wells at the site and estimated the hydraulic conductivity to be 1 x 10^{-2} centimeters per second (cm/sec). With an average horizontal hydraulic gradient of 0.0033 foot per foot, the average horizontal groundwater velocity was calculated to be 0.3 foot per day. Based on the assumed average velocity, the time of travel between the New City Cleaners site and monitoring wells at the Federal Building site is between 15.1 and 16.9 years.

The presence of organic material in the soil can retard the movement of organic contaminants, such as PCE, that are dissolved in groundwater. Soils that formed in the arid climate of this region are typically very low in organic matter, and the organic materials are primarily restricted to the upper 0.4 to 0.8 inch of the soil profile (Department of Energy "Hanford Site Background, Part 1 Soil Background for Non-Radioactive Analytes" Revision 3, October 1995; Soil Conservation Service "Soil Survey Benton County Area, Washington" 1971). Therefore, it is assumed that the soils comprising the upper unconfined aquifer underlying the downtown Richland area would not have a significant retardation effect on the movement of PCE. If PCE contamination moved at approximately the same rate as the horizontal movement of groundwater, PCE-contaminated groundwater originating at the dry cleaner facility could have reached the Federal Building site by the time of the December 1998 groundwater sampling.

3.2.2 Wellsian Way Well Field

Mr. Roger Wright, City of Richland Engineering Manager, provided information regarding the city's municipal water supply well field. He indicated that there are four wells in the system, but they are not being used for water supply because of the presence of PCE and TCE contamination. A treatment system has been operating since 1996 in an effort to decontaminate the aquifer.

Mr. Wright indicated that the groundwater flow gradient in the vicinity of the well field is predominantly from north to south, and that the most likely source of the contamination is believed to be a former repair shop that operated at the present location of Budget Rent-A-Car on Wellsian Way near Elliot Street. The suspect site is located approximately 2,500 feet southwest of the Federal Building property.

3.2.3 Other Potential Off-Site Sources

Historical information obtained from an undated Kroll Atlas indicated that there have been multiple service stations along Stevens Drive and Lee Boulevard west, southwest, and south of the Federal Building property. Some of the facilities are still operating as gasoline stations or automotive repair shops, but others have been converted to other uses. The map indicated that there were ten service stations in an area from 1,600 feet west, 1,200 to 2,200 feet southwest, and 600 feet south of the site. Another dry cleaner (Richland Laundry and Dry Cleaners, 1106 Harding Street) that has been in operation for many years is located about 1,100 feet southwest of the Federal Building. Facilities and operations such as these that used, stored, or disposed of solvents represent potential sources of volatile organic compounds in the subsurface environment in the vicinity of the Federal Building. Their potential for impact on the subject site is unknown.

City of Richland representatives indicated that evidence of halogenated organic solvent contamination in groundwater at another location in the vicinity of the Federal Building site has been detected. Chloroform, TCE, and PCE were detected in groundwater samples from monitoring wells located south of the former city shop facility at 1300 Mansfield Street. Water level measurements at the former city shop site indicated a northeasterly flow gradient at that location. Therefore, wells located south of the site are believed to be upgradient of the city's facility. The former city shop site is located approximately 800 feet northeast of the New City Cleaners site and approximately 900 feet west northwest of the Federal Building (Figure 1).

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Halogenated Organic Compounds

The pattern of halogenated organic compounds detected in groundwater samples collected at the site is not entirely consistent with the former, on-site solvent USTs being the source. One consideration is that if the groundwater flow gradient has been consistently toward the east northeast, a potential release from the former solvent USTs would not be likely to account for the presence of chloroform and PCE in the sample from MW-01. In addition, the compounds detected in the liquid sample collected in 1995 from the former waste solvent UST (acetone and TCE) did not correlate with the results of the monitoring well sample analyses (PCE in all three wells, TCE in one well, and acetone in none). The absence of soil contamination, as documented in the solvent UST site assessment report, is also indicative that the former solvent USTs are not the likely source of the groundwater contamination.

Acetone is a common laboratory contaminant, so the detection of this compound in the sample collected from the former solvent UST is not conclusive evidence that acetone was used in the printing equipment maintenance. However, acetone was not detected in the laboratory blank. Furthermore, according to an employee in the printing department at the local newspaper, acetone was commonly used as a de-inking solvent in the past.

The halogenated organic compounds detected in groundwater samples collected at the Federal Building site are similar to those detected at the New City Cleaners site (i.e. PCE and its typical breakdown products). The same group of organic compounds has also been detected in wells located upgradient of the former Richland City Shop facility at 1300 Mansfield Street. Therefore, it is probable that the volatile compounds detected at the Federal Building site are indicative of the presence of contamination that originated from one or more off-site source(s).

The discovery of volatile organic compounds in groundwater monitoring wells at the site triggers a regulatory agency notification requirement. Washington Administrative Code (WAC) 173-340-300 (2) states that "Any owner or operator who has information that a hazardous substance has been released to the environment at the owner or operator's facility and may be a threat to human health or the environment shall report such information to the department ... within ninety days of discovery." Receipt of the laboratory report on January 4, 1999, was the first indication that contaminants greater than potential regulatory action levels were present at the site. Even though it is not clear that the presence of halogenated organic compounds in groundwater at the site is the result of a release from the Federal Building's facilities (former USTs), we recommend that the condition be reported to Ecology as a potential release no later than April 4, 1999.

We recommend that a second set of samples be collected from the monitoring wells at least three months, and not longer than six months, after the December 1998 sampling event. The objectives would be to look for patterns and trends in the data, and to reduce the potential for sampling errors, if any, to skew the data.

4.2 Diesel Fuel Constituents

Results of analytical testing of groundwater samples collected in December 1998 did not indicate the presence of diesel fuel constituents at concentrations greater than potential regulatory criteria in any of the wells. PAH, EPH, and VPH were detected in a groundwater sample collected from MW-01 during the September 1998 sampling event. At that time VPH+EPH was 4,900 μg/L, which was greater than the MTCA Method A cleanup level of 1,000 μg/L. The September groundwater sample from MW-01 was collected one day after the well was drilled and developed. It is possible that disturbances caused by the drilling and by suspended sediment in the sample may have resulted in an elevated EPH+VPH concentration in the initial sample.

A difference in the physical setting between the two sampling events was that the September event occurred during the irrigation season, and the December event was about two months after the end of the irrigation season. The closed diesel fuel UST is located in a lawn area that has an underground sprinkler system. A significant quantity of irrigation water may be applied to the area, based on the fact that several feet of standing water have been observed to accumulate in the telecommunications vault adjacent to the UST site. The groundwater elevation in MW-01 was 0.28 foot (3.4 inches) lower in December than it was in September 1998.

These observations lead to several conclusions. One is that there may be a "smear zone" at the top of the water table at the location of the closed UST where petroleum hydrocarbons have adhered to soil particles. A possible consequence is that when the groundwater elevation rises, petroleum hydrocarbon constituents are picked up by the groundwater from the soil. Another consequence may be that the application of irrigation water at the site, during the period from about April to October each year, may flush petroleum hydrocarbons from the soil into the groundwater.

It is recommended that groundwater samples be collected from the site monitoring wells quarterly to evaluate the status of diesel fuel contamination. If the test data regarding TPH concentrations in groundwater samples from MW-01 confirm our initial finding that irrigation

may be impacting the transfer of petroleum products to the groundwater, an approach to reducing this effect would be to hard-surface (pave) the area over the closed UST, and discontinue irrigation.

It is also recommended that the risk assessment regarding petroleum-contaminated soil (PCS) at the closed UST location be completed. Based on our initial evaluation (Shannon & Wilson, October 1998), a preliminary cleanup level of 3,265 mg/kg was calculated for EPH+VPH. Concentrations of EPH+VPH in soil samples ranged from 340 to 3,100 mg/kg, indicating that site concentrations of EPH+VPH were below the preliminary risk-based level. In December 1998, groundwater samples were also analyzed for EPH+VPH. EPH+VPH, if present, were not detected at concentrations greater than the PQL in a sample from the downgradient well (MW-02) located near the property boundary. This finding also supports the use of a risk assessment to address the PCS issue.

5.0 LIMITATIONS

This report was prepared for the exclusive use of Abide International, General Services Administration, and their representatives. The findings we have presented within this report are based on limited sampling, observation, and testing. The data presented in this report should be considered representative at the time of our field observations. The analyses and sampling results can only provide you with our best judgement as to the general environmental characteristics of the property at this time and should not be construed as a definitive conclusion regarding soil and groundwater at this site. We have prepared the attached "Important Information About Your Environmental Report" to assist you and other in understanding the use and limitations of this report. Please consider it as an integral part of this report.

SHANNON & WILSON, INC.

Donna R. Parkes
Environmental Specialist

Dee J. Burrie, P.E.
Vice President

DRP:PDB:DJB/drp

03-12-99/v1075-03.rpt/V-1075-01/drp

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Project No: V-1075-03
Client: Abide International
Project: **Richland Federal Building Groundwater Monitoring**

TABLE 1 - SUMMARY OF FIELD MEASUREMENTS AT WELLS

Date	MW-01 Top of Well Elevation, ft.	MW-01 Depth to Water, ft.	MW-01 Water Surface Elevation, ft.	MW-01 pH	MW-02 Top of Well Elevation, ft	MW-02 Depth to Water, ft.	MW-02 Water Surface Elevation, ft.	MW-02 pH	MW-03 Top of Well Elevation, ft.	MW-03 Depth to Water, ft.	MW-03 Water Surface Elevation, ft.	MW-03 pH
9-10-98	357.94	12.64	345.30	--	--	--	--	--	--	--	--	--
12-9-98	357.94	12.92	345.02	7.6	359.47	14.97	344.50	7.8	362.08	17.41	344.67	7.8

TABLE 2
RESULTS OF ANALYTICAL TESTING OF
GROUNDWATER SAMPLES, µg/L

Parameter	MW-01 (RFB-06)	MW-01 (RFB-MW01-002)	MW-02 (RFB-MW02-002)	MW-03 (RFB-MW03-002)
	9/10/98	12/9/98		
PAH				
Naphthalene	0.19	<0.05	<0.05	<0.05
2-Methylnaphthalene	1.4	<0.05	<0.05	<0.05
Acenaphthylene	0.11	<0.05	<0.05	<0.05
Acenaphthene	0.41	<0.05	<0.05	<0.05
Fluorene	1	<0.05	<0.05	<0.05
Phenanthrene	3.4	<0.05	<0.05	<0.05
Anthracene	<0.050	<0.05	<0.05	<0.05
Fluoranthene	<0.050	<0.05	<0.05	<0.05
Pyrene	0.13	<0.05	<0.05	<0.05
Benzo(a)anthracene*	<0.050	<0.05	<0.05	<0.05
Chrysene*	0.092	<0.05	<0.05	<0.05
Benzo(b)fluoranthene*	<0.050	<0.05	<0.05	<0.05
Benzo(k)fluoranthene*	<0.050	<0.05	<0.05	<0.05
Benzo(a)pyrene*	<0.050	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene*	<0.050	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene*	<0.050	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	<0.050	<0.05	<0.05	<0.05
EPH				
Aliphatic Fractions				
C10-C12	310	<50	<50	<50
C12-C16	1,200	100	<50	<50
C16-C18	520	<50	<50	<50
C18-C21	400	<50	<50	<50
C21-C28	220	<50	<50	<50
C28-C36	<200	<50	<50	<50
Total Aliphatic	2,900	100		
Aromatic Fractions				
C10-C12	140	<50	<50	<50
C12-C16	640	<50	<50	<50
C16-C18	430	<50	<50	<50
C18-C21	360	<50	<50	<50
C21-C28	90	<50	<50	<50
C28-C36	<150	<50	<50	<50
Total Aromatic	1,700			
VPH				
Aliphatic Fractions				
C5-C6	<50	<50	<50	<50
C6-C8	<50	<50	<50	<50
C8-C10	<50	<50	<50	<50
C10-C12	88	<50	<50	<50
Total Aliphatic	88			
Aromatic Fractions				
C8-C10	<50	<50	<50	<50
C10-C12	81	<50	<50	<50
C12-C13	130	<50	<50	<50
Total Aromatic	210			
Target Analytes:				
Methyl t-butylether	<5.0	<5.0	<5.0	<5.0
Benzene	<5.0	<5.0	<5.0	<5.0
Toluene	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	<5.0	<5.0	<5.0	<5.0
Xylenes	<5.0	<5.0	<5.0	<5.0

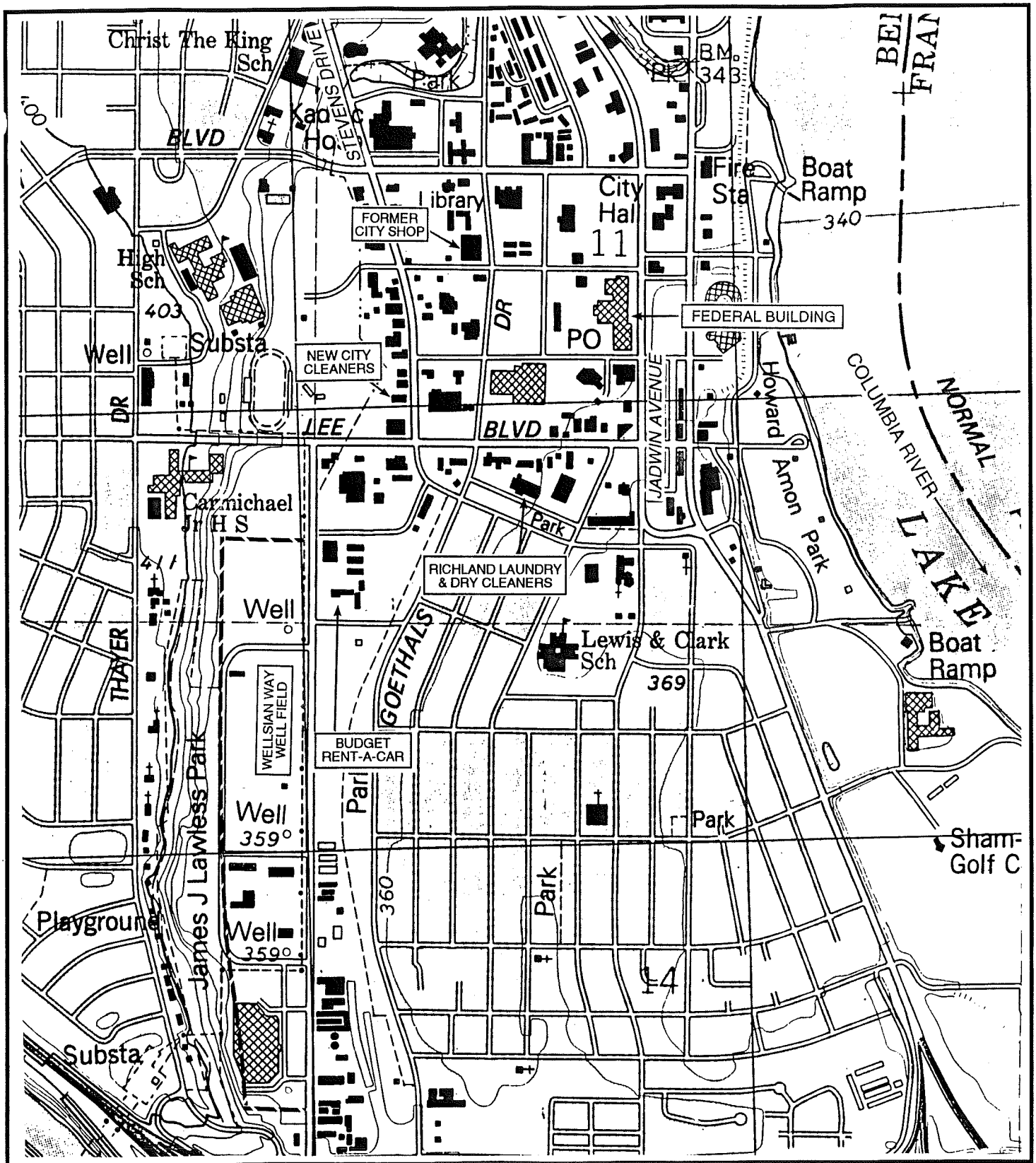
TABLE 2 (Continued)
RESULTS OF ANALYTICAL TESTING OF
GROUNDWATER SAMPLES, µg/L

Parameter	MW-01 (RFB-06)	MW-01 (RFB-MW01-002)	MW-02 (RFB-MW02-002)	MW-03 (RFB-MW03-002)
	9/10/98	12/9/98		
Volatiles (EPA 8260B)**	NT			
(cis) 1,2-Dichloroethene		<1.0	4.5	<1.0
Chloroform		24	<1.0	9.9
Trichloroethene		<1.0	3.1	<1.0
Tetrachloroethene		3.9	22	130

* Carcinogenic PAHs include benzo(a)pyrene, chrysene, dibenzo(a,h)-anthracene, indeno (1,2,3-cd)pyrene, benzo(k)fluoranthene, benzo(a)anthracene, and benzo(b)fluoranthene.

** Volatile organic compounds that were detected in one or more samples are shown in the table. Refer to laboratory report for complete list of analytes.

µg/L = Micrograms per liter
PAH = Polycyclic aromatic hydrocarbons
EPH = Extractable petroleum hydrocarbons
VPH = Volatile petroleum hydrocarbons
NT = Not tested



0 1,000 2,000

Approximate Scale in Feet

From USGS Topographic Map
Richland Quadrangle, 1992

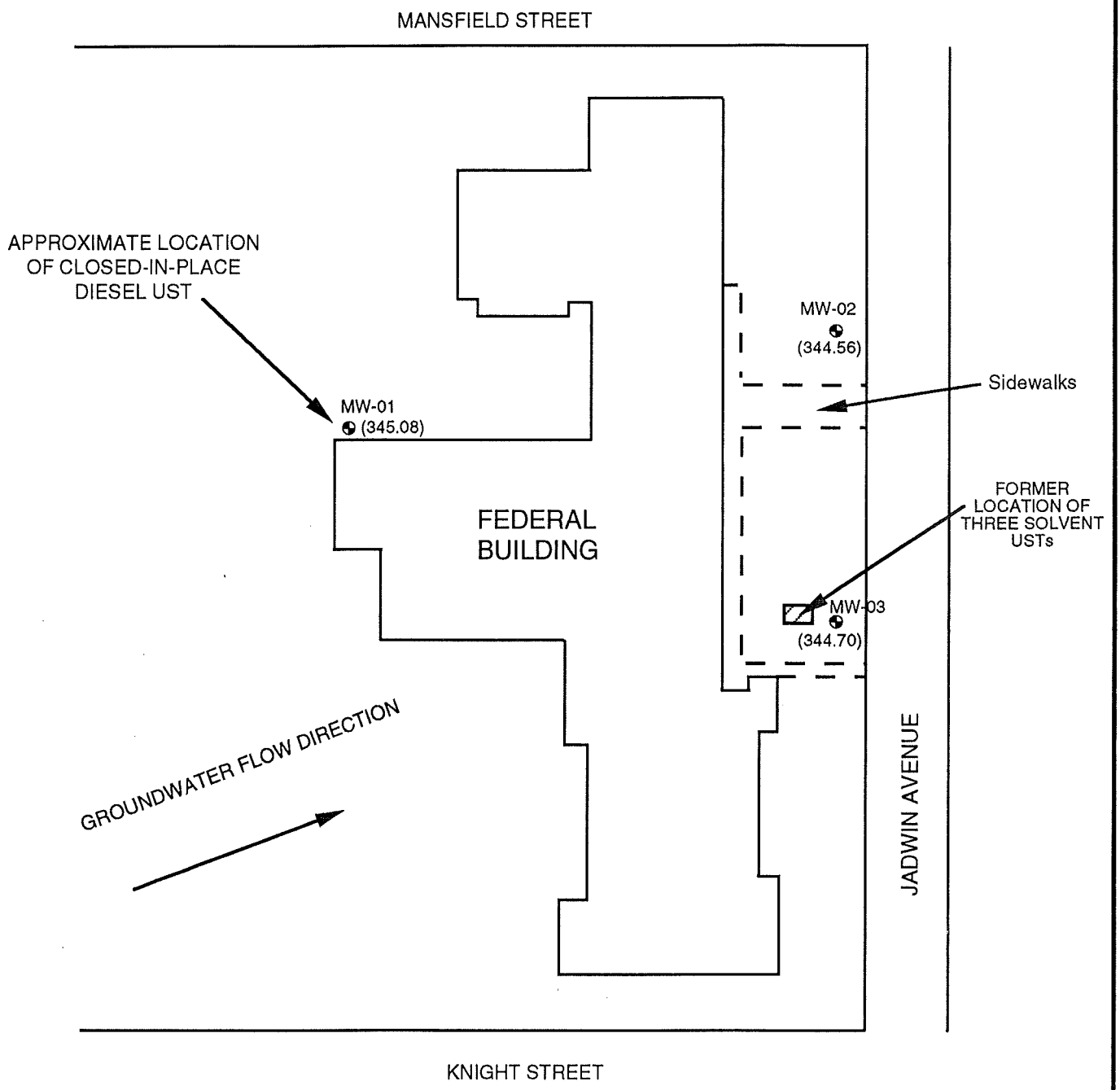
Federal Building Diesel Fuel UST Site
Richland, Washington

SITE LOCATION AND SURROUNDING LAND USE MAP

March 1999 V-1075-03

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. 1



MW-01 (344.57) Monitoring well: approximate location, designation, and groundwater elevation on 12-5-98

0 100 200

Approximate Scale in Feet

N

Federal Building Diesel Fuel UST Site
Richland, Washington

MONITORING WELL LOCATION MAP

March 1999 V-1075-03

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FIG. 2

APPENDIX A

MONITORING WELL LOGS AND AS-BUILT DIAGRAMS

LOG & AS-BUILT DIAGRAM

GEOLOGIC LOG

Driller: Environmental West Exploration
Completion Date: 9/9/98

Ground Surface

Brown, silty SAND with gravel.

Grey, coarse SAND (no noticeable petroleum odor). Drilled through top and bottom of tank at 4.0 and 8.0 feet.

Sandy GRAVEL, moist (noticeable petroleum odor).

Sandy, cobbly GRAVEL, wet (slight petroleum odor).

Sandy, cobbly GRAVEL, wet (no noticeable petroleum odor).

Bottom of Boring at 20.0'

* Groundwater encountered at 14 feet below the ground surface during drilling.

** Samples S4 and S5 of drill cuttings; materials too coarse for split spoon sampler.

Hydrologic Unit

Samples

Unsaturated Zone

S1 (N=95/11")

S2 (N=95/10")

S3 (N=50/5")

Saturated Zone

S4**

S5**

Depth in Feet

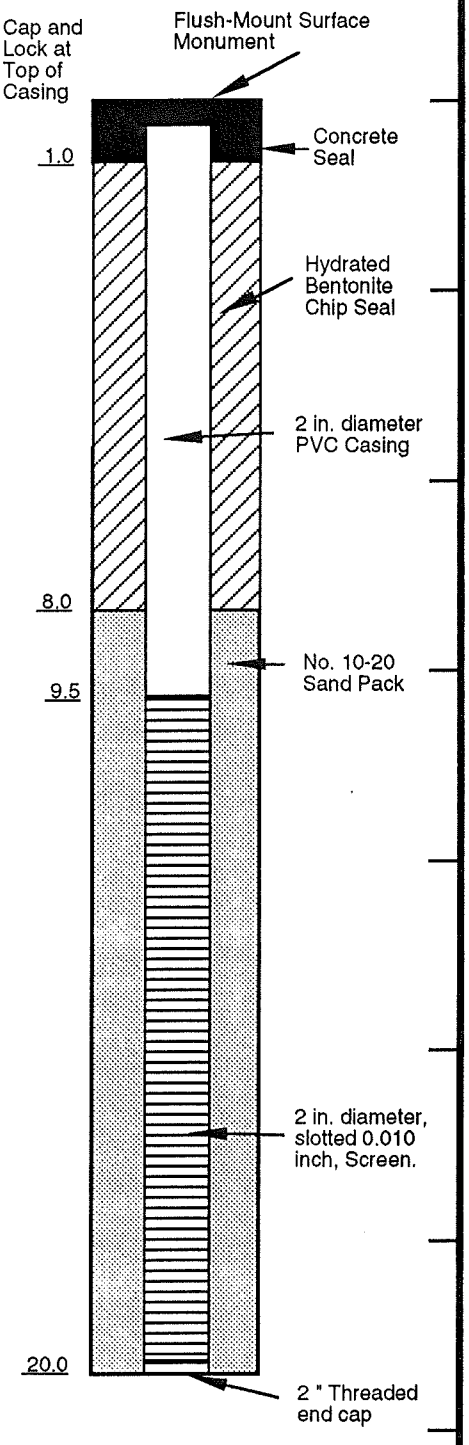
0, 3, 6, 9, 12, 15, 18, 21

Water Level

Depth to Groundwater 12.6 feet* 9/9/98

AS-BUILT

Top of Monument Elevation = 357.94



Note: SPT done in accordance with ASTM D- 1586-84 using 140 lb. hammer, 30" free fall, and 3" OD split-spoon sampler. N = number of blows to drive sampler last 12 inches.

Drilling Method: Air Rotary
Sampling Method: SPT

Note: Soil classification based on description of cuttings and samples; actual transitions may be gradual.

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

January 1999 V-1075-03

Closed Diesel Fuel UST, Federal Building
Richland, Washington

MONITORING WELL MW-01
(Ecology Tag No. AEA 917)

LOG & AS-BUILT DIAGRAM

GEOLOGIC LOG

Driller: Environmental West Exploration
Completion Date: 12/5/98

Ground Surface

Brown, silty SAND with gravel.

Grey, sandy GRAVEL and cobbles, moist.

Grey, sandy GRAVEL and cobbles with occasional lenses of sand, wet.

Bottom of Boring at 20.0'

* Groundwater encountered at 16 feet below the ground surface during drilling.

Hydrologic Unit

Unsaturated Zone

Saturated Zone

Samples

S1 (N = 50/3")

S2 (N = 50/3")

S3 (N = 50/3")

Depth in Feet

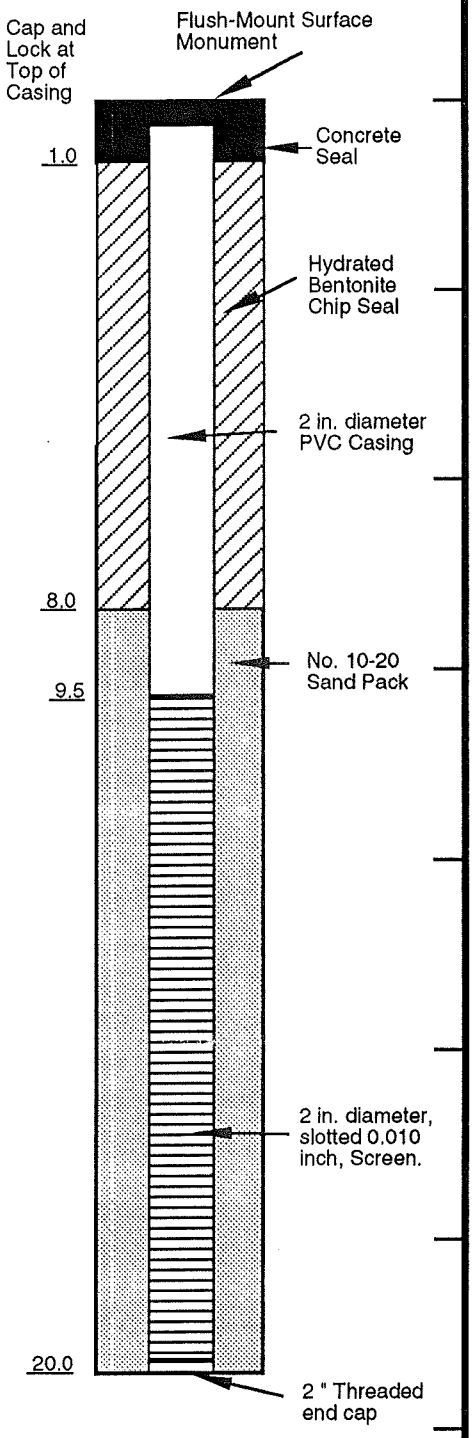
0, 3, 6, 9, 12, 15, 18, 21

Water Level

Depth to Groundwater 15 feet* 12/9/98

AS-BUILT

Top of Monument Elevation = 359.47



Note: SPT done in accordance with ASTM D- 1586-84 using 140 lb. hammer, 30" free fall, and 3" OD split-spoon sampler. N = number of blows to drive sampler last 12 inches.

Drilling Method: Air Rotary
Sampling Method: SPT

Note: Soil classification based on description of cuttings and samples; actual transitions may be gradual.

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

January 1999 V-1075-03

Closed Diesel Fuel UST, Federal Building
Richland, Washington

MONITORING WELL MW-02
(Ecology Tag No. AEK 274)

LOG & AS-BUILT DIAGRAM

GEOLOGIC LOG

Driller: Environmental West Exploration
Completion Date: 12/5/98

Ground Surface

Brown, silty SAND with gravel.

Grey, sandy GRAVEL and cobbles, moist.

S1
(N = 50/1")

Grey, sandy GRAVEL and cobbles with occasional lenses of sand, wet.

S2
(N = 50/5")

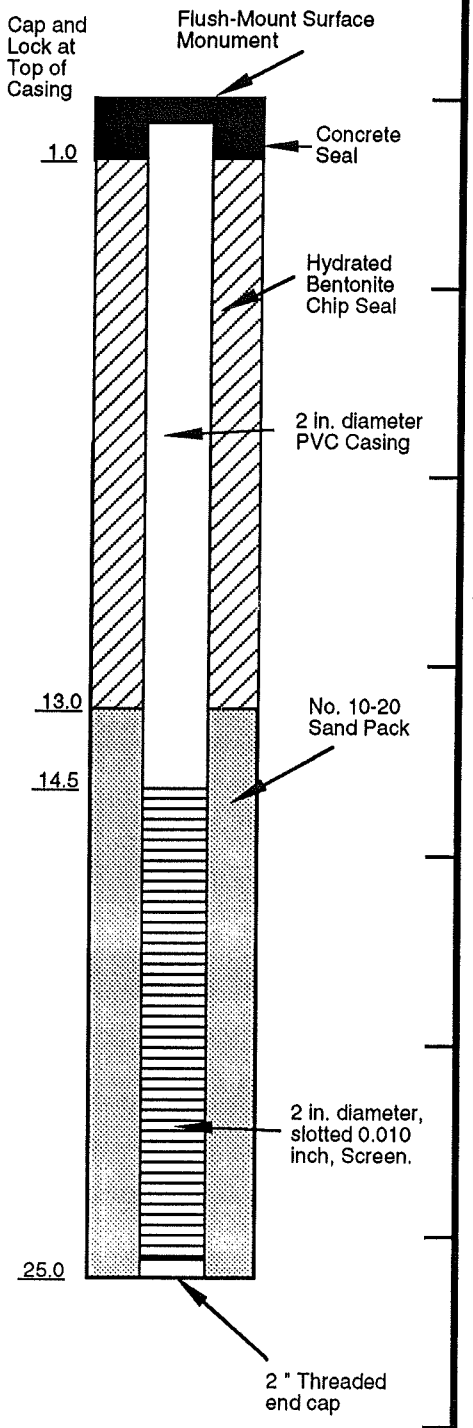
Bottom of Boring at 25.0'

* Groundwater encountered at 18 feet below the ground surface during drilling.

Hydrologic Unit
Samples
Unsaturated Zone
Saturated Zone
Depth in Feet
0
4
8
12
16
20
24
28
Water Level
Depth to Groundwater 17.4 feet* 12/9/98

AS-BUILT

Top of Monument Elevation = 362.08



Note: SPT done in accordance with ASTM D- 1586-84 using 140 lb. hammer, 30" free fall, and 3" OD split-spoon sampler. N = number of blows to drive sampler last 12 inches.

Drilling Method: Air Rotary
Sampling Method: SPT

Note: Soil classification based on description of cuttings and samples; actual transitions may be gradual.

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

January 1999 V-1075-03

Closed Diesel Fuel UST, Federal Building
Richland, Washington

MONITORING WELL MW-03
(Ecology Tag No. AEK 275)

APPENDIX B

ONSITE ENVIRONMENTAL LABORATORY REPORT

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

December 30, 1998

Donna Parkes
Shannon & Wilson, Inc.
303 Wellsian Way
Richland, WA 99352

Re: Analytical Data for Project V-1075-03
Laboratory Reference No. 9812-086

Dear Donna:

Enclosed are the analytical results and associated quality control data for samples submitted on December 10, 1998.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Chemist

Enclosures

14924 NE 31st Circle • Redmond, WA 98052 • (425) 883-3881 • Fax (425) 885-4603

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

PAH's by EPA 8270C (SIM)
Selective Ion Monitoring

Date Extracted:	12-15-98
Date Analyzed:	12-16-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-01
Client ID:	**RFB-MW02-002**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.050
2-Methylnaphthalene	ND		0.050
Acenaphthylene	ND		0.050
Acenathphene	ND		0.050
Fluorene	ND		0.050
Pentachloropehenol	ND		0.050
Phenanthrene	ND		0.050
Anthracene	ND		0.050
Fluoranthene	ND		0.050
Benzo[a]anthracene	ND		0.050
Chrysene	ND		0.050
Benzo[b]fluoranthene	ND		0.050
Benzo[k]fluoranthene	ND		0.050
Benzo[a]pyrene	ND		0.050
Indeno[1,2,3-cd]pyrene	ND		0.050
Dibenz[a,h]anthracene	ND		0.050
Benzo[g,h,i]perylene	ND		0.050

Surrogate	**Percent Recovery**	**Control Limits**
Nitrobenzene-d5	62	35 - 114
2-Fluorobiphenyl	69	43 - 116
Terphenyl-d14	80	33 - 144

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

PAH's by EPA 8270C (SIM)
Selective Ion Monitoring

Date Extracted:	12-15-98
Date Analyzed:	12-16-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-02
Client ID:	**RFB-MW03-002**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.050
2-Methylnaphthalene	ND		0.050
Acenaphthylene	ND		0.050
Acenathphene	ND		0.050
Fluorene	ND		0.050
Pentachloropehenol	ND		0.050
Phenanthrene	ND		0.050
Anthracene	ND		0.050
Fluoranthene	ND		0.050
Benzo[a]anthracene	ND		0.050
Chrysene	ND		0.050
Benzo[b]fluoranthene	ND		0.050
Benzo[k]fluoranthene	ND		0.050
Benzo[a]pyrene	ND		0.050
Indeno[1,2,3-cd]pyrene	ND		0.050
Dibenz[a,h]anthracene	ND		0.050
Benzo[g,h,i]perylene	ND		0.050

Surrogate	**Percent Recovery**	**Control Limits**
Nitrobenzene-d5	61	35 - 114
2-Fluorobiphenyl	80	43 - 116
Terphenyl-d14	85	33 - 144

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

PAH's by EPA 8270C (SIM)
Selective Ion Monitoring

Date Extracted:	12-15-98
Date Analyzed:	12-16-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-03
Client ID:	**RFB-MW01-002**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.050
2-Methylnaphthalene	ND		0.050
Acenaphthylene	ND		0.050
Acenathphene	ND		0.050
Fluorene	ND		0.050
Pentachloropehenol	ND		0.050
Phenanthrene	ND		0.050
Anthracene	ND		0.050
Fluoranthene	ND		0.050
Benzo[a]anthracene	ND		0.050
Chrysene	ND		0.050
Benzo[b]fluoranthene	ND		0.050
Benzo[k]fluoranthene	ND		0.050
Benzo[a]pyrene	ND		0.050
Indeno[1,2,3-cd]pyrene	ND		0.050
Dibenz[a,h]anthracene	ND		0.050
Benzo[g,h,i]perylene	ND		0.050

Surrogate	**Percent Recovery**	**Control Limits**
Nitrobenzene-d5	64	35 - 114
2-Fluorobiphenyl	74	43 - 116
Terphenyl-d14	81	33 - 144

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

PAH's by EPA 8270C (SIM)
Selective Ion Monitoring
METHOD BLANK QUALITY CONTROL

Date Extracted:	12-15-98
Date Analyzed:	12-16-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB1215W1

Compound:	Results	Flags	PQL
Naphthalene	ND		0.050
2-Methylnaphthalene	ND		0.050
Acenaphthylene	ND		0.050
Acenathphene	ND		0.050
Fluorene	ND		0.050
Pentachloropehenol	ND		0.050
Phenanthrene	ND		0.050
Anthracene	ND		0.050
Fluoranthene	ND		0.050
Benzo[a]anthracene	ND		0.050
Chrysene	ND		0.050
Benzo[b]fluoranthene	ND		0.050
Benzo[k]fluoranthene	ND		0.050
Benzo[a]pyrene	ND		0.050
Indeno[1,2,3-cd]pyrene	ND		0.050
Dibenz[a,h]anthracene	ND		0.050
Benzo[g,h,i]perylene	ND		0.050

Surrogate	Percent Recovery	Control Limits
Nitrobenzene-d5	72	35 - 114
2-Fluorobiphenyl	86	43 - 116
Terphenyl-d14	90	33 - 144

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

PAH's by EPA 8270C
MS/MSD QUALITY CONTROL

Date Extracted: 12-03-98
Date Analyzed: 12-03-98

Matrix: Water
Units: ug/L (ppb)

Lab ID: 11-130-02MS

Compound:	Spike Amount	MS	Percent Recovery	MSD	Percent Recovery	RPD
Phenol	100	31.2	31	30.1	30	3.6
2-Chlorophenol	100	45.9	46	47.6	48	3.6
1,4-Dichlorobenzene	50.0	19.6	39	21.7	43	10
N-Nitroso-di-n-propylamine	50.0	21.2	42	23.9	48	12
1,2,4-Trichlorobenzene	50.0	22.9	46	25.1	50	9.2
4-Chloro-3-methylphenol	100	59.8	60	64.4	64	7.4
Acenaphthene	50.0	27.7	55	32.2	64	15
2,4-Dinitrotoluene	50.0	28.3	57	30.0	60	5.8
4-Nitrophenol	100	46.0	46	40.2	40	13
Pentachlorophenol	100	76.1	74	76.1	74	0.0
Pyrene	50.0	36.8	74	37.2	74	1.1

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

EXTRACTABLE PETROLEUM HYDROCARBONS

Date Extracted: 12-15-98
Date Analyzed: 12-21-98

Matrix: Water
Units: mg/L (ppm)

Lab ID: 12-086-01
Client ID: RFB-MW02-002

		PQL
Aliphatic C10-C12:	ND	0.050
Aliphatic C12-C16:	ND	0.050
Aliphatic C16-C18:	ND	0.050
Aliphatic C18-C21:	ND	0.050
Aliphatic C21-C28:	ND	0.050
Aliphatic C28-C36:	ND	0.050
Total Aliphatic:	N/A	
Aromatic C10-C12:	ND	0.050
Aromatic C12-C16:	ND	0.050
Aromatic C16-C18:	ND	0.050
Aromatic C18-C21:	ND	0.050
Aromatic C21-C28:	ND	0.050
Aromatic C28-C36:	ND	0.050
Total Aromatic:	N/A	

Surrogate Recovery:		Control Limits
o-Terphenyl	82%	50%-150%

Flags:

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

EXTRACTABLE PETROLEUM HYDROCARBONS

Date Extracted: 12-15-98
Date Analyzed: 12-21-98

Matrix: Water
Units: mg/L (ppm)

Lab ID: 12-086-02
Client ID: RFB-MW03-002

		PQL
Aliphatic C10-C12:	ND	0.050
Aliphatic C12-C16:	ND	0.050
Aliphatic C16-C18:	ND	0.050
Aliphatic C18-C21:	ND	0.050
Aliphatic C21-C28:	ND	0.050
Aliphatic C28-C36:	ND	0.050
Total Aliphatic:	N/A	
Aromatic C10-C12:	ND	0.050
Aromatic C12-C16:	ND	0.050
Aromatic C16-C18:	ND	0.050
Aromatic C18-C21:	ND	0.050
Aromatic C21-C28:	ND	0.050
Aromatic C28-C36:	ND	0.050
Total Aromatic:	N/A	
Surrogate Recovery:		Control Limits
o-Terphenyl	37%	50%-150%
Flags:	Z	

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

EXTRACTABLE PETROLEUM HYDROCARBONS

Date Extracted: 12-15-98
Date Analyzed: 12-21-98

Matrix: Water
Units: mg/L (ppm)

Lab ID: 12-086-03
Client ID: RFB-MW01-002

		PQL
Aliphatic C10-C12:	ND	0.050
Aliphatic C12-C16:	0.10	0.050
Aliphatic C16-C18:	ND	0.050
Aliphatic C18-C21:	ND	0.050
Aliphatic C21-C28:	ND	0.050
Aliphatic C28-C36:	ND	0.050
Total Aliphatic:	0.10	
Aromatic C10-C12:	ND	0.050
Aromatic C12-C16:	ND	0.050
Aromatic C16-C18:	ND	0.050
Aromatic C18-C21:	ND	0.050
Aromatic C21-C28:	ND	0.050
Aromatic C28-C36:	ND	0.050
Total Aromatic:	N/A	

Surrogate Recovery:		Control Limits
o-Terphenyl	72%	50%-150%

Flags:

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

EXTRACTABLE PETROLEUM HYDROCARBONS
METHOD BLANK QUALITY CONTROL

Date Extracted:	12-15-98
Date Analyzed:	12-21-98
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB1215W1

		PQL
Aliphatic C10-C12:	ND	0.050
Aliphatic C12-C16:	ND	0.050
Aliphatic C16-C18:	ND	0.050
Aliphatic C18-C21:	ND	0.050
Aliphatic C21-C28:	ND	0.050
Aliphatic C28-C36:	ND	0.050
Total Aliphatic:	NA	
Aromatic C10-C12:	ND	0.050
Aromatic C12-C16:	ND	0.050
Aromatic C16-C18:	ND	0.050
Aromatic C18-C21:	ND	0.050
Aromatic C21-C28:	ND	0.050
Aromatic C28-C36:	ND	0.050
Total Aromatic:	NA	

Surrogate Recovery:		Control Limits
o-Terphenyl	87%	50%-150%

Flags:

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

EXTRACTABLE PETROLEUM HYDROCARBONS
SB/SBD QUALITY CONTROL

Date Extracted: 12-15-98
Date Analyzed: 12-21-98

Matrix: Water
Units: mg/L (ppm)

Spike Level: 1.00 ppm

Lab ID:	SB1215W1	SB1215W1 DUP		
			PQL	RPD
Aliphatic C10-C12:	0.0914	0.0862	0.050	5.9
Aliphatic C12-C16:	0.328	0.280	0.050	16
Aliphatic C16-C18:	0.193	0.181	0.050	6.4
Aliphatic C18-C21:	0.157	0.147	0.050	6.3
Aliphatic C21-C28:	0.0793	ND	0.050	NA
Aliphatic C28-C36:	ND	ND	0.050	NA
Aromatic C10-C12:	0.0524	ND	0.050	NA
Aromatic C12-C16:	0.151	0.102	0.050	39
Aromatic C16-C18:	0.137	0.105	0.050	27
Aromatic C18-C21:	0.119	0.0818	0.050	37
Aromatic C21-C28:	ND	ND	0.050	NA
Aromatic C28-C36:	ND	ND	0.050	NA
Percent Recovery:	131	98		28
Surrogate Recovery:			Control Limits	
o-Terphenyl	76%	76%	50-150%	

Flags:

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILE PETROLEUM HYDROCARBONS

Date Extracted:	12-15-98
Date Analyzed:	12-15-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-01
Client ID:	RFB-MW02-002

VPH:	Results	PQL
Aliphatic C5-C6	ND	50
Aliphatic C6-C8	ND	50
Aliphatic C8-C10	ND	50
Aliphatic C10-C12	ND	50
Total Aliphatic:	NA	
Aromatic C8-C10	ND	50
Aromatic C10-C12	ND	50
Aromatic C12-C13	ND	50
Total Aromatic:	NA	
Target Analytes:		
Methyl t-butylether	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m , p - Xylene	ND	5.0
o -Xylene	ND	5.0

Surrogate:	Percent Recovery	Control Limits
Fluorobenzene	92	70%-130%

Flags:

	Result
VPH	NA

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILE PETROLEUM HYDROCARBONS

Date Extracted:	12-15-98
Date Analyzed:	12-15-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-02
Client ID:	RFB-MW03-002

VPH:	Results	PQL
Aliphatic C5-C6	ND	50
Aliphatic C6-C8	ND	50
Aliphatic C8-C10	ND	50
Aliphatic C10-C12	ND	50
Total Aliphatic:	NA	
Aromatic C8-C10	ND	50
Aromatic C10-C12	ND	50
Aromatic C12-C13	ND	50
Total Aromatic:	NA	
Target Analytes:		
Methyl t-butylether	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m , p - Xylene	ND	5.0
o -Xylene	ND	5.0

Surrogate:	Percent Recovery	Control Limits
Fluorobenzene	91	70%-130%

Flags:

	Result
VPH	NA

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILE PETROLEUM HYDROCARBONS

Date Extracted:	12-15-98
Date Analyzed:	12-15-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-03
Client ID:	RFB-MW01-002

VPH:	Results	PQL
Aliphatic C5-C6	ND	50
Aliphatic C6-C8	ND	50
Aliphatic C8-C10	ND	50
Aliphatic C10-C12	ND	50
Total Aliphatic:	NA	
Aromatic C8-C10	ND	50
Aromatic C10-C12	ND	50
Aromatic C12-C13	ND	50
Total Aromatic:	NA	
Target Analytes:		
Methyl t-butylether	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m , p - Xylene	ND	5.0
o -Xylene	ND	5.0

Surrogate:	Percent Recovery	Control Limits
Fluorobenzene	90	70%-130%

Flags:

	Result
VPH	NA

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILE PETROLEUM HYDROCARBONS
METHOD BLANK QUALITY CONTROL

Date Extracted:	12-15-98
Date Analyzed:	12-15-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB1215W1

VPH:	Results	PQL
Aliphatic C5-C6	ND	50
Aliphatic C6-C8	ND	50
Aliphatic C8-C10	ND	50
Aliphatic C10-C12	ND	50
Total Aliphatic:	NA	
Aromatic C8-C10	ND	50
Aromatic C10-C12	ND	50
Aromatic C12-C13	ND	50
Total Aromatic:	NA	
Target Analytes:		
Methyl t-butylether	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m , p - Xylene	ND	5.0
o -Xylene	ND	5.0

Surrogate:	Percent Recovery	Control Limits
Fluorobenzene	90	70%-130%

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILE PETROLEUM HYDROCARBONS
DUPLICATE QUALITY CONTROL

Date Extracted: 12-15-98
Date Analyzed: 12-15-98

Matrix: Water
Units: ug/L (ppb)

Lab ID: 12-086-01

VPH:	Sample	Duplicate	PQL	RPD
Aliphatic C5-C6	ND	ND	50	NA
Aliphatic C6-C8	ND	ND	50	NA
Aliphatic C8-C10	ND	ND	50	NA
Aliphatic C10-C12	ND	ND	50	NA
Aromatic C8-C10	ND	ND	50	NA
Aromatic C10-C12	ND	ND	50	NA
Aromatic C12-C13	ND	ND	50	NA
Target Analytes:				
Methyl t-butylether	ND	ND	5.0	NA
Benzene	ND	ND	5.0	NA
Toluene	ND	ND	5.0	NA
Ethylbenzene	ND	ND	5.0	NA
m , p - Xylene	ND	ND	5.0	NA
o -Xylene	ND	ND	5.0	NA
Surrogate:	Percent Recovery	Percent Recovery	Control Limits	
Fluorobenzene	92	90	70%-130%	

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILE PETROLEUM HYDROCARBONS
SB/SBD QUALITY CONTROL

Date Extracted: 12-15-98
Date Analyzed: 12-15-98

Matrix: Water
Units: ug/L (ppb)

Spike Level: 50.0 (ppb)

Lab ID: SB1215W1

	SB	Percent Recovery	SBD	Percent Recovery	PQL	RPD
Methyl t-butylether:	42.4	85	41.6	83	5.0	1.9
Benzene:	47.1	94	46.1	92	5.0	2.1
Toluene:	47.6	95	46.5	93	5.0	2.3
Ethylbenzene:	47.7	95	46.7	93	5.0	2.1
m , p - Xylene:	47.6	95	46.6	93	5.0	2.1
o -Xylene:	47.3	95	46.1	92	5.0	2.6
Surrogate:					Control Limits	
Fluorobenzene		96		93	70%-130%	

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	12-11-98
Date Analyzed:	12-11-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-01
Client ID:	**RFB-MW02-002**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		1.0
Chloromethane	ND		1.0
Vinyl Chloride	ND		1.0
Bromomethane	ND		1.0
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		1.0
1,1-Dichloroethene	ND		1.0
Methylene Chloride	ND		5.0
(trans) 1,2-Dichloroethene	ND		1.0
1,1-Dichloroethane	ND		1.0
2,2-Dichloropropane	ND		1.0
(cis) 1,2-Dichloroethene	4.5		1.0
Chloroform	ND		1.0
1,1,1-Trichloroethane	ND		1.0
Carbon Tetrachloride	ND		5.0
1,1-Dichloropropene	ND		1.0
Benzene	ND		1.0
1,2-Dichloroethane	ND		1.0
Trichloroethene	3.1		1.0
1,2-Dichloropropane	ND		1.0
Dibromomethane	ND		1.0
Bromodichloromethane	ND		1.0
(cis) 1,3-Dichloropropene	ND		1.0
Toluene	ND		1.0
(trans) 1,3-Dichloropropene	ND		1.0
1,1,2-Trichloroethane	ND		1.0
Tetrachloroethene	22		1.0
1,3-Dichloropropane	ND		1.0

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	12-11-98
Date Analyzed:	12-11-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-02
Client ID:	**RFB-MW03-002**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		1.0
Chloromethane	ND		1.0
Vinyl Chloride	ND		1.0
Bromomethane	ND		1.0
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		1.0
1,1-Dichloroethene	ND		1.0
Methylene Chloride	ND		5.0
(trans) 1,2-Dichloroethene	ND		1.0
1,1-Dichloroethane	ND		1.0
2,2-Dichloropropane	ND		1.0
(cis) 1,2-Dichloroethene	ND		1.0
Chloroform	9.9		1.0
1,1,1-Trichloroethane	ND		1.0
Carbon Tetrachloride	ND		5.0
1,1-Dichloropropene	ND		1.0
Benzene	ND		1.0
1,2-Dichloroethane	ND		1.0
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		1.0
Dibromomethane	ND		1.0
Bromodichloromethane	ND		1.0
(cis) 1,3-Dichloropropene	ND		1.0
Toluene	ND		1.0
(trans) 1,3-Dichloropropene	ND		1.0
1,1,2-Trichloroethane	ND		1.0
Tetrachloroethene	130		1.0
1,3-Dichloropropane	ND		1.0

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 12-086-02
Client ID: RFB-MW03-002

Compound	Results	Flags	PQL
Dibromochloromethane	ND		1.0
1,2-Dibromoethane	ND		1.0
Chlorobenzene	ND		1.0
1,1,1,2-Tetrachloroethane	ND		1.0
Ethylbenzene	ND		1.0
m,p-Xylene	ND		2.0
o-Xylene	ND		1.0
Styrene	ND		1.0
Bromoform	ND		1.0
Isopropylbenzene	ND		1.0
Bromobenzene	ND		1.0
1,1,2,2-Tetrachloroethane	ND		1.0
1,2,3-Trichloropropane	ND		1.0
n-Propylbenzene	ND		5.0
2-Chlorotoluene	ND		1.0
4-Chlorotoluene	ND		1.0
1,3,5-Trimethylbenzene	ND		1.0
tert-Butylbenzene	ND		1.0
1,2,4-Trimethylbenzene	ND		1.0
sec-Butylbenzene	ND		1.0
1,3-Dichlorobenzene	ND		1.0
p-Isopropyltoluene	ND		1.0
1,4-Dichlorobenzene	ND		1.0
1,2-Dichlorobenzene	ND		1.0
n-Butylbenzene	ND		1.0
1,2-Dibromo-3-chloropropane	ND		5.0
1,2,4-Trichlorobenzene	ND		1.0
Hexachlorobutadiene	ND		1.0
Naphthalene	ND		5.0
1,2,3-Trichlorobenzene	ND		1.0
Acetone	ND		20

Surrogate	Percent Recovery		Control Limits
Dibromofluoromethane	91		71-133
Toluene-d8	115		80-151
4-Bromofluorobenzene	144	*	75-139

* - Surrogate recovery is outside control limits.

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	12-11-98
Date Analyzed:	12-11-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-03
Client ID:	**RFB-MW01-002**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		1.0
Chloromethane	ND		1.0
Vinyl Chloride	ND		1.0
Bromomethane	ND		1.0
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		1.0
1,1-Dichloroethene	ND		1.0
Methylene Chloride	ND		5.0
(trans) 1,2-Dichloroethene	ND		1.0
1,1-Dichloroethane	ND		1.0
2,2-Dichloropropane	ND		1.0
(cis) 1,2-Dichloroethene	ND		1.0
Chloroform	24		1.0
1,1,1-Trichloroethane	ND		1.0
Carbon Tetrachloride	ND		5.0
1,1-Dichloropropene	ND		1.0
Benzene	ND		1.0
1,2-Dichloroethane	ND		1.0
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		1.0
Dibromomethane	ND		1.0
Bromodichloromethane	ND		1.0
(cis) 1,3-Dichloropropene	ND		1.0
Toluene	ND		1.0
(trans) 1,3-Dichloropropene	ND		1.0
1,1,2-Trichloroethane	ND		1.0
Tetrachloroethene	3.9		1.0
1,3-Dichloropropane	ND		1.0

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 12-086-03
Client ID: RFB-MW01-002

Compound	Results	Flags	PQL
Dibromochloromethane	ND		1.0
1,2-Dibromoethane	ND		1.0
Chlorobenzene	ND		1.0
1,1,1,2-Tetrachloroethane	ND		1.0
Ethylbenzene	ND		1.0
m,p-Xylene	ND		2.0
o-Xylene	ND		1.0
Styrene	ND		1.0
Bromoform	ND		1.0
Isopropylbenzene	ND		1.0
Bromobenzene	ND		1.0
1,1,2,2-Tetrachloroethane	ND		1.0
1,2,3-Trichloropropane	ND		5.0
n-Propylbenzene	ND		1.0
2-Chlorotoluene	ND		1.0
4-Chlorotoluene	ND		1.0
1,3,5-Trimethylbenzene	ND		1.0
tert-Butylbenzene	ND		1.0
1,2,4-Trimethylbenzene	ND		1.0
sec-Butylbenzene	ND		1.0
1,3-Dichlorobenzene	ND		1.0
p-Isopropyltoluene	ND		1.0
1,4-Dichlorobenzene	ND		1.0
1,2-Dichlorobenzene	ND		1.0
n-Butylbenzene	ND		1.0
1,2-Dibromo-3-chloropropane	ND		5.0
1,2,4-Trichlorobenzene	ND		1.0
Hexachlorobutadiene	ND		1.0
Naphthalene	ND		5.0
1,2,3-Trichlorobenzene	ND		1.0
Acetone	ND		20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	98	71-133
Toluene-d8	120	80-151
4-Bromofluorobenzene	135	75-139

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	12-11-98
Date Analyzed:	12-11-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	12-086-04
Client ID:	**TRIP BLANK**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		1.0
Chloromethane	ND		1.0
Vinyl Chloride	ND		1.0
Bromomethane	ND		1.0
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		1.0
1,1-Dichloroethene	ND		1.0
Methylene Chloride	6.6		5.0
(trans) 1,2-Dichloroethene	ND		1.0
1,1-Dichloroethane	ND		1.0
2,2-Dichloropropane	ND		1.0
(cis) 1,2-Dichloroethene	ND		1.0
Chloroform	ND		1.0
1,1,1-Trichloroethane	ND		1.0
Carbon Tetrachloride	ND		5.0
1,1-Dichloropropene	ND		1.0
Benzene	ND		1.0
1,2-Dichloroethane	ND		1.0
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		1.0
Dibromomethane	ND		1.0
Bromodichloromethane	ND		1.0
(cis) 1,3-Dichloropropene	ND		1.0
Toluene	2.7		1.0
(trans) 1,3-Dichloropropene	ND		1.0
1,1,2-Trichloroethane	ND		1.0
Tetrachloroethene	ND		1.0
1,3-Dichloropropane	ND		1.0

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 12-086-04
Client ID: TRIP BLANK

Compound	Results	Flags	PQL
Dibromochloromethane	ND		1.0
1,2-Dibromoethane	ND		1.0
Chlorobenzene	ND		1.0
1,1,1,2-Tetrachloroethane	ND		1.0
Ethylbenzene	ND		1.0
m,p-Xylene	ND		2.0
o-Xylene	ND		1.0
Styrene	ND		1.0
Bromoform	ND		1.0
Isopropylbenzene	ND		1.0
Bromobenzene	ND		1.0
1,1,2,2-Tetrachloroethane	ND		1.0
1,2,3-Trichloropropane	ND		5.0
n-Propylbenzene	ND		1.0
2-Chlorotoluene	ND		1.0
4-Chlorotoluene	ND		1.0
1,3,5-Trimethylbenzene	ND		1.0
tert-Butylbenzene	ND		1.0
1,2,4-Trimethylbenzene	ND		1.0
sec-Butylbenzene	ND		1.0
1,3-Dichlorobenzene	ND		1.0
p-Isopropyltoluene	ND		1.0
1,4-Dichlorobenzene	ND		1.0
1,2-Dichlorobenzene	ND		1.0
n-Butylbenzene	ND		1.0
1,2-Dibromo-3-chloropropane	ND		5.0
1,2,4-Trichlorobenzene	ND		1.0
Hexachlorobutadiene	ND		1.0
Naphthalene	ND		5.0
1,2,3-Trichlorobenzene	ND		1.0
Acetone	ND		20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	94	71-133
Toluene-d8	116	80-151
4-Bromofluorobenzene	138	75-139

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 1 of 2

Date Extracted:	12-11-98
Date Analyzed:	12-11-98
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB1211W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		1.0
Chloromethane	ND		1.0
Vinyl Chloride	ND		1.0
Bromomethane	ND		1.0
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		1.0
1,1-Dichloroethene	ND		1.0
Methylene Chloride	ND		5.0
(trans) 1,2-Dichloroethene	ND		1.0
1,1-Dichloroethane	ND		1.0
2,2-Dichloropropane	ND		1.0
(cis) 1,2-Dichloroethene	ND		1.0
Chloroform	ND		1.0
1,1,1-Trichloroethane	ND		1.0
Carbon Tetrachloride	ND		5.0
1,1-Dichloropropene	ND		1.0
Benzene	ND		1.0
1,2-Dichloroethane	ND		1.0
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		1.0
Dibromomethane	ND		1.0
Bromodichloromethane	ND		1.0
(cis) 1,3-Dichloropropene	ND		1.0
Toluene	ND		1.0
(trans) 1,3-Dichloropropene	ND		1.0
1,1,2-Trichloroethane	ND		1.0
Tetrachloroethene	ND		1.0
1,3-Dichloropropane	ND		1.0

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 2 of 2

Lab ID: MB1211W1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		1.0
1,2-Dibromoethane	ND		1.0
Chlorobenzene	ND		1.0
1,1,1,2-Tetrachloroethane	ND		1.0
Ethylbenzene	ND		1.0
m,p-Xylene	ND		2.0
o-Xylene	ND		1.0
Styrene	ND		1.0
Bromoform	ND		1.0
Isopropylbenzene	ND		1.0
Bromobenzene	ND		1.0
1,1,2,2-Tetrachloroethane	ND		1.0
1,2,3-Trichloropropane	ND		5.0
n-Propylbenzene	ND		1.0
2-Chlorotoluene	ND		1.0
4-Chlorotoluene	ND		1.0
1,3,5-Trimethylbenzene	ND		1.0
tert-Butylbenzene	ND		1.0
1,2,4-Trimethylbenzene	ND		1.0
sec-Butylbenzene	ND		1.0
1,3-Dichlorobenzene	ND		1.0
p-Isopropyltoluene	ND		1.0
1,4-Dichlorobenzene	ND		1.0
1,2-Dichlorobenzene	ND		1.0
n-Butylbenzene	ND		1.0
1,2-Dibromo-3-chloropropane	ND		5.0
1,2,4-Trichlorobenzene	ND		1.0
Hexachlorobutadiene	ND		5.0
Naphthalene	ND		5.0
1,2,3-Trichlorobenzene	ND		1.0
Acetone	ND		20

Surrogate	Percent Recovery		Control Limits
Dibromofluoromethane	97		71-133
Toluene-d8	115		80-151
4-Bromofluorobenzene	140	*	75-139

* - Surrogate recovery is outside control limits.

Date of Report: December 30, 1998
Samples Submitted: December 10, 1998
Lab Traveler: 12-086
Project: V-1075-03

VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 12-11-98
Date Analyzed: 12-12-98

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB1211W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	RPD	
1,1-Dichloroethene	250	218	87	233	93	6.4	
Benzene	250	206	82	203	81	1.3	
Trichloroethene	250	247	99	252	101	2.1	
Toluene	250	237	95	252	101	6.0	**
Chlorobenzene	250	236	95	242	97	2.2	

** RPD is outside control limits.

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

A - Due to high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

D - Data from 1:____ dilution.

E - The value reported exceeds the quantitation range, and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeniety. The sample was re-extracted and re-analyzed with similar results.

M - Predominantly _____ range hydrocarbons present in the sample.

N - Hydrocarbons in the gasoline range (C7-toluene) are present in the sample.

O - Hydrocarbons in the heavy oil range (>C24) are present in the sample.

P - Hydrocarbons in the diesel range (C12-C24) are present in the sample which are elevating the oil result.

Q - The RPD of the results between the two columns is greater than 25.

R - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

X - Sample underwent silica gel cleanup procedures.

Y - Sample underwent acid cleanup procedures.

Z - Sample re-fractionated and re-analyzed with similar results. Suspected matrix interference.

ND - Not Detected
MRL - Method Reporting Limit
PQL - Practical Quantitation

DAB

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN OF CUSTODY RECORD

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

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Kennewick, WA 99336
(509) 735-1280 (501) 736-6309

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Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2412 N. 30th St., Suite 201
Tacoma, WA 98407
(206) 759-0156

Page 1 of 1
Laboratory On Site
Attn: D. Baumeister

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	PAH 625 (SIM) / 1L. bottles	EPH / 1 L. bottles w/HCl	VPH / 40 mm voa bottles w/HCl	VOC (8260) / 40 mL voa bottles w/HCl			Total Number of Containers	Remarks/Matrix
RFB-mw02-002	1	9:50	12/9/98			X	X	X	X			8	groundwater
RFB-mw03-002	2	10:55	↓			X	X	X	X			8	↓
RFB-mw01-002	3	12:00	↓			X	X	X	X			8	↓
trip blank	4								X			1	water

Project Information		Sample Receipt	
Project Number:	V-1075-03	Total Number of Containers	
Project Name:	Federal Bldg.	COC Seals/Intact? Y/N/NA	
Contact:	D. Parkes	Received Good Cond./Cold	
Ongoing Project?	Yes ☑ No ☐	Delivery Method:	UPS O/N
Sampler:	D. Parkes	(attach shipping bill, if any)	

Instructions
Requested Turn Around Time: Standard
Special Instructions:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Donna Parkes Time: 4:00	Signature: Time:	Signature: Time:
Printed Name: Donna Parkes Date: 12/9/98	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson Inc	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Bob Wallace Time: 10:00 AM	Signature: Time:	Signature: Time:
Printed Name: Bob Wallace Date: 12-10-98	Printed Name: Date:	Printed Name: Date:
Company: OSE	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No.

APPENDIX C

PBS ENVIRONMENTAL DATA REGARDING SOLVENT UST SAMPLE

Table 1
Laboratory Analysis
Waste Solvent Tank (#6) Contents
Volatile Organics (EPA 8240)

Analyte	Sample WSOL-1	MRL
Acetone	22	20
Benzene	ND	1.0
Bromodichloromethane	ND	1.0
Bromoform	ND	5.0
Bromomethane	ND	10
2 Butanone	ND	10
Carbon Disulfide	ND	1.0
Carbon Tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	1.0
Chloroform	ND	1.0
Chloromethane	ND	10
Dibromochloromethane	ND	1.0
1,2-Dibromomethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	1.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
trans1,3Dichloropropene	ND	1.0
Ethylbenzene	ND	1.0
2-Hexanone	ND	10
4-Methyl-2-Pentanone	ND	10
Methylene Chloride	3 (a)	10
Styrene	ND	1.0
1,1,2,2 Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	1.0
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	36	1.0
Trichlorofluoromethane	ND	1.0
Vinyl Acetate	ND	10
Vinyl Chloride	ND	1.0
Xylenes	ND	1.0

(a) Analyte found in the associated lab blank as well
ND: Not detected above the Method Reporting Level
MRL: Method Reporting Level
All values in parts per billion (ppb)

Analytical**Technologies,**Inc.

17400 S.W. Upper Boones Ferry Road, Suite 270 Durham, OR 97224
(503) 684-0447 (503) 620-0393 (FAX)

ATI I.D. 506690

July 17, 1995

Erik Anderson
PBS Environmental
1220 SW Morrison
Suite 600
Portland, OR 97205

Project Name: Richland

Attention: Erik Anderson

On June 29, 1995, Analytical Technologies, Inc. received one water sample for analysis for the above listed project. The sample was analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Please note that the EPA 8240 analysis was networked to Analytical Technologies, Inc. in Renton, Washington.

If you have any questions or comments, please do not hesitate to contact us at (503)684-0447.

Brian Hennes
Project Manager

Steven E. Stanley
Laboratory Manager

SES:alm
Enclosure

Analytical Technologies, Inc.

ANALYTICAL SCHEDULE

CLIENT: PBS Environmental ATI I.D.: 506690
PROJECT #:
PROJECT NAME: RICHLAND

ANALYSIS	TECHNIQUE	REFERENCE	LAB
Volatile Organic Compounds	GCMS	EPA 8240	R

PLD = ATI - Portland
R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

GCMS - RESULTS

Analytical Technologies, Inc.

TEST:	EPA 8240	ATI I.D.:	506690-1
CLIENT I.D.:	WSOL-1	DATE SAMPLED:	06/28/95
CLIENT:	PBS Environmental	DATE RECEIVED:	06/29/95
PROJECT #:		DATE ANALYZED:	07/12/95
PROJECT NAME:	RICHLAND	DILUTION FACTOR:	1
SAMPLE MATRIX:	WATER	UNITS:	ug/L

PARAMETER		RESULTS	
ACETONE		22	
BENZENE	<	1.0	
BROMODICHLOROMETHANE	<	1.0	
BROMOFORM	<	5.0	
BROMOMETHANE	<	10	
2-BUTANONE (MEK)	<	10	
CARBON DISULFIDE	<	1.0	
CARBON TETRACHLORIDE	<	1.0	
CHLOROBENZENE	<	1.0	
CHLOROETHANE	<	1.0	
CHLOROFORM	<	1.0	
CHLOROMETHANE	<	10	
DIBROMOCHLOROMETHANE	<	1.0	
1,2-DIBROMOETHANE (EDB)	<	1.0	
1,2-DICHLOROBENZENE	<	1.0	
1,3-DICHLOROBENZENE	<	1.0	
1,4-DICHLOROBENZENE	<	1.0	
DICHLORODIFLUOROMETHANE	<	1.0	
1,1-DICHLOROETHANE	<	1.0	
1,2-DICHLOROETHANE (EDC)	<	1.0	
1,1-DICHLOROETHENE	<	1.0	
cis-1,2-DICHLOROETHENE	<	1.0	
trans-1,2-DICHLOROETHENE	<	1.0	
1,2-DICHLOROPROPANE	<	1.0	
cis-1,3-DICHLOROPROPENE	<	1.0	
trans-1,3-DICHLOROPROPENE	<	1.0	
ETHYLBENZENE	<	1.0	
2-HEXANONE (MBK)	<	10	
4-METHYL-2-PENTANONE (MIBK)	<	10	
METHYLENE CHLORIDE		3	JB
STYRENE	<	1.0	
1,1,2,2-TETRACHLOROETHANE	<	1.0	
TETRACHLOROETHENE	<	1.0	
TOLUENE	<	1.0	
1,1,1-TRICHLOROETHANE	<	1.0	
1,1,2-TRICHLOROETHANE	<	1.0	
TRICHLOROETHENE		36	
TRICHLOROFLUOROMETHANE	<	1.0	
VINYL ACETATE	<	10	
VINYL CHLORIDE	<	1.0	
TOTAL XYLENES		10	

SURROGATES:		CONTROL LIMITS
1,2-DICHLOROETHANE-D4	102%	74% - 125%
TOLUENE-D8	100%	78% - 123%
BROMOFLUOROBENZENE	102%	81% - 127%

J = ESTIMATED VALUE
B = ANALYTE FOUND IN THE ASSOCIATED BLANK AS WELL AS THE SAMPLE.

Analytical Technologies, Inc.
17400 S.W. Upper Boones Ferry Rd., Suite 270
Durham, Oregon 97224 • (503) 684-0447 FAX: (503) 620-0393

DATE 6/28/95 PAGE 1 OF 1

Chain of Custody

LABORATORY NUMBER: 506690
PROJECT NOTICE NUMBER: _____

PROJECT MANAGER: Erik Anderson
COMPANY: PBS
ADDRESS: _____
PHONE: 228-1939 SAMPLED BY: EA

SAMPLE DISPOSAL INSTRUCTIONS
☐ ATI Disposal @ $5.00 each ☐ Return

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
WSOL-1	6-28-95	1700	Water	-1

ANALYSIS REQUEST

PETROLEUM HYDROCARBONS											ORGANICS						INORGANICS		TCLP			OTHER									NUMBER OF CONTAINERS
TPH-HCID	State: OR / WA	TPH-G	State: OR / WA	TPH-D	State: OR / WA	418.1	EPA 418.1	8015M	8020/M-BETX only	8310 HPLC PAHs	7421 Lead	% Moisture	8010 Halogenated VOCs	8020 Aromatic VOCs	8040 Phenols	8240 GC/MS Volatiles	8270 GC/MS Semivolatiles	8080 OC Pesticides/PCBs	8080/M PCBs only	Drinking Water (8)	Priority Pollutant Metals (13)	Cyanide	TCLP Metals (8)	TCLP Volatiles 8040 ZHE/EXT	TCLP Semivolatiles 8270							
																X																2

PROJECT INFORMATION
PROJECT NUMBER:
PROJECT NAME: Richland
PURCHASE ORDER NUMBER:
ONGOING PROJECT? YES ☐ NO ☒

SAMPLE RECEIPT
TOTAL NUMBER OF CONTAINERS: 2
COC SEALS/INTACT? Y \ N / N/A
RECEIVED INTACT? Y \ N
RECEIVED COLD? Y \ N

PRIOR AUTHORIZATION REQUIRED FOR RUSH PROJECTS
TAT: (NORMAL) ☒ 2 WKS (RUSH) ☐ 24 HR ☐ 48 HRS ☐ 72 HRS ☐ 1 WK
GREATER THAN 24 HR. NOTICE? YES ☐ NO ☐ (LAB USE ONLY)
SPECIAL INSTRUCTIONS:

Received via: HAND

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY 3.
Signature: Erik Anderson Time: 8:30	Signature: Time:	Signature: Time:
Printed Name: Erik Anderson Date: 6-29-95	Printed Name: Date:	Printed Name: Date:
Company: PBS	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time: 8:30	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company: ATI	Company:	Analytical Technologies, Inc.

APPENDIX D

PBS ENVIRONMENTAL REPORT (UST CLOSURE)

PBS
ENVIRONMENTAL

5 August 1997

Henry Ong
Project Manager - Richland Federal Building
Abide International Inc.
P.O. Box 1631
Richland, Washington 99352

Re: Analytical Results of Soil Samples Collected From Beneath Chemical USTs

Dear Mr. Ong:

On July 17, 1997 PBS monitored the excavation of three chemical underground storage tanks USTs. The three tanks were located in the front of the Richland Federal Building (east side) and were installed in a row in an east-west orientation. Excavation of the tanks began at approximately 12:30 pm and by 3:30 pm, all three tanks were out of the ground and blocked-up on plastic sheeting. No visual or olfactory evidence of leakage was observed during the excavation of these tanks. The tanks and piping were coated with a heavy asphaltic material and appeared to be in very good condition. Supply piping to the tanks appeared to be welded at the joints. Due to the presence of structures preventing the excavation of the supply piping, the supply piping was abandoned in place. All fill and vent piping was excavated and disposed of with the three USTs.

PBS collected three soil samples from the bottom of the finished excavation (one sample from beneath each tank). As a quality control measure, one of the samples was split in the field and submitted for analysis as a sample duplicate. Each sample was collected from a depth of approximately 1 foot beneath the bottoms of each tank which correlated with a total depth of approximately 9.5 feet below ground surface. The soil in the vicinity of the tanks consisted of a course sandy gravel mixed with river cobbles. No evidence of ground water was observed during the excavation activities. Samples STX 1 and STX 2 were collected from beneath the west tank, sample STX-3 was collected from beneath the center tank and sample STX-4 was collected from beneath the west tank. These samples were transported under chain of custody to North Creek Analytical in Portland, Oregon. The tanks formerly stored solvents for use in the maintenance of printing equipment.

Each of the four samples was analyzed for volatile organic compounds by EPA Method 8260. This analysis tests for 63 different organic compounds. No detectable levels of any of these

compounds were identified in any of the four samples submitted for analysis. These findings provide additional evidence supporting PBS' earlier observations that indicated that these tanks had not leaked.

Attached to this letter is a copy of the final analytical report and the chain of custody form. If you have any questions regarding this information, please contact me at your convenience.

Sincerely,

Douglas Hancock
Project Manager

PBS Environmental	Project: Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number: 5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager: Doug Hancock	Reported: 8/1/97 13:55

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
STX-1	P707335-01	Soil	7/17/97
STX-2	P707335-02	Soil	7/17/97
STX-3	P707335-03	Soil	7/17/97
STX-4	P707335-04	Soil	7/17/97

The results in this report apply to the samples analyzed in accordance with the chain of custody docume
This analytical report must be reproduced in its entire

Howard Holmes, Project Manager

PBS Environmental 1220 SW Morrison Portland, OR 97205	Project: Federal Building Project Number: 5950.01 Project Manager: Doug Hancock	Sampled: 7/17/97 Received: 7/18/97 Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
			P707335-01				Soil	
STX-1	0870017	7/31/97	7/31/97		1250	ND	ug/kg dry	
Acetone	"	"	"		50.0	ND	"	
Benzene	"	"	"		50.0	ND	"	
Bromobenzene	"	"	"		50.0	ND	"	
Bromochloromethane	"	"	"		50.0	ND	"	
Bromodichloromethane	"	"	"		100	ND	"	
Bromoform	"	"	"		500	ND	"	
Bromomethane	"	"	"		1250	ND	"	
2-Butanone	"	"	"		50.0	ND	"	
n-Butylbenzene	"	"	"		50.0	ND	"	
sec-Butylbenzene	"	"	"		50.0	ND	"	
tert-Butylbenzene	"	"	"		50.0	ND	"	
Carbon tetrachloride	"	"	"		50.0	ND	"	
Chlorobenzene	"	"	"		100	ND	"	
Chloroethane	"	"	"		50.0	ND	"	
Chloroform	"	"	"		250	ND	"	
Chloromethane	"	"	"		50.0	ND	"	
2-Chlorotoluene	"	"	"		50.0	ND	"	
4-Chlorotoluene	"	"	"		250	ND	"	
1,2-Dibromo-3-chloropropane	"	"	"		50.0	ND	"	
Dibromochloromethane	"	"	"		50.0	ND	"	
1,2-Dibromoethane	"	"	"		50.0	ND	"	
Dibromomethane	"	"	"		50.0	ND	"	
1,2-Dichlorobenzene	"	"	"		50.0	ND	"	
1,3-Dichlorobenzene	"	"	"		50.0	ND	"	
1,4-Dichlorobenzene	"	"	"		100	ND	"	
Dichlorodifluoromethane	"	"	"		50.0	ND	"	
1,1-Dichloroethane	"	"	"		50.0	ND	"	
1,2-Dichloroethane	"	"	"		50.0	ND	"	
1,1-Dichloroethene	"	"	"		50.0	ND	"	
cis-1,2-Dichloroethene	"	"	"		50.0	ND	"	
trans-1,2-Dichloroethene	"	"	"		50.0	ND	"	
1,2-Dichloropropane	"	"	"		50.0	ND	"	
1,3-Dichloropropane	"	"	"		50.0	ND	"	
2,2-Dichloropropane	"	"	"		50.0	ND	"	
1,1-Dichloropropene	"	"	"		50.0	ND	"	
cis-1,3-Dichloropropene	"	"	"		50.0	ND	"	
trans-1,3-Dichloropropene	"	"	"		50.0	ND	"	
Ethylbenzene	"	"	"		50.0	ND	"	

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions

Howard Holmes, Project Manager

PBS Environmental	Project: Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number: 5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager: Doug Hancock	Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
STX-1 (continued)			**P707335-01**				Soil	
Hexachlorobutadiene	0870017	7/31/97	7/31/97		100	ND	ug/kg dry	
2-Hexanone	"	"	"		250	ND	"	
Isopropylbenzene	"	"	"		50.0	ND	"	
p-Isopropyltoluene	"	"	"		50.0	ND	"	
4-Methyl-2-pentanone	"	"	"		250	ND	"	
Methylene chloride	"	"	"		500	ND	"	
Naphthalene	"	"	"		100	ND	"	
n-Propylbenzene	"	"	"		50.0	ND	"	
Styrene	"	"	"		50.0	ND	"	
1,1,1,2-Tetrachloroethane	"	"	"		50.0	ND	"	
1,1,2,2-Tetrachloroethane	"	"	"		50.0	ND	"	
Tetrachloroethene	"	"	"		50.0	ND	"	
Toluene	"	"	"		50.0	ND	"	
1,2,3-Trichlorobenzene	"	"	"		50.0	ND	"	
1,2,4-Trichlorobenzene	"	"	"		50.0	ND	"	
1,1,1-Trichloroethane	"	"	"		50.0	ND	"	
1,1,2-Trichloroethane	"	"	"		50.0	ND	"	
Trichloroethene	"	"	"		50.0	ND	"	
Trichlorofluoromethane	"	"	"		50.0	ND	"	
1,2,3-Trichloropropane	"	"	"		50.0	ND	"	
1,2,4-Trimethylbenzene	"	"	"		50.0	ND	"	
1,3,5-Trimethylbenzene	"	"	"		100	ND	"	
Vinyl chloride	"	"	"		50.0	ND	"	
o-Xylene	"	"	"		50.0	ND	"	
m,p-Xylene	"	"	"			ND	"	
Surrogate: 4-BFB	"	"	"	*65.0-130*		*106*	%	
Surrogate: Dibromofluoromethane	"	"	"	*65.0-130*		*150*	"	1
Surrogate: Toluene-d8	"	"	"	*65.0-130*		*92.6*	"	

*Refer to end of report for text of notes and definitions.

North Creek Analytical, Inc.

Howard Holmes, Project Manager

PBS Environmental	Project: Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number: 5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager: Doug Hancock	Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
			P707335-02				Soil	
STX-2	0870017	7/31/97	7/31/97		1250	ND	ug/kg dry	
Acetone	"	"	"		50.0	ND	"	
Benzene	"	"	"		50.0	ND	"	
Bromobenzene	"	"	"		50.0	ND	"	
Bromochloromethane	"	"	"		50.0	ND	"	
Bromodichloromethane	"	"	"		100	ND	"	
Bromoform	"	"	"		500	ND	"	
Bromomethane	"	"	"		1250	ND	"	
2-Butanone	0870017	7/31/97	7/31/97		50.0	ND	ug/kg dry	
n-Butylbenzene	"	"	"		50.0	ND	"	
sec-Butylbenzene	"	"	"		50.0	ND	"	
tert-Butylbenzene	"	"	"		50.0	ND	"	
Carbon tetrachloride	"	"	"		50.0	ND	"	
Chlorobenzene	"	"	"		100	ND	"	
Chloroethane	"	"	"		50.0	ND	"	
Chloroform	"	"	"		250	ND	"	
Chloromethane	"	"	"		50.0	ND	"	
2-Chlorotoluene	"	"	"		50.0	ND	"	
4-Chlorotoluene	"	"	"		250	ND	"	
1,2-Dibromo-3-chloropropane	"	"	"		50.0	ND	"	
Dibromochloromethane	"	"	"		50.0	ND	"	
1,2-Dibromoethane	"	"	"		50.0	ND	"	
Dibromomethane	"	"	"		50.0	ND	"	
1,2-Dichlorobenzene	"	"	"		50.0	ND	"	
1,3-Dichlorobenzene	"	"	"		50.0	ND	"	
1,4-Dichlorobenzene	"	"	"		100	ND	"	
Dichlorodifluoromethane	"	"	"		50.0	ND	"	
1,1-Dichloroethane	"	"	"		50.0	ND	"	
1,2-Dichloroethane	"	"	"		50.0	ND	"	
1,1-Dichloroethene	"	"	"		50.0	ND	"	
cis-1,2-Dichloroethene	"	"	"		50.0	ND	"	
trans-1,2-Dichloroethene	"	"	"		50.0	ND	"	
1,2-Dichloropropane	"	"	"		50.0	ND	"	
1,3-Dichloropropane	"	"	"		50.0	ND	"	
2,2-Dichloropropane	"	"	"		50.0	ND	"	
1,1-Dichloropropene	"	"	"		50.0	ND	"	
cis-1,3-Dichloropropene	"	"	"		50.0	ND	"	
trans-1,3-Dichloropropene	"	"	"		50.0	ND	"	
Ethylbenzene								

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions

Howard Holmes, Project Manager

PDS Environmental	Project: Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number: 5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager: Doug Hancock	Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
			P707335-02				Soil	
STX-2 (continued)								
Hexachlorobutadiene	0870017	7/31/97	7/31/97		100	ND	ug/kg dry	
2-Hexanone	"	"	"		250	ND	"	
Isopropylbenzene	"	"	"		50.0	ND	"	
p-Isopropyltoluene	"	"	"		50.0	ND	"	
4-Methyl-2-pentanone	"	"	"		250	ND	"	
Methylene chloride	"	"	"		500	ND	"	
Naphthalene	"	"	"		100	ND	"	
n-Propylbenzene	"	"	"		50.0	ND	"	
Styrene	"	"	"		50.0	ND	"	
1,1,1,2-Tetrachloroethane	"	"	"		50.0	ND	"	
1,1,2,2-Tetrachloroethane	"	"	"		50.0	ND	"	
Tetrachloroethene	"	"	"		50.0	ND	"	
Toluene	"	"	"		50.0	ND	"	
1,2,3-Trichlorobenzene	"	"	"		50.0	ND	"	
1,2,4-Trichlorobenzene	"	"	"		50.0	ND	"	
1,1,1-Trichloroethane	"	"	"		50.0	ND	"	
1,1,2-Trichloroethane	"	"	"		50.0	ND	"	
Trichloroethene	"	"	"		50.0	ND	"	
Trichlorofluoromethane	"	"	"		50.0	ND	"	
1,2,3-Trichloropropane	"	"	"		50.0	ND	"	
1,2,4-Trimethylbenzene	"	"	"		50.0	ND	"	
1,3,5-Trimethylbenzene	"	"	"		100	ND	"	
Vinyl chloride	"	"	"		50.0	ND	"	
o-Xylene	"	"	"		50.0	ND	"	
m,p-Xylene	"	"	"			ND	"	
Surrogate: 4-BFB	"	"	"	*65.0-130*		*103*	*%*	
Surrogate: Dibromofluoromethane	"	"	"	*65.0-130*		*131*	"	J
Surrogate: Toluene-d8	"	"	"	*65.0-130*		*95.3*	"	

*Refer to end of report for text of notes and definitions

PBS Environmental	Project:	Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number:	5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager:	Doug Hancock	Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
STX-3			P707335-03				Soil	
Acetone	0870017	7/31/97	7/31/97		1250	ND	ug/kg dry	
Benzene	"	"	"		50.0	ND	"	
Bromobenzene	"	"	"		50.0	ND	"	
Bromochloromethane	"	"	"		50.0	ND	"	
Bromodichloromethane	"	"	"		50.0	ND	"	
Bromoform	"	"	"		100	ND	"	
Bromomethane	"	"	"		500	ND	"	
2-Butanone	"	"	"		1250	ND	"	
n-Butylbenzene	0870017	7/31/97	7/31/97		50.0	ND	ug/kg dry	
sec-Butylbenzene	"	"	"		50.0	ND	"	
tert-Butylbenzene	"	"	"		50.0	ND	"	
Carbon tetrachloride	"	"	"		50.0	ND	"	
Chlorobenzene	"	"	"		50.0	ND	"	
Chloroethane	"	"	"		100	ND	"	
Chloroform	"	"	"		50.0	ND	"	
Chloromethane	"	"	"		250	ND	"	
2-Chlorotoluene	"	"	"		50.0	ND	"	
4-Chlorotoluene	"	"	"		50.0	ND	"	
1,2-Dibromo-3-chloropropane	"	"	"		250	ND	"	
Dibromochloromethane	"	"	"		50.0	ND	"	
1,2-Dibromoethane	"	"	"		50.0	ND	"	
Dibromomethane	"	"	"		50.0	ND	"	
1,2-Dichlorobenzene	"	"	"		50.0	ND	"	
1,3-Dichlorobenzene	"	"	"		50.0	ND	"	
1,4-Dichlorobenzene	"	"	"		50.0	ND	"	
Dichlorodifluoromethane	"	"	"		100	ND	"	
1,1-Dichloroethane	"	"	"		50.0	ND	"	
1,2-Dichloroethane	"	"	"		50.0	ND	"	
1,1-Dichloroethene	"	"	"		50.0	ND	"	
cis-1,2-Dichloroethene	"	"	"		50.0	ND	"	
trans-1,2-Dichloroethene	"	"	"		50.0	ND	"	
1,2-Dichloropropane	"	"	"		50.0	ND	"	
1,3-Dichloropropane	"	"	"		50.0	ND	"	
2,2-Dichloropropane	"	"	"		50.0	ND	"	
1,1-Dichloropropene	"	"	"		50.0	ND	"	
cis-1,3-Dichloropropene	"	"	"		50.0	ND	"	
trans-1,3-Dichloropropene	"	"	"		50.0	ND	"	
Ethylbenzene	"	"	"		50.0	ND	"	

PBS Environmental	Project:	Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number:	5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager:	Doug Hancock	Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
STX-3 (continued)			P707335-03				Soil	
Hexachlorobutadiene	0870017	7/31/97	7/31/97		100	ND	ug/kg dry	
2-Hexanone	"	"	"		250	ND	"	
Isopropylbenzene	"	"	"		50.0	ND	"	
p-Isopropyltoluene	"	"	"		50.0	ND	"	
4-Methyl-2-pentanone	"	"	"		250	ND	"	
Methylene chloride	"	"	"		500	ND	"	
Naphthalene	"	"	"		100	ND	"	
n-Propylbenzene	"	"	"		50.0	ND	"	
Styrene	"	"	"		50.0	ND	"	
1,1,1,2-Tetrachloroethane	"	"	"		50.0	ND	"	
1,1,2,2-Tetrachloroethane	"	"	"		50.0	ND	"	
Tetrachloroethene	"	"	"		50.0	ND	"	
Toluene	"	"	"		50.0	ND	"	
1,2,3-Trichlorobenzene	"	"	"		50.0	ND	"	
1,2,4-Trichlorobenzene	"	"	"		50.0	ND	"	
1,1,1-Trichloroethane	"	"	"		50.0	ND	"	
1,1,2-Trichloroethane	"	"	"		50.0	ND	"	
Trichloroethene	"	"	"		50.0	ND	"	
Trichlorofluoromethane	"	"	"		50.0	ND	"	
1,2,3-Trichloropropane	"	"	"		50.0	ND	"	
1,2,4-Trimethylbenzene	"	"	"		50.0	ND	"	
1,3,5-Trimethylbenzene	"	"	"		50.0	ND	"	
Vinyl chloride	"	"	"		100	ND	"	
o-Xylene	"	"	"		50.0	ND	"	
m,p-Xylene	"	"	"		50.0	ND	"	
Surrogate: 4-BFB	"	"	"	*65.0-130*		*104*	%	
Surrogate: Dibromofluoromethane	"	"	"	*65.0-130*		*136*	"	J
Surrogate: Toluene-d8	"	"	"	*65.0-130*		*97.1*	"	

PBS Environmental	Project: Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number: 5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager: Doug Hancock	Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
STX-4			P707335-04				Soil	
Acetone	0870017	7/31/97	7/31/97		1250	ND	ug/kg dry	
Benzene	"	"	"		50.0	ND	"	
Bromobenzene	"	"	"		50.0	ND	"	
Bromochloromethane	"	"	"		50.0	ND	"	
Bromodichloromethane	"	"	"		50.0	ND	"	
Bromoform	"	"	"		100	ND	"	
Bromomethane	"	"	"		500	ND	"	
2-Butanone	"	"	"		1250	ND	"	
n-Butylbenzene	0870017	7/31/97	7/31/97		50.0	ND	ug/kg dry	
sec-Butylbenzene	"	"	"		50.0	ND	"	
tert-Butylbenzene	"	"	"		50.0	ND	"	
Carbon tetrachloride	"	"	"		50.0	ND	"	
Chlorobenzene	"	"	"		50.0	ND	"	
Chloroethane	"	"	"		100	ND	"	
Chloroform	"	"	"		50.0	ND	"	
Chloromethane	"	"	"		250	ND	"	
2-Chlorotoluene	"	"	"		50.0	ND	"	
4-Chlorotoluene	"	"	"		50.0	ND	"	
1,2-Dibromo-3-chloropropane	"	"	"		250	ND	"	
Dibromochloromethane	"	"	"		50.0	ND	"	
1,2-Dibromoethane	"	"	"		50.0	ND	"	
Dibromomethane	"	"	"		50.0	ND	"	
1,2-Dichlorobenzene	"	"	"		50.0	ND	"	
1,3-Dichlorobenzene	"	"	"		50.0	ND	"	
1,4-Dichlorobenzene	"	"	"		50.0	ND	"	
Dichlorodifluoromethane	"	"	"		100	ND	"	
1,1-Dichloroethane	"	"	"		50.0	ND	"	
1,2-Dichloroethane	"	"	"		50.0	ND	"	
1,1-Dichloroethene	"	"	"		50.0	ND	"	
cis-1,2-Dichloroethene	"	"	"		50.0	ND	"	
trans-1,2-Dichloroethene	"	"	"		50.0	ND	"	
1,2-Dichloropropane	"	"	"		50.0	ND	"	
1,3-Dichloropropane	"	"	"		50.0	ND	"	
2,2-Dichloropropane	"	"	"		50.0	ND	"	
1,1-Dichloropropene	"	"	"		50.0	ND	"	
cis-1,3-Dichloropropene	"	"	"		50.0	ND	"	
trans-1,3-Dichloropropene	"	"	"		50.0	ND	"	
Ethylbenzene	"	"	"		50.0	ND	"	

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.

Howard Holmes, Project Manager

PBS Environmental	Project:	Federal Building	Sampled: 7/17/97
1220 SW Morrison	Project Number:	5950.01	Received: 7/18/97
Portland, OR 97205	Project Manager:	Doug Hancock	Reported: 8/1/97 13:55

Volatile Organic Compounds per EPA Method 8260A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
SFX-4 (continued)			**P707335-04**				**Soil**	
Hexachlorobutadiene	0870017	7/31/97	7/31/97		100	ND	ug/kg dry	
2-Hexanone	"	"	"		250	ND	"	
Isopropylbenzene	"	"	"		50.0	ND	"	
p-Isopropyltoluene	"	"	"		50.0	ND	"	
4-Methyl-2-pentanone	"	"	"		250	ND	"	
Methylene chloride	"	"	"		500	ND	"	
Naphthalene	"	"	"		100	ND	"	
n-Propylbenzene	"	"	"		50.0	ND	"	
Styrene	"	"	"		50.0	ND	"	
1,1,1,2-Tetrachloroethane	"	"	"		50.0	ND	"	
1,1,2,2-Tetrachloroethane	"	"	"		50.0	ND	"	
Tetrachloroethene	"	"	"		50.0	ND	"	
Toluene	"	"	"		50.0	ND	"	
1,2,3-Trichlorobenzene	"	"	"		50.0	ND	"	
1,2,4-Trichlorobenzene	"	"	"		50.0	ND	"	
1,1,1-Trichloroethane	"	"	"		50.0	ND	"	
1,1,2-Trichloroethane	"	"	"		50.0	ND	"	
Trichloroethene	"	"	"		50.0	ND	"	
Trichlorofluoromethane	"	"	"		50.0	ND	"	
1,2,3-Trichloropropane	"	"	"		50.0	ND	"	
1,2,4-Trimethylbenzene	"	"	"		50.0	ND	"	
1,3,5-Trimethylbenzene	"	"	"		50.0	ND	"	
Vinyl chloride	"	"	"		100	ND	"	
o-Xylene	"	"	"		50.0	ND	"	
m,p-Xylene	"	"	"		50.0	ND	"	
Surrogate: 4-BFB	"	"	"	*65.0-130*		*110*	*%*	
Surrogate: Dibromofluoromethane	"	"	"	*65.0-130*		*134*	"	*1*
Surrogate: Toluene-d8	"	"	"	*65.0-130*		*95.2*	"	

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 (206) 481-9200 FAX 485-2992
East 11115 Montgomery, Suite B, Spokane, WA 99206-3779 (509) 924-9200 FAX 924-9290
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 643-9200 FAX 644-2202

CHAIN OF CUSTODY REPORT

Work Order #

REPORT TO:

ENTION: HANCOCK

RESS: PBS ENVIRONMENTAL

NE: 248-1939 FAX: 248-0223

JECT NAME: FEDERAL BUILDING

JECT NUMBER: 5950.01

IPLED BY: DH

INVOICE TO:

ATTENTION:

ADDRESS:

P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *

EA

Organic & Inorganic Analyses: 10 Standard | 7 | 5 | 4 | 3 | 2 | X | Same Day

Fuels & Hydrocarbon Analyses: 5 Standard | 3-4 | 2 | 1 | Same Day

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Request: WG's 8260	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
STX-1	7/17/97		X			
STX-2	"		X			
STX-3	"		X			
STX-4	"		X			

RELINQUISHED BY: Erik Anderson DATE: 7-18-97

PRINT NAME: Erik Anderson FIRM: PBS TIME: 15:45

RELINQUISHED BY: DATE:

PRINT NAME: FIRM: TIME:

RECEIVED BY: Claire Mull DATE: 7/18/97

PRINT NAME: Claire Mull FIRM: NCA TIME: 15:45

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

PAGE OF

JAN-12-1999 16:07

TOTAL P.13

P.13/13

APPENDIX E

IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL REPORT

Important Information About Your Environmental Site Assessment/Evaluation Report

ENVIRONMENTAL SITE ASSESSMENTS/EVALUATIONS ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

This report was prepared to meet the needs you specified with respect to your specific site and your risk management preferences. Unless indicated otherwise, we prepared your report expressly for you and for the purposes you indicated. No one other than you should use this report for any purpose without first conferring with us. No one is authorized to use this report for any purpose other than that originally contemplated without our prior written consent.

The findings and conclusions documented in this site assessment/evaluation have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in this area. The conclusions presented are based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

OUR REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Our environmental site assessment is based on several factors and may include (but not be limited to): reviewing public documents to chronicle site ownership for the past 30, 40, or more years; investigating the site's regulatory history to learn about permits granted or citations issued; determining prior uses of the site and those adjacent to it; reviewing available topographic and real estate maps, historical aerial photos, geologic information, and hydrologic data; reviewing readily available published information about surface and subsurface conditions; reviewing federal and state lists of known and potentially contaminated sites; evaluating the potential for naturally occurring hazards; and interviewing public officials, owners/operators, and/or adjacent owners with respect to local concerns and environmental conditions.

Except as noted within the text of the report, no sampling or quantitative laboratory testing was performed by us as part of this site assessment. Where such analyses were conducted by an outside laboratory, Shannon & Wilson relied upon the data provided and did not conduct an independent evaluation regarding the reliability of the data.

CONDITIONS CAN CHANGE.

Site conditions, both surface and subsurface, may be affected as a result of natural processes or human influence. An environmental site assessment/evaluation is based on conditions that existed at the time of the evaluation. Because so many aspects of a historical review rely on third party information, most consultants will refuse to certify (warrant) that a site is free of contaminants, as it is impossible to know with absolute certainty if such a condition exists. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas that showed no signs of contamination at the time they were studied.

Unless your consultant indicates otherwise, your report should not be construed to represent geotechnical subsurface conditions at or adjacent to the site and does not provide sufficient information for construction-related activities. Your report also should not be used following floods, earthquakes, or other acts of nature; if the size or configuration of the site is altered; if the location of the site is modified; or if there is a change of ownership and/or use of the property.

INCIDENTAL DAMAGE MAY OCCUR DURING SAMPLING ACTIVITIES.

Incidental damage to a facility may occur during sampling activities. Asbestos and lead-based paint sampling often require destructive sampling of pipe insulation, floor tile, walls, doors, ceiling tile, roofing, and other building materials. Shannon & Wilson does not provide for paint repair. Limited repair of asbestos sample locations are provided. However, Shannon & Wilson neither warranties repairs made by our field personnel, nor are we held liable for injuries or damages as a result of those repairs. If you desire a specific form of repair,

such as those provided by a licensed roofing contractor, you need to request the specific repair at the time of the proposal. The owner is responsible for repair methods that are not specified in the proposal.

READ RESPONSIBILITY CLAUSES CAREFULLY.

Environmental site assessments/evaluations are less exact than other design disciplines because they are based extensively on judgment and opinion, and there may not have been any (or very limited) investigation of actual subsurface conditions. Wholly unwarranted claims have been lodged against consultants. To limit this exposure, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses may appear in this report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

Consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed, or conditions at the site have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of the final assessment/evaluation.

An assessment/evaluation of a site helps reduce your risk, but does not eliminate it. Even the most rigorous professional assessment may fail to identify all existing conditions.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, HEALTH, PROPERTY, AND WELFARE OF THE PUBLIC.

If our environmental site assessment/evaluation discloses the existence of conditions that may endanger the safety, health, property, or welfare of the public, we may be obligated under rules of professional conduct, statutory law, or common law to notify you and others of these conditions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland