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Engineers & Scientists

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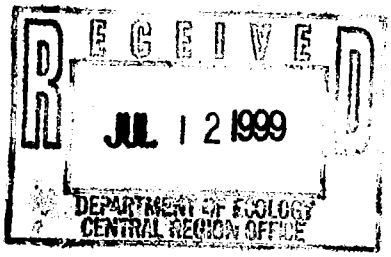
9 July 1999

Ms. Christina Zerby
Site Manager
Washington Department of Ecology
15 West Yakima, Suite 200
Yakima, WA 98902



Subject: Supplemental Site Characterization
Glacier Park West Site
Leavenworth, WA
K/J 996022.09

Reference: Agreed Order No. DE 95TC-C166

Dear Ms. Zerby:

As we discussed during our 28 June 1999 phone conversation, this letter report summarizes the results of supplemental site characterization activities recently performed at the Glacier Park West property located in Leavenworth, Washington (site). In addition, this letter report provides interpretation of the supplemental data and presents recommendations regarding the need for further site activities. The supplemental characterization work was performed in response to the agreement reached during the meeting between the potentially liable parties (PLPs) and the Washington State Department of Ecology (Ecology) on 9 April 1999, as documented in Ecology's letter to the PLPs dated 13 April 1999. The original submittal schedule for this additional characterization information (i.e., end of June 1999) was extended to 12 July 1999 during the telephone conversation between Melissa Papworth of Kennedy/ Jenks Consultants and you on 28 June 1999.

BACKGROUND

The Glacier Park West property is owned by BN Leasing Corporation, a subsidiary of The Burlington Northern and Santa Fe Railway Company (BNSF), and was leased by BNSF and its predecessors to several bulk fuel distributors between 1938 and the early 1990s.[1] In early 1995, BNSF and three other potentially liable persons [i.e., Budget Fuel Service, J.H. Ritchie, and Shell Oil Company (Shell)] entered into Agreed Order No. DE 95TC-C166 with Ecology to perform a Remedial Investigation/ Feasibility Study (RI/FS) in accordance with the Model Toxics Control Act (MTCA). The results of the RI/FS indicated that gasoline and diesel-range petroleum hydrocarbon compounds were present in soil on the site at concentrations exceeding the MTCA Method A soil cleanup levels cited under WAC 173-340-740 and WAC 173-340-745.

Following performance of the RI/FS, BNSF and Shell met with Ecology on 9 April 1999 to discuss the need for remedial action at the site. During the meeting, the parties agreed that

[1] Olympus Environmental, Inc., *Remedial Investigation/Feasibility Study, Glacier Park West Site, Leavenworth, Washington.* February 1997.

additional sampling would be performed to provide data for comparison with MTCA Method B (residential) and Method C (commercial) cleanup levels based on Ecology's 1997 *Interim and Interpretive Policy Statement* (Interim TPH Policy).

On 7 June 1999, the *Technical Work Plan - Supplemental Site Characterization* (Work Plan) for performance of the additional sampling was submitted to Ecology. On 8 June 1999, the additional sampling activities were performed at the site. Sampling activities were performed in accordance with the Work Plan, and included excavation and sampling of five test pits in areas where petroleum hydrocarbon concentrations were expected to be the highest based on prior investigative findings. Two soil samples were collected from each test pit from soil horizons that appeared to contain the highest concentrations of petroleum hydrocarbons. A total of 10 soil samples were submitted for volatile petroleum hydrocarbon (VPH) and extractable petroleum hydrocarbon (EPH) analyses using Washington analytical methods. In addition, the samples were analyzed for gasoline and diesel-range petroleum hydrocarbons (extended to include oil) in accordance with Ecology-specified methods. Additional details of the sampling activities are summarized in Attachment A. Field conditions encountered in each excavation are summarized in Table 1. The test pit sampling locations are illustrated on Figure 1.

INVESTIGATION RESULTS

The results of supplemental sampling activities are summarized in Tables 2 and 3. Laboratory analysis reports are provided in Attachment B.

Gasoline- and diesel-range petroleum hydrocarbon concentrations were detected in each of the soil samples submitted for analysis. Reported gasoline-range hydrocarbon concentrations ranged from 21.0 milligrams per kilogram (mg/kg) in sample TP2-10 to 676 mg/kg in sample TP5-10. Seven of the 10 soil samples contained gasoline-range hydrocarbons at concentrations exceeding the Method A soil cleanup level of 100 mg/kg established under WAC 173-340-740(2) and WAC 173-340-745(2) (Table 2).

Diesel-range hydrocarbons were detected at concentrations from 62 mg/kg in sample TP2-11 to 3,800 mg/kg in sample TP5-10. Eight of the 10 soil samples contained diesel-range hydrocarbons at concentrations exceeding the MTCA Method A soil cleanup level of 200 mg/kg. Oil-range petroleum hydrocarbons were not detected at concentrations above the laboratory detection limits in any of the soil samples.

Low concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX) were detected in several soil samples submitted for analysis. However, none of the BTEX concentrations exceeded their respective MTCA Method A soil cleanup levels. In addition, low levels of carcinogenic and non-carcinogenic polycyclic aromatic hydrocarbon (PAH) compounds were detected; however, the detected concentrations were below MTCA Method A Cleanup Levels.

To evaluate compliance with MTCA Method B residential soil cleanup levels, the VPH and EPH analytical results were evaluated using methods described in Ecology's Interim TPH Policy. Using these methods, attainment of the acceptable risk thresholds established for MTCA Method B is evaluated on a sample-by-sample basis using established risk assessment

procedures under a direct contact exposure pathway [WAC 173-340-700(3)(b) and -740 (3)]. The procedure includes calculation of a hazard index for non-carcinogenic compounds and a total risk for carcinogenic compounds, including PAHs and benzene. [Note: The spreadsheet used to perform these risk assessment calculations was obtained from Ecology's internet site.] The MTCA Method B residential cleanup level is exceeded when either (1) the hazard index calculated based on exposure to the non-carcinogenic compounds at a site exceeds 1.0, or (2) the cumulative carcinogenic risk associated with exposure to all of the carcinogens present at a site exceeds 1 in 100,000 (1×10^{-5}) for the site [WAC 173-340-700(3)(b)].

Using Ecology's spreadsheet, a hazard index and carcinogenic risk were calculated for each of the 10 soil samples. Where the analytical results for the same petroleum fraction is provided by both the VPH and EPH methods, the maximum detected concentrations were used in the risk calculations. (Note: This approach represents worst-case scenario for each sample collected.) In addition, for compounds or equivalent carbon ranges that were below detectable levels, one-half the detection limit was used as a risk calculation input value. Using these conservative assumptions, the hazard indices calculated for the 10 samples ranged from 0.05 to 0.98. The calculated maximum cancer risk values ranged from 6.39×10^{-8} to 6.42×10^{-7}. Both the maximum hazard indices and the maximum cancer risk values are below the MTCA Method B residential soil cleanup level for petroleum hydrocarbons in accordance with WAC 173-340-700(2).

Using the hydrocarbon concentrations detected in the VPH and EPH analyses, Ecology's spreadsheet also evaluates soil-to-groundwater leaching potential by calculating a concentration of hydrocarbon compounds in groundwater using Raoult's Law. The calculated concentration of petroleum hydrocarbon in site groundwater ranged from 0.2 to 0.5 milligram per liter (mg/l), which is well below the MTCA Method A groundwater cleanup level of 1 mg/l. These predicted concentrations are consistent with recent "actual" groundwater monitoring data from wells at the site. Neither dissolved TPH nor BTEX were detected during monitoring of onsite well MW-1 during the RI/FS. Low concentrations of diesel-range TPH and xylenes were detected during monitoring of well MW-3 during the RI/FS. In February 1998, Olympus Environmental, Inc. resampled well MW-3. Neither dissolved TPH nor BTEX were detected in the 1998 sample collected from MW-3 (see Attachment D).

During the 9 April 1999 meeting between Ecology and the PLPs, Ecology expressed concern about potential non-aqueous phase liquid (LNAPL) migration in the vadose zone. During the supplemental site characterization, soils were collected from the areas that appeared to contain the highest concentrations of TPH (based on field indications). All of the TPH concentrations detected in site soils are below reported liquid phase hydrocarbon residual saturation concentrations for similar soil types. The soils encountered at the site during the supplemental site characterization were mainly silty gravelly sands, silty sands, and sandy silts. The percentage (by weight) of particles passing the No. 200 sieve for the three soil samples collected from TP-1 ranged from 21.8 to 45.0. This indicates that fluid flow through the soil will be governed by the fine-grained matrix. API (1989) reports residual liquid hydrocarbon concentrations of 7,500 mg/kg for gasoline and 17,000 mg/kg for middle distillates in "fine

sand/silt."[2] Comparing these values to the maximum detected concentrations of 676 mg/kg for gasoline-range TPH and 3,800 mg/kg for diesel-range TPH indicates that the soils encountered were below residual saturation for liquid petroleum. This conclusion is also consistent with field observations made during the test pit excavation.

CONCLUSIONS

Based on evaluation of the results of the supplemental site characterization, the human health risk levels associated with potential exposure to the petroleum hydrocarbons present in site soils are acceptable based on the MTCA Method B residential criteria. In addition, the potential for adverse impacts to groundwater quality appears to be minimal based on the soil-to-groundwater leaching potential of the petroleum hydrocarbon mixture present in site soils. Considering this new information about the composition of the petroleum hydrocarbon mixture present in site soils and the site-specific concentrations of individual fractions/compounds, it appears that the site is eligible for closure without further action.

We look forward to discussing the results of the supplemental site characterization with you. Please contact Ms. Melissa Papworth at (253) 942-3422 if you have any questions regarding the information contained herein.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Melissa E Papworth

Melissa E. Papworth, P.E.
Vice President

MEP:nld
w:\99\996022.09\7mep1\letter.doc

Attachments

cc: Ms. Jennifer L. Anderson, BNSF
Ms. Pamela Nehring, BNSF
Mr. Robert E. Walkley
Mr. Frank R. Fossati, Shell Oil

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[2] American Petroleum Institute (API), *A Guide to the Assessment and Remediation of Underground Petroleum Releases*, API Publication 1628. August 1989.

TABLE 1

TEST PIT LOG
Glacier Park West Site, Leavenworth, Washington

Test Pit	Lithological Log			Soil Sample Log			
	Depth Range	Soil Classification	Description	Number	Depth	OVA(ppm)	Sheen
TP-1	0 to 2-3 feet	Well graded gravel with sand and silt (fill material)	Orange, gray, and black in color. Angular gravel with matrix of approximately 50% silt and 50% sand. Black material has a charred appearance and is crumbly. No petroleum odor or staining.	TP1-1	1	0	none
	2-3 to 4-5 feet	Sandy Silt	Brown-orange silt with 30 to 40% fine sand. No petroleum odor or staining.	TP1-4	4	0	none
	4-5 to 10 feet	Well graded gravel with sand and silt	Brown-orange gravel with approximately 35% sand and 20% silt. Gravel includes some large cobbles and boulders. No petroleum odor or staining.	TP1-9	9	0	none
TP-2	0 to 2-3 feet	Well graded gravel with sand and silt (fill material)	Gray to brown soil mixed with black charcoal-like material. No petroleum odor or staining.				
	2-3 to 5 feet	Sandy Silt	Light brown silt with 30 to 40% fine sand. No petroleum odor or staining.				
	5 to 8 feet	Well graded sand with silt and gravel	Gray to olive sand with 30% silt and 15-20% gravel, including some cobbles and boulders. No petroleum odor or staining.				
	8 to 11 feet	Well graded sand with silt and gravel	Dark gray, strong petroleum odor, texturally similar to overlying material, sharp contact with overlying material.	TP2-8 TP2-10 TP2-11	8 10 11	60 90 150	heavy heavy heavy
TP-3	0 to 2-3 feet	Well graded gravel with sand and silt (fill material)	Predominantly black charcoal-like material, mixed with gravelly soil. No petroleum odor or staining.				
	2-3 to 5.5 feet	Sandy Silt	Light brown silt with 30 to 40% fine sand. No petroleum odor or staining.				
	5.5 to 10 feet	Well graded sand with silt and gravel	Light to medium gray sand with 20% silt and 35 to 40% gravel. Gravel is mostly medium-grained, with cobbles and boulders present. Petroleum odor and staining are present below 5.5 feet, odor increases with depth, upper contact is sharp.	TP3-5 TP3-8 TP3-10	5 8 10	90 110 120	moderate heavy heavy
TP-4	0 to 2 feet	Well graded gravel with sand and silt (fill material)	Light brown to tan gravel with minor black, charcoal-like debris. No petroleum odor or staining.				
	2 to 6 feet	Sandy Silt	Light brown silt with 30 to 40% fine sand. No petroleum odor or staining.				
	6 to 10 feet	Well graded sand with silt and gravel	Light to dark gray coarse sand with 30% gravel and 20% silt. Gravel is mostly medium-grained, with some boulders and cobbles present. Petroleum odor and staining are present below 6 feet, contact is sharp.	TP4-7 TP4-8 TP4-10	7 8 10	150 150 275	heavy heavy heavy
TP-5	0 to 2 feet	Well graded gravel with sand and silt (fill material)	Light brown to tan gravel with minor black, charcoal-like debris. No petroleum odor or staining.				
	2 to 3-5 feet	Sandy Silt	Light brown silt with 30 to 40% fine sand. Variable thickness. No petroleum odor or staining.				
	3-5 to 7 feet	Well graded sand with silt and gravel	Light brown sand with 20 to 25% gravel and 20 to 25% silt. Gravel is mostly fine to medium grained, but cobbles and bounders are present. No petroleum odor or staining.				
	7 to 10 feet	Well graded sand with silt and gravel	Medium to dark gray. Strong petroleum odor and staining below 7 feet. Moderately sharp contact with overlying material.	TP5-7 TP5-8 TP5-10	7 8 10	220 450 >1,000	heavy heavy heavy
TP-6	0 to 2-3 feet	Well graded gravel with sand and silt (fill material)	Light brown to tan angular gravel with silt and sand mixed with black charcoal-like debris. Gray sand with silt and gravel occurs locally from 2-3 feet bgs. Minor petroleum staining from 2 to 3 feet, not a continuous layer.				
	2-3 to 5.5 feet	Sandy Silt	Light brown silt with 30 to 40% fine sand. No petroleum odor or staining.				
	5.5 to 6.5 feet	Well graded sand with silt and gravel	Light brown to olive gray sand with 20% silt and 30-35% gravel, including some large cobbles and boulders. No petroleum odor or staining.				
	6.5 to 10 feet	Well graded sand with silt and gravel	Medium to dark gray with strong petroleum odor and staining, upper contact is sharp.	TP6-7 TP6-9 TP6-10	7 9 10	275 325 300	heavy heavy heavy

TABLE 2

TPH, VPH, EPH, AND PAH ANALYTICAL RESULTS[a]
Glacier Park West Site, Leavenworth, Washington

Analyte	Sample Number									
	TP2-10	TP2-11	TP3-8	TP3-10	TP4-8	TP4-10	TP5-8	TP5-10	TP6-8	TP6-10
Total Petroleum Hydrocarbons (mg/kg)										
Gasoline Range	21.0	61.6	87.1	127	355	186	265	676	222	188
Diesel Range	81	62	250	1,000	2,500	1,000	2,400	3,800	2,600	1,900
Heavy Oil Range	<11[b]	<11	<11	<110	<120	<110	<110	<220	<110	<110
EPH Aliphatics (mg/kg)										
C8-C10	<5	<5	<5	5	12	9	31	22	10	14
C10-C12	15	10	7	44	71	57	212	128	71	95
C12-C16	100	51	49	243	343	249	1,080	574	368	489
C16-C21	89	27	52	200	260	176	892	400	269	357
C21-C34	16	8	10	33	45	29	136	67	44	59
Total EPH Aliphatics[c]	**223**	**99**	**121**	**525**	**731**	**520**	**2,351**	**1,191**	**762**	**1,014**
EPH Aromatics (mg/kg)										
C8-C10	<5	<5	<5	<5	6	<5	7	9	<5	5
C10-C12	<5	<5	<5	9	14	13	58	38	16	24
C12-C16	24	16	18	61	79	67	300	168	90	133
C16-C21	54	28	42	135	165	119	540	292	186	276
C21-C34	22	18	19	29	38	28	80	42	36	44
Total EPH Aromatics[c]	**105**	**67**	**84**	**237**	**302**	**230**	**985**	**549**	**331**	**482**
VPH (mg/kg)										
C5-C6 Aliphatics	<5	<5	<5	<5	<5	<5	<25	<25	<5	<5
C6-C8 Aliphatics	<5	<5	<5	<5	<5	<5	<25	<25	<5	<5
C8-C10 Aliphatics	<5	<5	<5	<5	<5	<5	<25	<25	<5	<5
C10-C12 Aliphatics	7	6	<5	13	16	17	110	85	26	25
C8-C10 Aromatics	<5	6	7	17	30	26	52	75	24	29
C10-C12 Aromatic	18	13	12	83	77	70	260	240	95	99
Methyl tert-butyl ether	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.25	<0.05	<0.05
Toluene	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.5	<0.5	<0.1	<0.1
Ethylbenzene	<0.1	<0.1	<0.1	0.2	0.2	0.1	1.2	1.4	0.4	0.1
m,p-Xylenes	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<1	0.7	<0.1	<0.1
o-Xylenes	<0.1	<0.1	<0.1	0.1	0.2	<0.1	<0.5	<0.5	0.1	<0.1
Naphthalene	<0.5	<0.5	<0.5	<0.8	<1.2	<0.9	<2.5	<6.1	<0.9	<0.9
PAHs (ug/kg)										
Napthalene	<10	11	<10	55	410	180	1,300	3,200	63	100
2-methylnaphthalene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acenaphthylene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acenaphthene	11	<10	<10	36	49	47	250	97	53	69
Dibenzofuran	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Fluorene	89	60	66	290	360	370	1,600	700	530	630
Phenanthrene	200	110	120	510	750	590	2,900	1,400	980	1,200
Anthracene	<10	<10	<10	23	32	25	110	31	27	33
Fluoranthene	<10	<10	<10	<10	12	<10	23	16	12	15
Pyrene	<10	<10	<10	18	37	21	100	40	26	33
Benzo (a) anthracene[d]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chrysene[d]	<10	<10	<10	<10	52	<10	38	20	13	16
Benzo (b) fluoranthene[d]	<10	<10	<10	<10	11	<10	<10	<10	<10	<10
Benao (k) fluoranthene[d]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzo (a) pyrene[d]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Indeno (1,2,3-cd) pyrene[d]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dibenz (a,h) anthracene[d]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzo (g,h,i) perylene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total cPAHs[c,d]	**35**	**35**	**35**	**35**	**88**	**35**	**68**	**50**	**43**	**46**

Notes:

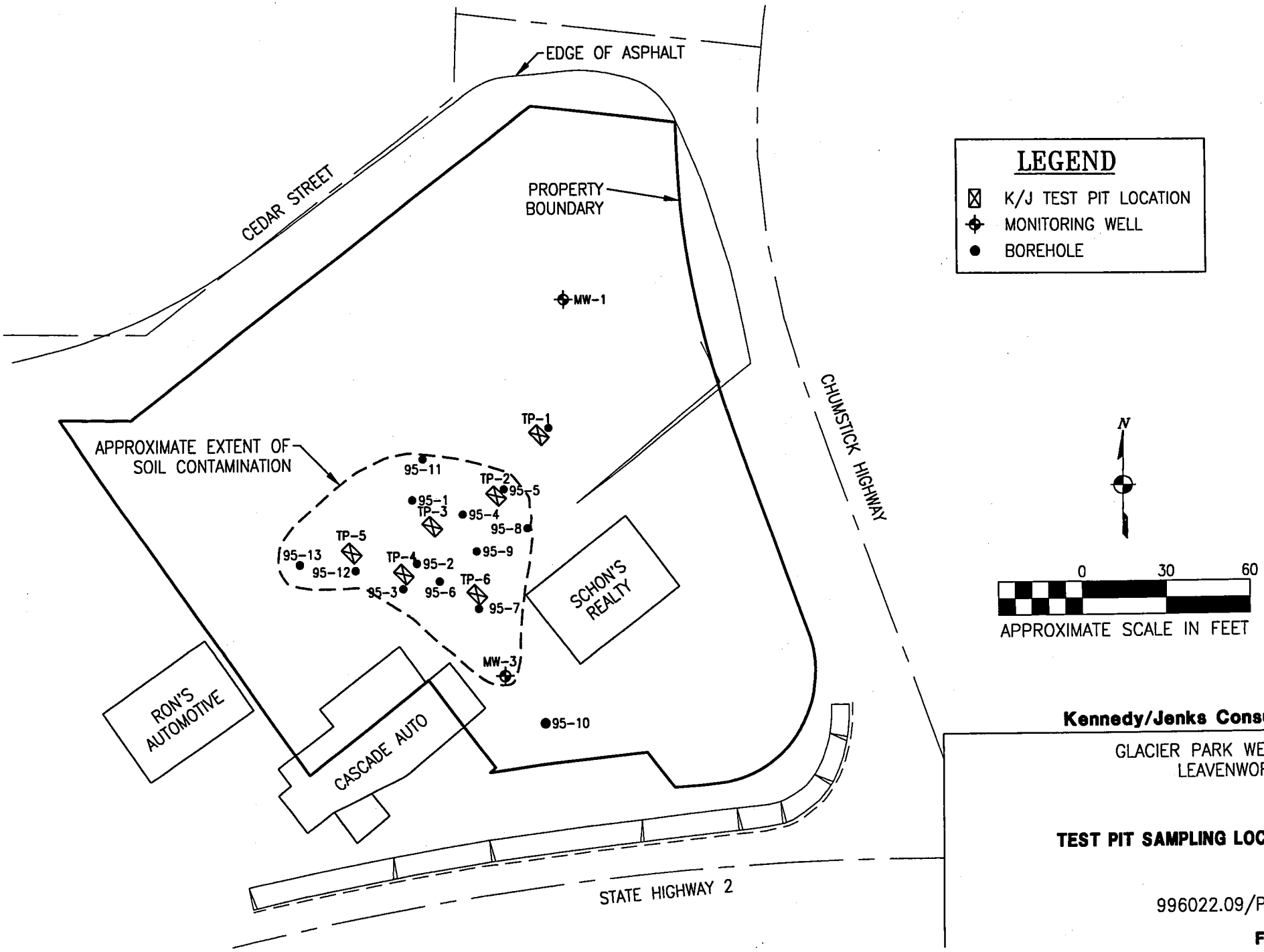
(a) TPH = Total Petroleum Hydrocarbons; VPH = Volatile Petroleum Hydrocarbons; EPH = extractable petroleum hydrocarbons; PAH = polycyclic aromatic hydrocarbons.
(b) < denotes analyte not present at concentration below the indicated detection limit.
(c) Where analyte was not detected, a value of 1/2 the laboratoray detection limit was used.
(d) Carcinogenic polycyclic aromatic hydrocarbons (cPAHs).

TABLE 3

GEOTECHNICAL ANALYSIS RESULTS, BACKGROUND SOIL SAMPLES

Glacier Park West Site, Leavenworth, Washington

Analysis	Units	Sample Number		
		TP1-1	TP1-4	TP1-9
Total Solids	percent	93.7	86.1	90.9
Total Organic Carbon	percent	1.5	1.1	0.15
Wet Bulk Density	pcf	129	130	143
Dry Bulk Density	pcf	123	113	130
Moisture Content	percent	5	15	9



Kennedy/Jenks Consultants

GLACIER PARK WEST SITE
LEAVENWORTH, WA

TEST PIT SAMPLING LOCATIONS

996022.09/P9SK002

FIGURE 1

ATTACHMENT A

FIELD ACTIVITIES

On 8 June 1999, subsurface investigations were performed at the Glacier Park West site. Subsurface investigations included excavation of six test pits using a trackhoe to a maximum depth of 11 feet bgs (below ground surface) and collection of soil samples for chemical analysis. The test pits were excavated at the approximate locations indicated in the 25 May 1999 Technical Work Plan prepared by Kennedy/Jenks Consultants; however, the locations of test pits TP3, TP4, TP5, and TP6 were moved slightly north to avoid marked underground utility lines. Test pit locations are illustrated on Figure 1.

Test pit TP1 was located northeast of the suspected lateral extent of petroleum-affected soil to obtain "background" soil samples. Test pits TP2 through TP6 were located within the estimated area of petroleum-affected soil.

Test pit soil samples were visually logged using the Unified Soil Classification System (USCS) Visual-Manual Method (ASTM D-2488). Field screening performed on test pit soil samples included organic vapor analysis using an organic vapor analyzer (OVA) and headspace technique, water sheen testing, and observation of soil color and odor. A summary of soil conditions and field screening results is provided in Table 1.

Soil samples were collected from the trackhoe bucket by transferring soil directly into laboratory-prepared containers using individually wrapped disposable plastic scoops. Samples were stored in an iced cooler and transferred to the analytical laboratory under standard chain-of-custody procedures.

Soil samples were selected for laboratory analysis from test pit TP1 ("background") based on lithological conditions encountered. A total of three soil samples were collected from TP1 at depths of 1, 4, and 9 feet bgs. One sample was collected from each of the identified lithologic units (refer to Table 1). The three samples were submitted to Analytical Resources, Inc. (ARI) of Seattle, Washington, for analysis of total organic carbon (TOC) content, and to Soil Technology, Inc. of Bainbridge Island, Washington, for analysis of dry bulk density, moisture content, and particle size distribution. The results of these analyses are provided in Table 3.

Soil samples from test pits TP2 through TP6 (petroleum-affected area) were selected for laboratory analysis based on field screening results. Two samples from each test pit displaying field indications of petroleum impact were selected for laboratory analysis. A total of 10 soil samples were submitted to ARI for the following analyses:

- Gasoline-range hydrocarbons by Ecology specified -method NWTPH-G
- Diesel-range hydrocarbons by Ecology specified-method NWTPH-D
- Extractable petroleum hydrocarbons (EPH) in accordance with Ecology's Interim TPH Policy methods
- Polycyclic aromatic hyrdrocarbons (PAHs) using EPA Method 8270 in Selective Ion Monitoring (SIM) mode to achieve lower detection limits
- Volatile petroleum hydrocarbons (VPH), including benzene, toluene, ethylbenzene and xylene (BTEX) in accordance with Ecology's Interim TPH Policy Method.

In addition, three soil samples (collected from different test pits) were analyzed for soluble metals to evaluate potential soil disposal options. These samples were extracted using the Toxicity Characteristic Leaching Procedure (TCLP) and analyzed for RCRA metals by EPA Method 6000 series. [Note: The results of soluble metal analyses are pending and are not provided in this letter report.]

Laboratory report sheets and chain-of-custody documentation are provided in Attachment B.

Following completion of test pit sampling, test pits excavations were backfilled with original excavated material in the approximate sequence in which it was removed. Backfilled soil within the test pits was compacted by tamping with the trackhoe bucket.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

1 July 1999

Melissa Papworth
Kennedy Jenks Consultants
530 South 336th Street
Federal Way, WA 98003

RE: Project: BNSF - Leavenworth
ARI Job AJ86

Dear Melissa:

Please find enclosed a sample custody record and a final data set for the above referenced project. Thirteen soil samples and a set of trip blanks were received in good condition on June 9, 1999.

Sample analysis for gas range hydrocarbons was completed referencing WDOE method NWTPH-Gx. Initial analysis on June 14th was too dilute. Samples were successfully reanalyzed on June 22nd. None of the samples generated elution patterns indicative of gasoline. Due to the delay in reanalysis, the surcharge will be dropped for this test.

The NWTPH-Gx bromobenzene surrogate recovery was slightly elevated for sample **TP5-10**. As the trifluorotoluene surrogate was recovered within advisory limits, no corrective action was required for this sample.

Analysis for diesel and motor oil range hydrocarbons was completed referencing WDOE method NWTPH-Dx. Sample elution patterns did not closely match our diesel standard, however it is probable that they represent a weathered diesel product.

Please review the cover letter provided by Columbia Analytical Services, Inc. for details regarding the VPH and EPH analyses.

Quality control analysis results are included for your review. Copies of the reports and all associated raw data will be kept on file. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Jeff J. Reitan
Client Services Manager

JJR/jr
Enclosures

333 Ninth Avenue North • Seattle WA 98109-5187 • **206-621-6490** • **206-621-7523** fax

KENNEDY/JE[illegible] CONSULTANTS

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☐ 17310 Red Hill Ave., #220, Irvine, CA 92714
☐ 2181 East Bayshore Rd., #200, Palo Alto, CA 94303
☐ 5190 Neil Road, #300, Reno, NV 89502
☐ 3336 Bradshaw Rd., #140, Sacramento, CA 95827
☐ 303 Second St., San Francisco, CA 94107
☐ 1000 Hill Rd., #200, Ventura, CA 93003

SAMPLE CHAIN-OF-CUSTODY ANALYSIS REQUEST

Page 1 of 2

6.0

99-0355
99-0356
AJ96

POSSIBLE HAZARDS: _____

Date 6/9/99
Source of Samples Test pits
Sampler Name DKM
Phone 253-874-0555
Project No. 96022.09 BNSF-Leavenworth

Report To Melissa Papworth
Company K/J
Address _____
Phone 253-874-0555

Lab Destination ARI
Address 400 Ninth Ave. N.
Seattle, WA 98109-4708
Phone 206-621-6490
Carrier/Way Bill No. _____

(1) Lab ID No.	(1) Client ID No.	COLLECTION Date	COLLECTION Time	(2) Type	Depth	(3) # Containers	(4) Pres.	Turn-around	(5) ANALYSES REQUESTED: Total Organic Carbon	VPH	EPH (w/ PAH)	WTPH - Diesel	WTPH - Gas				Comment/Conditions (Container type, container number, etc.)
	TP1-1	6/8/99	9:05	S	1	1		5-day	X								
	TP1-4		9:10		4	1			X								
	TP1-9		9:15		9	1			X								5-day turn around
	TP2-10		9:50		10	4				X	X	X	X				
	TP2-11		10:00		11	4				X	X	X	X				
	TP3-8		10:40		8	4				X	X	X	X				
	TP3-10		10:30		10	4				X	X	X	X				
	TP4-8		11:20		8	4				X	X	X	X				
	TP4-10		11:10		10	4				X	X	X	X				
	TP5-8	↓	11:55	↓	8	4		↓		X	X	X	X				

(1) Write only one sample number in each space.
(2) Specify type of sample(s): Water (W), Solid (S), or indicate type.
(3) Mark each sample which should be composited in Laboratory as follows: Place an "A" in box for each sample that should be composited into one sample; use sequential letter for additional groups.
(4) Preservation of sample.
(5) Write each analyses requested across top. Place an "X" in appropriate column to indicate type of analysis needed for each sample.

SAMPLE RELINQUISHED BY:

Print Name	Signature	Company	Date	Time
Dean Maltz		K/J	6/9/99	1000

SAMPLE RECEIVED BY:

Print Name	Signature	Company	Date	Time
Zach Stanley		ARI	6/9/99	1530

\MISC\CUSTODY2.FRM

000065.08

...IED ... CONSULTANTS

☐ 200 New Stine Rd., #115, Bakersfield, CA 93309
☒ 530 South 336th St., Federal Way, WA 98003
☐ 17310 Red Hill Ave., #220, Irvine, CA 92714
☐ 2191 East Bayshore Rd., #200, Palo Alto, CA 94303
☐ 5190 Neil Road, #300, Reno, NV 89502
☐ 3336 Bradshaw Rd., #140, Sacramento, CA 95827
☐ 303 Second St., San Francisco, CA 94107
☐ 1000 Hill Rd., #200, Ventura, CA 93003

SAMPLE CHAIN-OF-CUSTODY ANALYSIS REQUEST

POSSIBLE HAZARDS: _____

Date 6/9/99 | Report To Melissa Papworth

Source of Samples Test pits | Company K/J

Sampler Name DKM | Address _____

Phone 253-874-0555 | _____

Project No. 96022.09 BNSF-Leavenworth | Phone 253-874-0555

Lab Destination ARI

Address 400 North 34th Ave N.
Seattle, WA 98109-4708

Phone 206-621-6490

Carrier/Way Bill No. _____

(1) Lab ID No.	(1) Client ID No.	COLLECTION Date	COLLECTION Time	(2) Type	Depth	(3) Comp.	(4) Pres.	Turn-around	(5) ANALYSES REQUESTED: VPH	EPH (w/ PAH)	WTPH-Diesel	WTPH-Gas	# Containers	Comment/Conditions (Container type, container number, etc.)
	TP5-10	6/9/99	11:45	S	10	4		5-day	X	X	X	X		
	TP6-8	"	12:30	"	8	4		"	X	X	X	X		5-day turn around
	TP6-10	"	12:20	"	10	4		"	X	X	X	X		
	TRIP BLANK	5/26/99							X			X		

(1) Write only one sample number in each space.
(2) Specify type of sample(s): Water (W), Solid (S), or indicate type.
(3) Mark each sample which should be composited in Laboratory as follows: Place an "A" in box for each sample that should be composited into one sample; use sequential letter for additional groups.
(4) Preservation of sample.
(5) Write each analyses requested across top. Place an "X" in appropriate column to indicate type of analysis needed for each sample.

SAMPLE RELINQUISHED BY: Print Name	Signature	Company	Date	Time	SAMPLE RECEIVED BY: Print Name	Signature	Company	Date	Time
Dean Maltz		K/J	6/9/99	10:00	Zach Stanley		ARI	6/9/99	23[illegible]

VPH + BETX, MTBE, Naphthalene
EPH + PAHs

CONTRACTOR ANALYSIS REQUEST
TODY TRANSFER 06\10\99 ARI Project: AJ86

Laboratory: Columbia Analytical Services Inc, ARI Client: Kennedy Jenks Consulta
Contact: MINGTA LIN Project ID:
Address: 1317 South 13th St. ARI PMgr: Jeff Reitan
Kelso, WA 98626 Phone: (206) 340-2866 Ext 119
Phone: 360-577-7222 Fax: (206) 621-7523
Fax: 360-636-1068

Analytical Protocol: In-house Requested Turn Around: 06/25/99
Fax Results (Y/N): Yes

ARI Sample ID	Client Sample ID	Sampled	Matrix	Bottles	Analyses
99-8358-AJ86D	TP2-10	6/ 8/99	Soil	1	EPH, VPH
99-8359-AJ86E	TP2-11	6/ 8/99	Soil	1	EPH, VPH
99-8360-AJ86F	TP3-8	6/ 8/99	Soil	1	EPH, VPH
99-8361-AJ86G	TP3-10	6/ 8/99	Soil	1	EPH, VPH

Limits of Liability. Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.

Carrier	Airbill		Date
UPS			
Relinquished by	**Company**	**Date**	**Time**
	ARI	6/10/99	1600
Received by	**Company**	**Date**	**Time**
	CAS-K	6/11/99	1030

Carrier	Airbill		Date
Relinquished by	**Company**	**Date**	**Time**
Received by	**Company**	**Date**	**Time**

00055

CONTRACTOR ANALYSIS REQUEST
STODY TRANSFER 06\10\99 ARI Project: AJ86

Laboratory: Columbia Analytical Services Inc, ARI Client: Kennedy Jenks Consultant
b Contact: MINGTA LIN Project ID:
b Address: 1317 South 13th St. ARI PMgr: Jeff Reitan
Kelso, WA 98626 Phone: (206) 340-2866 Ext 119
Phone: 360-577-7222 Fax: (206) 621-7523
x: 360-636-1068

Analytical Protocol: In-house Requested Turn Around: 06/25/99
Fax Results (Y/N): Yes

ARI Sample ID	Client Sample ID	Sampled	Matrix	Bottles	Analyses
99-8362-AJ86H	TP4-8	6/ 8/99	Soil	1	EPH, VPH
-8363-AJ86I	TP4-10	6/ 8/99	Soil	1	EPH, VPH
-8364-AJ86J	TP5-8	6/ 8/99	Soil	1	EPH, VPH
8365-AJ86K	TP5-10	6/ 8/99	Soil	1	EPH, VPH

mits of Liability. Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures at meet standards for the industry. The total liability of ARI, its officers, gents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any iability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.

Carrier	Airbill		Date
Relinquished by	Company PAR-1	Date 6/10/99	Time 1600
Received by	Company CAS-K	Date 6/11/99	Time 1030

Carrier	Airbill		Date
Relinquished by	Company	Date	Time
Received by	Company	Date	Time

CONTRACTOR ANALYSIS REQUEST
STODY TRANSFER 06\10\99 ARI Project: AJ86

Laboratory: Columbia Analytical Services Inc, ARI Client: Kennedy Jenks Consultant
Lab Contact: MINSTA LIN Project ID:
Lab Address: 1317 South 13th St. ARI PMgr: Jeff Reitan
Kelso, WA 98626 Phone: (206) 340-2866 Ext 119
Phone: 360-577-7222 Fax: (206) 621-7523
Fax: 360-636-1068

Analytical Protocol: In-house Requested Turn Around: 06/25/99
Fax Results (Y/N): Yes

ARI Sample ID	Client Sample ID	Sampled	Matrix	Bottles	Analyses
99-8366-AJ86L	TP6-8	6/ 8/99	Soil	1	EPH, VPH
-8367-AJ86M	TP6-10	6/ 8/99	Soil	1	EPH, VPH
-8368-AJ86N	Trip Blank	5/26/99	Water	1	VPH

mits of Liability. Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures hat meet standards for the industry. The total liability of ARI, its officers, ents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any ability in excess thereof, not withstanding any provision to the contrary in any ontract, purchase order or co-signed agreement between ARI and the Subcontractor.

Carrier UPS	Airbill		Date
Relinquished by	Company ARI	Date 6/10/99	Time 1600
Received by	Company CAS-K	Date 6/11/99	Time 1030

Carrier	Airbill		Date
Relinquished by	Company	Date	Time
Received by	Company	Date	Time

ANALYTICAL
RESOURCES
INCORPORATED

TOTAL GASOLINE RANGE HYDROCARBONS
WTPHg Range Toluene to C12 by GC/FID

QC Report No: AJ86-Kennedy Jenks Consultants
Matrix: Soil Project:

Data Release Authorized: Date Received: 06/09/99
Reported: 06/23/99

Lab ID	Client Sample ID	Date Analyzed	Dilution Factor	Gas Range Hydrocarbons		Gasoline ID	Surr A Rec	Surr B Rec
AJ86-0621MB	Method Blank	06/21/99	1:1	5.0	U	NO	106%	108%
99-8358-AJ86D	**TP2-10**	06/21/99	1:1	**21**		NO	93.9%	106%
99-8359-AJ86E	**TP2-11**	06/22/99	1:1	**62**		NO	95.8%	112%
99-8360-AJ86F	**TP3-8**	06/22/99	1:1	**87**		NO	98.7%	117%
99-8361-AJ86G	**TP3-10**	06/22/99	1:1	**130**		NO	87.4%	121%
99-8362-AJ86H	**TP4-8**	06/22/99	1:1	**360**		NO	96.6%	144%
99-8363-AJ86I	**TP4-10**	06/22/99	1:1	**190**		NO	98.6%	127%
99-8364-AJ86J	**TP5-8**	06/22/99	1:1	**260**		NO	82.8%	127%
99-8365-AJ86K	**TP5-10**	06/22/99	1:1	**680**		NO	87.5%	172%
99-8366-AJ86L	**TP6-8**	06/22/99	1:1	**220**		NO	95.7%	134%
99-8367-AJ86M	**TP6-10**	06/22/99	1:1	**190**		NO	93.3%	126%

Surrogate A is Trifluorotoluene.
Surrogate B is Bromobenzene.
Values reported in ppm (mg/kg) on a dry weight basis.
Quantitation on total peaks in the gasoline range from Toluene to C12.

Data Qualifiers

U	Compound not detected at the given detection limit.
X	Value detected above linear range of instrument. Dilution required.
J	Indicates an estimated value below the calculated detection limit.
S	No value reported due to saturation of the detector. Dilution required.
D	Indicates the surrogate was not detected because of dilution of the extract.
NR	Indicates no recovery due to matrix interference.

FORM-1 TPH-g

ANALYTICAL
RESOURCES
INCORPORATED

TOTAL GASOLINE RANGE HYDROCARBONS
WTPHg Range Toluene to C12 by GC/FID

QC Report No: AJ86-Kennedy Jenks Consultants
Matrix: Water Project:

Data Release Authorized: Date Received: 06/09/99
Reported: 06/23/99

Lab ID	Client Sample ID	Date Analyzed	Dilution Factor	Gas Range	Gas ID	Surr A Rec	Surr B Rec
AJ86-0615MB	Method Blank	06/15/99	1:1	0.25 U	NO	92.8%	104%
99-8368-AJ86N	Trip Blank	06/15/99	1:1	0.25 U	NO	79.0%	94.7%

Surrogate A is Trifluorotoluene.
Surrogate B is Bromobenzene.

Values reported in ppm (mg/L).
Quantitation on total peaks in the gasoline range from Toluene to C12.

Data Qualifiers

U	Compound not detected at the given detection limit.
X	Value detected above linear range of instrument. Dilution required.
J	Indicates an estimated value below the calculated detection limit.
S	No value reported due to saturation of the detector. Dilution required.
D	Indicates the surrogate was not detected because of dilution of the extract.
NR	Indicates no recovery due to matrix interference.

ANALYTICAL
RESOURCES
INCORPORATED

TOTAL GASOLINE RANGE HYDROCARBONS
WTPHg Range Toluene to C12 by GC/FID

Lab Sample ID: AJ86SB
LIMS ID: 99-8358
Matrix: Soil

QC Report No: AJ86-Kennedy Jenks Consultants
Project:

Data Release Authorized:
Reported: 06/23/99

LABORATORY CONTROL SAMPLE RECOVERY REPORT
Analyzed 06/21/99

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	% RECOVERY
LABORATORY CONTROL SAMPLE			
Gasoline Range Hydrocarbons	2.44	2.5	97.6%

TPHg Surrogate Recovery

Trifluorotoluene	109%
Bromobenzene	110%

Values reported in parts per million (mg/kg)

TPHg SPIKE CONTROL LIMITS

Percent Recovery 80.0-120%

Advisory QA Limits

ANALYTICAL
RESOURCES
INCORPORATED

TOTAL GASOLINE RANGE HYDROCARBONS
WTPHg Range Toluene to C12 by GC/FID

Lab Sample ID: AJ86SB
LIMS ID: 99-8368
Matrix: Water

QC Report No: AJ86-Kennedy Jenks Consultants
Project:

Data Release Authorized:
Reported: 06/23/99

LABORATORY CONTROL SAMPLE RECOVERY REPORT
Analyzed 06/15/99

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	% RECOVERY
LABORATORY CONTROL SAMPLE			
Gasoline Range Hydrocarbons	2.07	2.50	82.8%

TPHg Surrogate Recovery

Trifluorotoluene	94.0%
Bromobenzene	98.4%

Values reported in parts per million (mg/L)

TPHg SPIKE CONTROL LIMITS

Percent Recovery	50-150%
Duplicate RPD	<50%

Advisory QA Limits

ANALYTICAL
RESOURCES
INCORPORATED

SOIL TPHg SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Soil
Instrument: PID2

QC Report No: AJ86

LIMS ID	Lab ID	Client ID	TFT	BB	TOT OUT
99-8358MB	062199MB	Method Blank	106%	108%	0
99-8358LC	062199LC	Lab Control	109%	110%	0
99-8358	AJ86D	TP2-10	93.9%	106%	0
99-8359	AJ86E	TP2-11	95.8%	112%	0
99-8360	AJ86F	TP3-8	98.7%	117%	0
99-8361	AJ86G	TP3-10	87.4%	121%	0
99-8362	AJ86H	TP4-8	96.6%	144%	0
99-8363	AJ86I	TP4-10	98.6%	127%	0
99-8364	AJ86J	TP5-8	82.8%	127%	0
99-8365	AJ86K	TP5-10	87.5%	172% *	1
99-8366	AJ86L	TP6-8	95.7%	134%	0
99-8367	AJ86M	TP6-10	93.3%	126%	0

	MB/LCS QC LIMITS	SAMPLE QC LIMITS
(TFT) = Trifluorotoluene	(30.0-160)	(30.0-160)
(BB) = Bromobenzene	(30.0-160)	(30.0-160)

Advisory Limits Only

\# Column to be used to flag recovery values

D System Monitoring Compound diluted out

ANALYTICAL
RESOURCES
INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS
WA TPHd Range C12 to C24 by GC/FID
and Motor Oil

LIMS ID: 99-8358 QC Report No: AJ86-Kennedy Jenks Consultants
Matrix: Soil Project:

Data Release Authorized: Date Received: 06/09/99
Reported: 06/17/99

Lab ID	Sample ID	Date Analyzed	Dilution Factor	Diesel Range	*HC ID	Motor Oil Range	Surrogate Recovery
AJ86MB	Method Blank	06/15/99	1:1	5.0 U	---	10 U	77.0%
AJ86D	**TP2-10**	06/15/99	1:1	**81**	NO	11 U	69.0%
AJ86E	**TP2-11**	06/15/99	1:1	**62**	NO	11 U	66.0%
AJ86ED	**TP2-11-DUPL**	06/15/99	1:1	**65**	NO	11 U	63.0%
AJ86F	**TP3-8**	06/15/99	1:1	**250**	NO	11 U	73.0%
AJ86G	**TP3-10**	06/15/99	1:10	**1,000**	NO	110 U	80.0%
AJ86H	**TP4-8**	06/15/99	1:10	**2,500**	NO	120 U	80.0%
AJ86I	**TP4-10**	06/15/99	1:10	**1,000**	NO	110 U	70.0%
AJ86J	**TP5-8**	06/15/99	1:10	**2,400**	NO	110 U	80.0%
AJ86K	**TP5-10**	06/15/99	1:20	**3,800**	NO	220 U	80.0%
AJ86L	**TP6-8**	06/15/99	1:10	**2,600**	NO	110 U	80.0%
AJ86M	**TP6-10**	06/16/99	1:10	**1,900**	NO	110 U	80.0%

Values reported in ppm (mg/kg) on a dry weight basis.

Surrogate is Methyl-Arachidate.

* ID indicates, in the opinion of the analyst, the petroleum product with the best pattern match. 'NO' indicates that there was not a good match for any of the requested products.
Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil quantitation on total peaks in the range from C24 to C38.

Data Qualifiers

U	Compound not detected at the given detection limit.
J	Indicates an estimated value below the calculated detection limit.
S	No value reported due to saturation of the detector. Dilution required.
D	Indicates the surrogate was not detected because of dilution of the extract.
E	Indicates a value above the linear range of the detector. Dilution required.
NR	Indicates no recovery due to matrix interference.
B	Indicates compound also detected in the method blank.

TOTAL DIESEL RANGE HYDROCARBONS
WA TPHd Range C12 to C24 by GC/FID

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: AJ86SB
LIMS ID: 99-8358
Matrix: Soil

QC Report No: AJ86-Kennedy Jenks Consultants
Project:

Data Release Authorized:
Reported: 06/17/99

LABORATORY CONTROL SAMPLE RECOVERY REPORT
Date extracted: 06/11/99
Date analyzed: 06/15/99

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	% RECOVERY
Diesel Range Hydrocarbons	87.8	100	87.8%

TPHd Surrogate Recovery

Methylarachidate	75.0%

Values reported in ppm (mg/kg) on a dry weight basis.

ANALYTICAL
RESOURCES
INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS
WA TPHd Range C12 to C24 by GC/FID

Sample No: TP2-10
Lab Sample ID: AJ86D QC Report No: AJ86-Kennedy Jenks Consultants
LIMS ID: 99-8358 Project:
Matrix: Soil

Date Received: 06/09/99

Data Release Authorized:
Reported: 06/17/99

MATRIX SPIKE/SPIKE DUPLICATE RECOVERY

Date extracted: 06/11/99
Date analyzed: 06/15/99

CONSTITUENT	SAMPLE VALUE	SPIKE VALUE	SPIKE ADDED	% RECOVERY	RPD
MATRIX SPIKE					
Diesel Range Hydrocarbons	81.4	197	110	105%	
MATRIX SPIKE DUPLICATE					
Diesel Range Hydrocarbons	81.4	197	110	105%	0.1%

TPHd Surrogate Recovery

Matrix Spike	Methylarachidate	74.0%
MS Duplicate	Methylarachidate	71.0%

Values reported in ppm (mg/kg) on a dry weight basis.

TOTAL DIESEL HYDROCARBONS COMPOUND SUMMARY

Matrix: Soil QC Report No: AJ86

LIMS ID	Lab ID	Extracted	Client ID	MeArach	TOT OUT
99-8358MB	061599MB	06/11/99	Method Blank	77%	0
99-8358LC	061599LC	06/11/99	Lab Control	75%	0
99-8358	AJ86D	06/11/99	TP2-10	69%	0
99-8358	AJ86D-MS	06/11/99	TP2-10-MS	74%	0
99-8358	AJ86D-MSD	06/11/99	TP2-10-MSD	71%	0
99-8359	AJ86E	06/11/99	TP2-11	66%	0
99-8359	AJ86E-DP	06/11/99	TP2-11-DP	63%	0
99-8360	AJ86F	06/11/99	TP3-8	73%	0
99-8361	AJ86G	06/11/99	TP3-10	80%	0
99-8362	AJ86H	06/11/99	TP4-8	80%	0
99-8363	AJ86I	06/11/99	TP4-10	70%	0
99-8364	AJ86J	06/11/99	TP5-8	80%	0
99-8365	AJ86K	06/11/99	TP5-10	80%	0
99-8366	AJ86L	06/11/99	TP6-8	80%	0
99-8367	AJ86M	06/11/99	TP6-10	80%	0

	Control QC LIMITS	Sample QC LIMITS
(MeArach) = Methylarachidate	(50-150)	(41-158)

\# Column to be used to flag recovery values

* Values outside of required QC limits

D System Monitoring Compound diluted out

ANALYTICAL
RESOURCES
INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: TP1-1

Lab Sample ID: AJ86A
LIMS ID: 99-8355
Matrix: Soil

QC Report No: AJ86-Kennedy Jenks Consultants
Project:

Date Sampled: 06/08/99
Date Received: 06/09/99

Data Release Authorized:
Reported: 06/15/99 Dr. M.A. Perkins

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	06/11/99 061199#1	EPA 160.3 SM 2540 B		0.01	Percent	93.7
Total Organic Carbon	06/15/99 061599#1	Plumb,1981		0.0050	Percent	1.5

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for AJ86 received 06/09/99

ANALYTICAL
RESOURCES
INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: TP1-4

Lab Sample ID: AJ86B
LIMS ID: 99-8356
Matrix: Soil

QC Report No: AJ86-Kennedy Jenks Consultants
Project:

Date Sampled: 06/08/99
Date Received: 06/09/99

Data Release Authorized:
Reported: 06/15/99 Dr. M.A. Perkins

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	06/11/99 061199#1	EPA 160.3 SM 2540 B		0.01	Percent	86.1
Total Organic Carbon	06/15/99 061599#1	Plumb,1981		0.0050	Percent	1.1

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for AJ86 received 06/09/99

ANALYTICAL
RESOURCES
INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: TP1-9

Lab Sample ID: AJ86C
LIMS ID: 99-8357
Matrix: Soil

QC Report No: AJ86-Kennedy Jenks Consultants
Project:

Date Sampled: 06/08/99
Date Received: 06/09/99

Data Release Authorized:
Reported: 06/15/99 Dr. M.A. Perkins

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	06/11/99 061199#1	EPA 160.3 SM 2540 B		0.01	Percent	90.9
Total Organic Carbon	06/15/99 061599#1	Plumb,1981		0.0050	Percent	0.15

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for AJ86 received 06/09/99

ANALYTICAL
RESOURCES
INCORPORATED

QA Report - Method Blank Analysis

QC Report No: AJ86-Kennedy Jenks Consultants
Matrix: Soil Project:
Date Received: NA

Data Release Authorized:
Reported: 06/15/99 Dr. M.A. Perkins

METHOD BLANK RESULTS
CONVENTIONALS

Analysis Date & Batch	Constituent	Units	Result
Method Blank 06/11/99 061199#1	Total Solids	mg residue	< 1.00 U
Method Blank 06/15/99 061599#1	Total Organic Carbon	Percent	<0.0050 U

ANALYTICAL
RESOURCES
INCORPORATED

QA Report - Laboratory Control Samples

QC Report No: AJ86-Kennedy Jenks Consultants
Project:
Date Received: NA

Data Release Authorized:
Reported: 06/15/99 Dr. M.A. Perkins

LABORATORY CONTROL SAMPLES
CONVENTIONALS

Constituent	Units	Measured Value	True Value	Recovery
Laboratory Control Sample				
Total Organic Carbon	Percent	0.506	0.500	101%

Date analyzed: 06/15/99 Batch ID: 061599#1

ANALYTICAL
RESOURCES
INCORPORATED

QA Report - Standard Reference Material Analysis

QC Report No: AJ86-Kennedy Jenks Consultants
Project:
Date Received: NA

Data Release Authorized:
Reported: 06/15/99 Dr. M.A. Perkins

STANDARD REFERENCE MATERIAL ANALYSIS
CONVENTIONALS

Constituent	Units	Value	True Value	Recovery
NBS #2704				
Total Organic Carbon	Percent	2.93	3.35	87.5%

Date analyzed: 06/15/99 Batch ID: 061599#1

ANALYTICAL
RESOURCES
INCORPORATED

QA Report - Matrix Spike/Matrix Spike Duplicate Analysis

QC Report No: AJ86-Kennedy Jenks Consultants
Matrix: Soil Project:
Date Received: 06/09/99

Data Release Authorized:
Reported: 06/15/99 Dr. M.A. Perkins

MATRIX SPIKE QA/QC REPORT
CONVENTIONALS

Constituent	Units	Sample Value	Spike Value	Spike Added	Recovery
ARI ID: 99-8355, AJ86 A Client Sample ID: TP1-1					
Total Organic Carbon	Percent	1.53	1.91	0.496	76.6%

MS/MSD Recovery Limits: 75 - 125 %

Columbia Analytical Services INC.
An Employee-Owned Company

June 29, 1999

Service Request No: K9903732

Jeff Reitan
Analytical Resources, Inc.
333 Ninth Avenue North
Seattle, WA 98109-5187

Re: AJ86

Dear Jeff:

Enclosed are the results of the sample(s) submitted to our laboratory on June 11, 1999. For your reference, these analyses have been assigned our service request number K9903732.

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

Please call if you have any questions. My extension is 245.

Respectfully submitted,

Columbia Analytical Services, Inc.

Mingta Lin
Project Chemist

ML/sm

317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 360/ 577-7222 • Fax 360/636-1068

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Volatile Petroleum Hydrocarbons
Washington DOE Method VPH - 6/97

Sample Name:	TP2-10	Units:	mg/Kg (ppm)
Lab Code:	K9903732-001	Basis:	Dry Weight Basis
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	7	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	18	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	0.5	1	6/16/99	6/19/99	ND	
Benzene	EPA 5030A	8021B	0.05	1	6/16/99	6/19/99	ND	
Toluene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
Ethylbenzene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
m,p-Xylenes	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
o-Xylene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
Naphthalene	EPA 5030A	8021B	0.5	1	6/16/99	6/19/99	ND	

Approved By: _____ Date: 6/28/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Volatile Petroleum Hydrocarbons
Washington DOE Method VPH - 6/97

Sample Name: TP2-11
Lab Code: K9903732-002
Test Notes:

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

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	6	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	6	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	13	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	0.5	1	6/16/99	6/19/99	ND	
Benzene	EPA 5030A	8021B	0.05	1	6/16/99	6/19/99	ND	
Toluene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
Ethylbenzene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
m,p-Xylenes	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
o-Xylene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
Naphthalene	EPA 5030A	8021B	0.5	1	6/16/99	6/19/99	ND	

Approved By: _____ Date: 6/28/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Volatile Petroleum Hydrocarbons
Washington DOE Method VPH - 6/97

Sample Name: TP4-8
Lab Code: K9903732-005
Test Notes:

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

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	46	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	30	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	77	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	0.5	1	6/16/99	6/19/99	ND	
Benzene	EPA 5030A	8021B	0.05	1	6/16/99	6/19/99	ND	
Toluene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	0.2	
Ethylbenzene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	0.2	
m,p-Xylenes	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	0.4	
o-Xylene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	0.2	
Naphthalene	EPA 5030A	8021B	1.2	1	6/16/99	6/19/99	ND	B

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 6/28/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Volatile Petroleum Hydrocarbons
Washington DOE Method VPH - 6/97

Sample Name:	TP6-8	Units:	mg/Kg (ppm)
Lab Code:	K9903732-009	Basis:	Dry Weight Basis
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	26	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	24	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/19/99	95	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	0.5	1	6/16/99	6/19/99	ND	
Benzene	EPA 5030A	8021B	0.05	1	6/16/99	6/19/99	ND	
Toluene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
Ethylbenzene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	0.4	
m,p-Xylenes	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	ND	
o-Xylene	EPA 5030A	8021B	0.1	1	6/16/99	6/19/99	0.1	
Naphthalene	EPA 5030A	8021B	0.9	1	6/16/99	6/19/99	ND	B

B The MRL is elevated because of matrix interferences.

Approved By: _____ Date: 6/28/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	NA	**Date Collected:**	5/26/99
Sample Matrix:	Water	**Date Received:**	6/11/99

Volatile Petroleum Hydrocarbons

Sample Name:	Trip Blank	Units:	ug/L (ppb)
Lab Code:	K9903732-011	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	5	1	6/18/99	6/18/99	ND	
Benzene	EPA 5030A	8021B	0.5	1	6/18/99	6/18/99	ND	
Toluene	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
Ethylbenzene	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
m,p-Xylenes	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
o-Xylene	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
Naphthalene	EPA 5030A	8021B	5	1	6/18/99	6/18/99	ND	

Approved By: _____ Date: 6/28/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA

Volatile Petroleum Hydrocarbons
Washington DOE Method VPH - 6/97

Sample Name:	Method Blank	Units:	mg/Kg (ppm)
Lab Code:	K990616-MB	Basis:	Dry Weight Basis
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/18/99	ND	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/18/99	ND	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/18/99	ND	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/18/99	ND	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/18/99	ND	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	5	1	6/16/99	6/18/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	0.5	1	6/16/99	6/18/99	ND	
Benzene	EPA 5030A	8021B	0.05	1	6/16/99	6/18/99	ND	
Toluene	EPA 5030A	8021B	0.1	1	6/16/99	6/18/99	ND	
Ethylbenzene	EPA 5030A	8021B	0.1	1	6/16/99	6/18/99	ND	
m,p-Xylenes	EPA 5030A	8021B	0.1	1	6/16/99	6/18/99	ND	
o-Xylene	EPA 5030A	8021B	0.1	1	6/16/99	6/18/99	ND	
Naphthalene	EPA 5030A	8021B	0.5	1	6/16/99	6/18/99	ND	

Approved By: _____ Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: NA
Sample Matrix: Water

Service Request: K9903732
Date Collected: NA
Date Received: NA

Volatile Petroleum Hydrocarbons

Sample Name: Method Blank
Lab Code: K990618-MB
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	50	1	6/18/99	6/18/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	5	1	6/18/99	6/18/99	ND	
Benzene	EPA 5030A	8021B	0.5	1	6/18/99	6/18/99	ND	
Toluene	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
Ethylbenzene	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
m,p-Xylenes	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
o-Xylene	EPA 5030A	8021B	1	1	6/18/99	6/18/99	ND	
Naphthalene	EPA 5030A	8021B	5	1	6/18/99	6/18/99	ND	

Approved By: _____ Date: 6/28/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH - 6/97

Sample Name:	TP2-10	Units:	mg/Kg (ppm)
Lab Code:	K9903732-001	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	15	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	100	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	89	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	16	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	24	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	54	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	22	E

E Estimated concentration; see case narrative.

Approved By: MMarthe Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name:	TP2-11	Units:	mg/Kg (ppm)
Lab Code:	K9903732-002	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	10	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	51	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	27	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	8	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	16	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	28	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	18	E

E Estimated concentration; see case narrative.

Approved By: MMunthe Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name:	TP3-8	Units:	mg/Kg (ppm)
Lab Code:	K9903732-003	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	7	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	49	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	52	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	10	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	18	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	42	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	19	E

E Estimated concentration; see case narrative.

Approved By: MMarthe Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name: TP3-10
Lab Code: K9903732-004
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	5	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	44	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	243	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	200	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	33	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	9	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	61	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	135	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	29	E

E Estimated concentration; see case narrative.

Approved By: MMartha Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name: TP4-8
Lab Code: K9903732-005
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	12	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	71	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	343	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	260	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	45	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	6	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	14	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	79	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	165	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	38	E

E Estimated concentration; see case narrative.

Approved By: MMarthe Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name: TP4-10
Lab Code: K9903732-006
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	9	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	57	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	249	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	176	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/20/99	29	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	13	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	67	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	119	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	28	E

E Estimated concentration; see case narrative.

Approved By: MMarthe Date: 6/25/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH - 6/97

Sample Name:	TP5-8	Units:	mg/Kg (ppm)
Lab Code:	K9903732-007	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	31	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	212	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	1080	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	802	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	136	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	7	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	58	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	300	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	540	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	80	E

E Estimated concentration; see case narrative.

Approved By: MMarthe Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name: TP5-10
Lab Code: K9903732-008
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	22	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	128	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	574	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	400	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	67	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	9	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	38	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	168	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	292	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	42	E

E Estimated concentration; see case narrative.

Approved By: MMarthe Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name: TP6-8
Lab Code: K9903732-009
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	10	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	71	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	368	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	269	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	44	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	ND	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	16	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	90	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	186	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	36	E

E Estimated concentration; see case narrative.

Approved By: MMartin Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name:	TP6-10	Units:	mg/Kg (ppm)
Lab Code:	K9903732-010	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	14	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	95	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	489	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	357	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/20/99	59	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	5	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	24	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	133	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	276	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	0.5	1	6/17/99	6/24/99	44	E

E Estimated concentration; see case narrative.

Approved By: MMcArthur Date: 6/25/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: NA
Date Received: NA

Extractable Petroleum Hydrocarbons
Washington DOE Method EPH

Sample Name: Method Blank
Lab Code: K990617-SB
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
C8 - C10 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C10 - C12 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C16 - C21 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C21 - C34 Aliphatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/19/99	ND	
C8 - C10 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C10 - C12 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C12 - C16 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	ND	
C21 - C34 Aromatics	EPA 3550B	WADOE EPH	5	1	6/17/99	6/24/99	14	E

E Estimated concentration; see case narrative.

Approved By: MMarthe Date 6/25/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name: TP2-10
Lab Code: K9903732-001
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	11	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	89	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	200	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: _____ Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP2-11	Units:	ug/Kg (ppb)
Lab Code:	K9903732-002	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	11	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	60	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	110	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: C C Haines Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name: TP3-8
Lab Code: K9903732-003
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	66	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	120	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: _____ Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP3-10	Units:	ug/Kg (ppb)
Lab Code:	K9903732-004	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	55	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	36	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	290	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	510	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	23	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	18	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: C Haines Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP4-8	Units:	ug/Kg (ppb)
Lab Code:	K9903732-005	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	410	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	49	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	360	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	750	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	32	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	12	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	37	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	52	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	11	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: _____ Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP4-10	Units:	ug/Kg (ppb)
Lab Code:	K9903732-006	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	180	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	47	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	370	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	590	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	25	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	21	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: _____ Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP5-8	Units:	ug/Kg (ppb)
Lab Code:	K9903732-007	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	1300	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	250	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	1600	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	2900	E
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	110	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	23	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	100	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	38	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

E Estimated concentration; see case narrative.

Approved By: C Weiss Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP5-10	Units:	ug/Kg (ppb)
Lab Code:	K9903732-008	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	3200	E
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	97	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	700	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	1400	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	31	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	16	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	40	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	20	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

E Estimated concentration; see case narrative.

Approved By: C C Haines Date: JUN 23 1999

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP6-8	Units:	ug/Kg (ppb)
Lab Code:	K9903732-009	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	63	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	53	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	530	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	980	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	27	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	12	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	26	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	13	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: C Heines Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99

Polynuclear Aromatic Hydrocarbons

Sample Name:	TP6-10	Units:	ug/Kg (ppb)
Lab Code:	K9903732-010	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	100	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	69	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	630	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	1200	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	33	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	15	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	33	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	16	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: C Haines Date: JUN 23 1999

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA

Polynuclear Aromatic Hydrocarbons

Sample Name:	Method Blank	Units:	ug/Kg (ppb)
Lab Code:	K990617-SB	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
2-Methylnaphthalene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Acenaphthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenzofuran	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluorene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Phenanthrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benz(a)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Chrysene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	10	1	6/17/99	6/22/99	ND	

Approved By: C Abrines Date: JUN 23 1999

1S22/020597p

APPENDIX A

Laboratory QC Results

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99
Date Extracted: 6/16/99
Date Analyzed: 6/19/99

Surrogate Recovery Summary
Volatile Petroleum Hydrocarbons

Prep Method: EPA 5030A
Analysis Method: WADOE VPH

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene (FID)
TP2-10	K9903732-001		123
TP2-11	K9903732-002		125
TP3-8	K9903732-003		124
TP3-10	K9903732-004		127
TP4-8	K9903732-005		113
TP4-10	K9903732-006		124
TP5-8	K9903732-007		123
TP5-10	K9903732-008		124
TP6-8	K9903732-009		125
TP6-10	K9903732-010		126
TP2-11	K9903732-002DUP		123
TP4-10	K9903732-006MS		126
TP4-10	K9903732-006DMS		127
Lab Control Sample	K990616-LCS		139
Method Blank	K990616-MB		134

CAS Acceptance Limits: 60-140

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99
Date Extracted: 6/16/99
Date Analyzed: 6/18-19/99

Surrogate Recovery Summary
Volatile Petroleum Hydrocarbons

Prep Method: EPA 5030A
Analysis Method: 8021B

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene (PID)
TP2-10	K9903732-001		116
TP2-11	K9903732-002		119
TP3-8	K9903732-003		117
TP3-10	K9903732-004		121
TP4-8	K9903732-005		96
TP4-10	K9903732-006		118
TP5-8	K9903732-007		113
TP5-10	K9903732-008		109
TP6-8	K9903732-009		117
TP6-10	K9903732-010		118
TP2-11	K9903732-002DUP		118
TP4-10	K9903732-006MS		114
TP4-10	K9903732-006DMS		115
Lab Control Sample	K990616-LCS		126
Method Blank	K990616-MB		127

CAS Acceptance Limits: 60-140

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99
Date Extracted: 6/16/99
Date Analyzed: 6/19/99

Duplicate Summary
Volatile Petroleum Hydrocarbons

Sample Name: TP2-11
Lab Code: K9903732-002DUP
Test Notes:

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

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
C5 - C6 Aliphatics	EPA 5030A	WADOE VPH	5	ND	ND	ND	NC	
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	ND	ND	ND	NC	
C8 - C10 Aliphatics	EPA 5030A	WADOE VPH	5	ND	ND	ND	NC	
C10 - C12 Aliphatics	EPA 5030A	WADOE VPH	5	6	5	5.5	18	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	6	ND	6	NC	
C10 - C12 Aromatics	EPA 5030A	WADOE VPH	5	13	12	12.5	8	
Methyl *tert*-Butyl Ether	EPA 5030A	8021B	0.5	ND	ND	ND	NC	
Benzene	EPA 5030A	8021B	0.05	ND	ND	ND	NC	
Toluene	EPA 5030A	8021B	0.1	ND	ND	ND	NC	
Ethylbenzene	EPA 5030A	8021B	0.1	ND	ND	ND	NC	
m,p-Xylenes	EPA 5030A	8021B	0.1	ND	ND	ND	NC	
o-Xylene	EPA 5030A	8021B	0.1	ND	ND	ND	NC	
Naphthalene	EPA 5030A	8021B	0.5	ND	ND	ND	NC	

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99
Date Extracted: 6/16/99
Date Analyzed: 6/19/99

Matrix Spike Summary
Volatile Petroleum Hydrocarbons

Sample Name: TP4-10
Lab Code: K9903732-006MS
Test Notes:

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

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	11	ND	15	136	70-130	A
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	11	26	21	NA	70-130	
Benzene	EPA 5030A	8021B	0.05	11	ND	9.1	83	70-130	
Toluene	EPA 5030A	8021B	0.1	11	ND	9.1	83	70-130	
Ethylbenzene	EPA 5030A	8021B	0.1	11	0.1	9.3	84	70-130	

NA Not Applicable; see case narrative.
A Outside acceptance limits; see case narrative.

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99
Date Extracted: 6/16/99
Date Analyzed: 6/19/99

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Petroleum Hydrocarbons

Sample Name: TP4-10
Lab Code: K9903732-006MS, K9903732-006DMS
Test Notes:

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

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	5	11	11	ND	15	16	136	145	70-130	6	A
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	5	11	11	26	21	24	NA	NA	70-130	NC	
Benzene	EPA 5030A	8021B	0.05	11	11	ND	9.1	9.3	83	85	70-130	2	
Toluene	EPA 5030A	8021B	0.1	11	11	ND	9.1	9.1	83	83	70-130	<1	
Ethylbenzene	EPA 5030A	8021B	0.1	11	11	0.1	9.3	9.5	84	85	70-130	2	

NA Not Applicable; see case narrative.
A Outside acceptance limits; see case narrative.

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: AJ86
LCS Matrix: Soil

Service Request: K9903732
Date Collected: NA
Date Received: NA
Date Extracted: 6/16/99
Date Analyzed: 6/18/99

Laboratory Control Sample Summary
Volatile Petroleum Hydrocarbons

Sample Name: Lab Control Sample
Lab Code: K990616-LCS
Test Notes:

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

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	6.0	7.8	130	70-130	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	6.0	6.0	100	70-130	
Benzene	EPA 5030A	8021B	6.0	5.6	93	70-130	
Toluene	EPA 5030A	8021B	6.0	5.5	92	70-130	
Ethylbenzene	EPA 5030A	8021B	6.0	5.5	92	70-130	

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	NA	**Date Collected:**	5/26/99
Sample Matrix:	Water	**Date Received:**	6/11/99
		Date Extracted:	6/18/99
		Date Analyzed:	6/18/99

Surrogate Recovery Summary
Volatile Petroleum Hydrocarbons

Prep Method:	EPA 5030A	Units:	PERCENT
Analysis Method:	WADOE VPH	Basis:	NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene (FID)
Trip Blank	K9903732-011		83
Method Blank	K990618-MB		83
Lab Control Sample	K990618-LCS		85
Lab Control Sample	K990618-DLCS		84

CAS Acceptance Limits: 60-140

Approved By: _____ Date: 6/23/99

SUR1/020597p
03732VOA.JW1 - SUR (FID) 6/25/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	NA	**Date Collected:**	5/26/99
Sample Matrix:	Water	**Date Received:**	6/11/99
		Date Extracted:	6/18/99
		Date Analyzed:	6/18/99

Surrogate Recovery Summary
Volatile Petroleum Hydrocarbons

Prep Method:	EPA 5030A		Units:	PERCENT
Analysis Method:	8021B		Basis:	NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene (PID)
Trip Blank	K9903732-011		87
Method Blank	K990618-MB		87
Lab Control Sample	K990618-LCS		86
Lab Control Sample	K990618-DLCS		85

CAS Acceptance Limits: 60-140

Approved By: _____ Date: 6/28/99

SUR1/020597p
03732VOA.JW1 - SUR (PID) 6/25/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: NA
LCS Matrix: Water

Service Request: K9903732
Date Collected: NA
Date Received: NA
Date Extracted: 6/18/99
Date Analyzed: 6/18/99

Laboratory Control Sample Summary
Volatile Petroleum Hydrocarbons

Sample Name: Lab Control Sample
Lab Code: K990618-LCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	100	118	118	70-130	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	100	124	124	70-130	
Benzene	EPA 5030A	8021B	100	103	103	70-130	
Toluene	EPA 5030A	8021B	100	101	101	70-130	
Ethylbenzene	EPA 5030A	8021B	100	101	101	70-130	

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: NA
LCS Matrix: Water

Service Request: K9903732
Date Collected: NA
Date Received: NA
Date Extracted: 6/18/99
Date Analyzed: 6/18/99

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Volatile Petroleum Hydrocarbons

Sample Name: Lab Control Sample
Lab Code: K990618-LCS, K990618-DLCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
C6 - C8 Aliphatics	EPA 5030A	WADOE VPH	100	100	118	119	118	119	70-130	<1	
C8 - C10 Aromatics	EPA 5030A	WADOE VPH	100	100	124	127	124	127	70-130	2	
Benzene	EPA 5030A	8021B	100	100	103	105	103	105	70-130	2	
Toluene	EPA 5030A	8021B	100	100	101	103	101	103	70-130	2	
Ethylbenzene	EPA 5030A	8021B	100	100	101	103	101	103	70-130	2	

Approved By: _____ Date: 6/28/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Analytical Resources Inc.
Project: AJ86
Sample Matrix: Soil

Service Request: K9903732
Date Collected: 6/8/99
Date Received: 6/11/99
Date Extracted: 6/17/99
Date Analyzed: 6/19-20/99

Surrogate Recovery Summary
Washington DOE Method EPH

Prep Method: EPA 3550B
Analysis Method: WADOE EPH

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1-Chlorohexadecane
TP2-10	K9903732-001		53
TP2-11	K9903732-002		56
TP3-8	K9903732-003		51
TP3-10	K9903732-004		50
TP4-8	K9903732-005		52
TP4-10	K9903732-006		51
TP5-8	K9903732-007		57
TP5-10	K9903732-008		50
TP6-8	K9903732-009		50
TP6-10	K9903732-010		53
TP5-10	K9903732-008MS		50
TP5-10	K9903732-008DMS		49 A
Lab Control Sample	K990617-SL		63
Method Blank	K990617-SB		62

CAS Acceptance Limits: 50-150

A Outside acceptance limits; see case narrative.

Approved By: MMarthe Date: 6/25/99

SUR1/061197p
03732PHC.LL1 - SUR 6/25/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99
		Date Extracted:	6/17/99
		Date Analyzed:	6/24/99

Surrogate Recovery Summary
Washington DOE Method EPH

Prep Method:	EPA 3550B	Units:	PERCENT
Analysis Method:	WADOE EPH	Basis:	NA

Sample Name	Lab Code	Test Notes	Percent Recovery o-Terphenyl
TP2-10	K9903732-001		73
TP2-11	K9903732-002		66
TP3-8	K9903732-003		96
TP3-10	K9903732-004		80
TP4-8	K9903732-005		76
TP4-10	K9903732-006		79
TP5-8	K9903732-007		78
TP5-10	K9903732-008		83
TP6-8	K9903732-009		73
TP6-10	K9903732-010		83
TP5-10	K9903732-008MS		94
TP5-10	K9903732-008DMS		100
Lab Control Sample	K990617-SL		140
Method Blank	K990617-SB		73

CAS Acceptance Limits: 50-150

Approved By: mth Date: 6/29/99

SUR1/061197p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

ient:	Analytical Resources Inc.	**Service Request:**	K9903732
roject:	AJ86	**Date Collected:**	6/8/99
Sample Matrix:	Soil	**Date Received:**	6/11/99
		Date Extracted:	6/17/99
		Date Analyzed:	6/20/99

Matrix Spike/Duplicate Matrix Spike Summary
Washington DOE Method EPH

Sample Name:	TP5-10	Units:	mg/Kg (ppm)
ab Code:	K9903732-008MS, K9903732-008DMS	Basis:	Dry
est Notes:			

									Percent Recovery				
				Spike Level		Sample	Spike Result				CAS Acceptance	Relative Percent	Result
nalyte	**Prep Method**	**Analysis Method**	**MRL**	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**	**Notes**
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	5	40	40	574	NA	NA	NC	NC	50-150	-	A
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	5	100	100	292	NA	NA	NC	NC	50-150	-	A

Outside acceptance limits; see case narrative.

Approved By: MMarthe Date: 6/25/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Analytical Resources Inc.	**Service Request:**	K9903732
Project:	AJ86	**Date Collected:**	NA
LCS Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	6/17/99
		Date Analyzed:	6/20-24/99

Laboratory Control Sample Summary
Washington DOE Method EPH

Sample Name:	Lab Control Sample	Units:	mg/Kg (ppm)
Lab Code:	K990617-SL	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
C12 - C16 Aliphatics	EPA 3550B	WADOE EPH	40	31	78	50-150	
C16 - C21 Aromatics	EPA 3550B	WADOE EPH	50	58	116	50-150	

Approved By: MMarthe Date: 6/25/99

APPENDIX B

Chain of Custody Information

Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form

Project/Client ARI Work Order K99 3732

Cooler received on 6/11/99 and opened on 6/11/99 by DW

1. Were custody seals on outside of cooler? YES (NO)
   If yes, how many and where? _____
2. Were seals intact and signature & date correct? ~~YES NO~~
3. COC # _____ _____ _____ _____ _____
   Temperature of cooler(s) upon receipt: 13.5 _____ _____ _____ _____
   Temperature Blank: NP _____ _____ _____ _____
4. Were custody papers properly filled out (ink, signed, etc.)? (YES) NO
5. Type of packing material present Bubble wrap
6. Did all bottles arrive in good condition (unbroken)? (YES) NO
7. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
8. Did all bottle labels and tags agree with custody papers? (YES) NO
9. *Were the correct types of bottles used for the tests indicated?* (YES) NO
10. Were all of the preserved bottles received at the lab with the appropriate pH? ~~YES NO~~
11. Were VOA vials checked for absence of air bubbles, and if present, noted below? (YES) NO
12. Did the bottles originate from CAS/K or a branch laboratory? _____ YES (NO)

Explain any discrepancies _____

Samples that required preservation or received outside of temperature range at the lab(circle)

Sample ID	Reagent	Volume	Lot Number	Initials

Soil Technology, Inc.

7865 NE Day Road West • Bainbridge Island, WA 98110-4207
(206) 842-8977 • Toll Free: (800) 546-5022 • Fax: (206) 842-9014

Facsimile Cover Sheet

To: Dean Malte
Company: Kennedy Jenks Consultants.
Phone: 253-874-0555
Fax: 253-952-3435
Job: 1244

From: Tony Parkins

Date: 6-24-99
No. of Pages: 3
(including this cover page)

Comments: Dean, following are the test results you requested. Hard copy will follow in the mail. Please call if you have any questions.

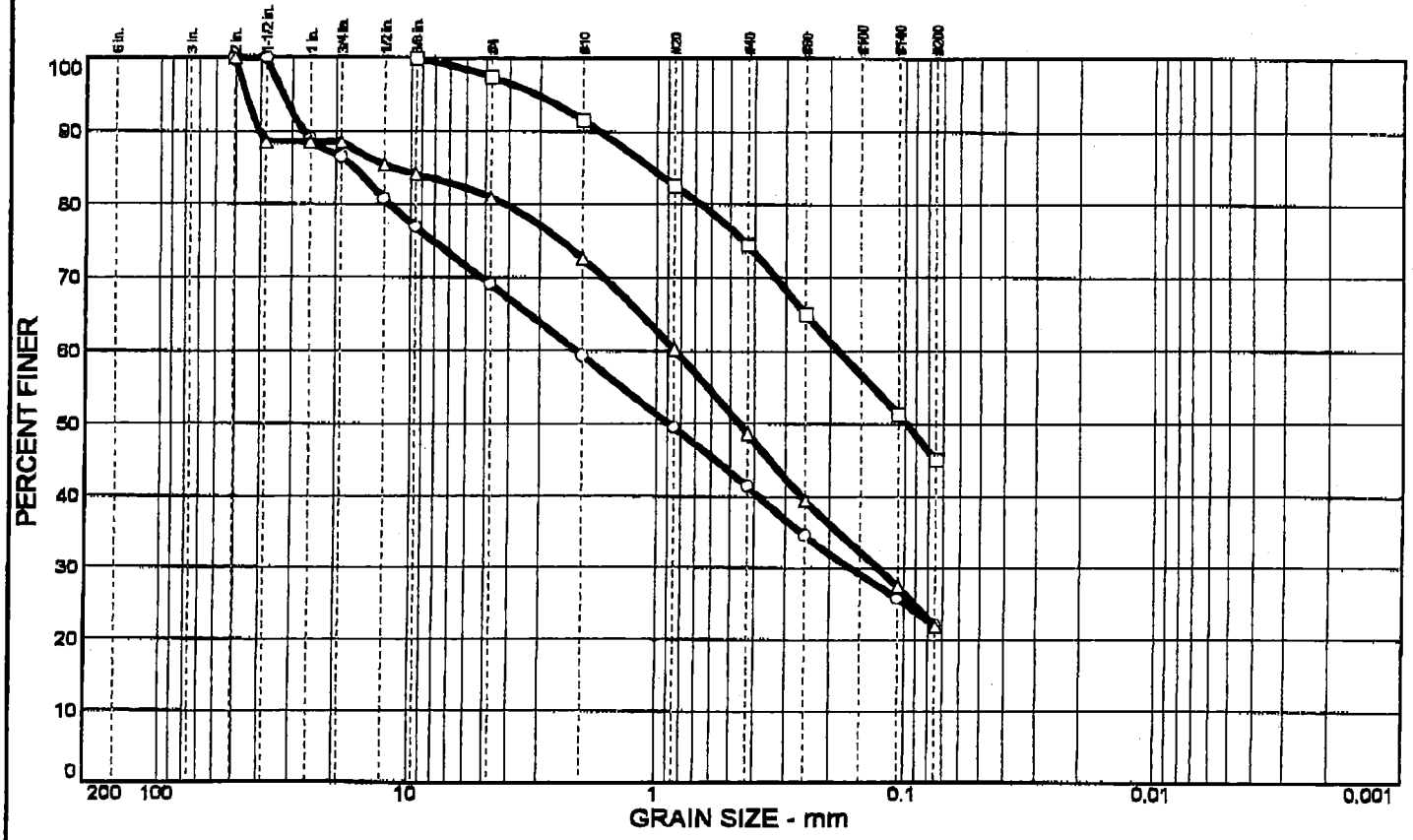
If you experience problems receiving any or all of the pages faxed to you, please call us for re-transmission.

Kennedy Jenks Consultants
996022.09 Leavenworth

Remolded Unit Weight and Moisture Contents
Table 1

Sample Number	Wet Density pcf	Dry Density pcf	Moisture Content %
Tp1-1	129	123	5
Tp1-4	130	113	15
Tp1-9	143	130	9

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		31.0	47.1			SM			
□		2.6	52.4			SM			
△		19.1	59.1			SM			

SIEVE inches size	PERCENT FINER ○	□	△
2	100.0		100.0
1.5	100.0		88.5
1	88.9		88.5
.75	86.4		88.5
.5	80.7		85.4
.375	76.9	100.0	84.1
GRAIN SIZE			
D_{60}	2.11	0.184	0.839
D_{30}	0.164		0.127
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	69.0	97.4	80.9
#10	59.4	91.5	72.6
#20	49.5	82.6	60.2
#40	41.4	74.4	48.7
#60	34.5	65.0	39.5
#140	25.7	51.3	27.4
#200	21.9	45.0	21.8

SOIL DESCRIPTION

○ Silty sand with gravel

□ Silty sand

△ Silty sand with gravel

REMARKS:

○ Classification based on grainsize only.

□ Classification based on grainsize only.

△ Classification based on grainsize only.

○ Source: TP-1	Sample No.: 1	Elev./Depth:
□ Source: TP-1	Sample No.: 4	Elev./Depth:
△ Source: TP-1	Sample No.: 9	Elev./Depth:

SOIL TECHNOLOGY, INC.

Client: Kennedy Jenks Consultants

Project: 996022.09 Leavenworth

Project No.: J-1244 Plate 1

BNSF Leavenworth	996022.1
Sample Number:	TP2-10

Worksheet:

Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*

1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."
3. Hazard quotients for individual substances or fractions cannot exceed 1.0
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.
6. The risk for the total cannot exceed 1x10E-05 for any land use.
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.02	0.5	0.026
EC >6 - 8	3									0.01	0.06	0.003
EC >8 -10	3									0.01	0.004	0.0002
EC >10 -12	15									0.06	0.0014	0.00007
EC >12 -16	100									0.30	0.00017	0.00001
EC >16 - 21	89									0.19	0.0000002	0.000000
Total aliphatic	212	0.06		0.04		0.01		0.00				
Aromatics												
EC >8 - 10	3									0.01	0.8	0.040
EC >10 - 12	18									0.08	2.0	0.102
EC >12 - 16	24									0.09	0.55	0.027
EC >16 - 21	54									0.17	0.086	0.0043
EC >21 - 35	22									0.05	0.00036	0.0000
Total aromatic	121	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.035		7.3		2.56E-07		6.39E-08		1.95E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	121	0.03		0.05		0.01		0.00				
Total				**0.09**	**2.56E-07**	**0.02**	**6.39E-08**	**0.00**	**1.95E-08**	**1.00000**		**0.2**

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

BNSF Leavenworth	996022.1											
Sample Number:	TP2-11											

Worksheet:

Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*

1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."
3. Hazard quotients for individual substances or fractions cannot exceed 1.0
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.
6. The risk for the total cannot exceed 1x10E-05 for any land use.
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.03	0.9	0.044
EC >6 - 8	3									0.03	0.11	0.005
EC >8 -10	3									0.02	0.007	0.0003
EC >10 -12	10									0.06	0.0017	0.00008
EC >12 -16	51									0.26	0.00015	0.00001
EC >16 - 21	27									0.10	0.0000001	0.000000
Total aliphatic	96	0.06		0.02		0.00		0.00				
Aromatics												
EC >8 - 10	6									0.05	3.3	0.167
EC >10 - 12	13									0.10	2.6	0.129
EC >12 - 16	16									0.11	0.64	0.032
EC >16 - 21	28									0.15	0.077	0.0039
EC >21 - 35	18									0.08	0.00051	0.0000
Total aromatic	81	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.035		7.3		2.56E-07		6.39E-08		1.95E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	81	0.03		0.03		0.01		0.00				
Total				**0.05**	**2.56E-07**	**0.01**	**6.39E-08**	**0.00**	**1.95E-08**	**1.00000**		**0.4**

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

BNSF Leavenworth	996022.1											
Sample Number:	TP3-8											
Worksheet:												
Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*												
1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.												
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."												
3. Hazard quotients for individual substances or fractions cannot exceed 1.0												
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0												
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.												
6. The risk for the total cannot exceed 1x10E-05 for any land use.												
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.												
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.												

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.03	0.8	0.038
EC >6 - 8	3									0.02	0.09	0.005
EC >8 -10	3									0.02	0.006	0.0003
EC >10 -12	7									0.04	0.0010	0.00005
EC >12 -16	49									0.22	0.00013	0.00001
EC >16 - 21	52									0.17	0.0000002	0.000000
Total aliphatic	116	0.06		0.02		0.01		0.00				
Aromatics												
EC >8 - 10	7									0.05	3.4	0.168
EC >10 - 12	12									0.08	2.0	0.102
EC >12 - 16	18									0.11	0.62	0.031
EC >16 - 21	42									0.20	0.100	0.0050
EC >21 - 35	19									0.07	0.00046	0.0000
Total aromatic	98	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.035		7.3		2.56E-07		6.39E-08		1.95E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	98	0.03		0.04		0.01		0.00				
Total				**0.06**	**2.56E-07**	**0.02**	**6.39E-08**	**0.00**	**1.95E-08**	**1.00000**		**0.3**

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

BNSF Leavenworth	996022.1											
Sample Number:	TP3-10											
Worksheet:												
Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*												
1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.												
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."												
3. Hazard quotients for individual substances or fractions cannot exceed 1.0												
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0												
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.												
6. The risk for the total cannot exceed 1x10E-05 for any land use.												
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.												
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.												
1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.01	0.2	0.010
EC >6 - 8	3									0.01	0.02	0.001
EC >8 -10	5									0.01	0.003	0.0001
EC >10 -12	44									0.06	0.0016	0.00008
EC >12 -16	243									0.28	0.00017	0.00001
EC >16 - 21	200									0.17	0.0000002	0.000000
Total aliphatic	497	0.06		0.10		0.03		0.00				
Aromatics												
EC >8 - 10	17									0.03	2.1	0.106
EC >10 - 12	83									0.15	3.7	0.184
EC >12 - 16	61									0.09	0.54	0.027
EC >16 - 21	135									0.16	0.083	0.0042
EC >21 - 35	29									0.03	0.00018	0.0000
Total aromatic	325	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.035		7.3		2.56E-07		6.39E-08		1.95E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	325	0.03		0.14		0.03		0.00				
Total				**0.24**	**2.56E-07**	**0.06**	**6.39E-08**	**0.01**	**1.95E-08**	**1.00000**		**0.3**
*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways:												
"direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water												
must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L,												
there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.												

BNSF Leavenworth	996022.1
Sample Number:	TP4-8

Worksheet:

Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*

1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."
3. Hazard quotients for individual substances or fractions cannot exceed 1.0
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.
6. The risk for the total cannot exceed 1x10E-05 for any land use.
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.01	0.2	0.008
EC >6 - 8	3									0.00	0.02	0.001
EC >8 -10	12									0.02	0.005	0.0003
EC >10 -12	71									0.08	0.0020	0.00010
EC >12 -16	343									0.30	0.00018	0.00001
EC >16 - 21	260									0.17	0.0000002	0.000000
Total aliphatic	691	0.06		0.14		0.04		0.00				
Aromatics												
EC >8 - 10	30									0.04	2.9	0.143
EC >10 - 12	77									0.10	2.6	0.131
EC >12 - 16	79									0.09	0.54	0.027
EC >16 - 21	165									0.15	0.078	0.0039
EC >21 - 35	38									0.03	0.00018	0.0000
Total aromatic	389	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.088		7.3		6.42E-07		1.61E-07		4.90E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	389	0.03		0.16		0.04		0.00				
Total				**0.31**	**6.42E-07**	**0.08**	**1.61E-07**	**0.01**	**4.90E-08**	**1.00000**		**0.3**

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

BNSF Leavenworth	996022.1
Sample Number:	TP4-10

Worksheet:

Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*

1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."
3. Hazard quotients for individual substances or fractions cannot exceed 1.0
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.
6. The risk for the total cannot exceed 1x10E-05 for any land use.
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.01	0.2	0.010
EC >6 - 8	3									0.01	0.02	0.001
EC >8 -10	9									0.02	0.005	0.0003
EC >10 -12	57									0.08	0.0021	0.00011
EC >12 -16	249									0.29	0.00017	0.00001
EC >16 - 21	176									0.15	0.0000002	0.000000
Total aliphatic	496	0.06		0.10		0.03		0.00				
Aromatics												
EC >8 - 10	26									0.05	3.3	0.163
EC >10 - 12	70									0.12	3.1	0.156
EC >12 - 16	67									0.10	0.60	0.030
EC >16 - 21	119									0.14	0.074	0.0037
EC >21 - 35	28									0.03	0.00018	0.0000
Total aromatic	310	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.035		7.3		2.56E-07		6.39E-08		1.95E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	310	0.03		0.13		0.03		0.00				
Total				**0.23**	**2.56E-07**	**0.06**	**6.39E-08**	**0.01**	**1.95E-08**	**1.00000**		**0.4**

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

BNSF Leavenworth	996022.1											
Sample Number:	TP5-8											
Worksheet:												
Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*												
1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.												
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."												
3. Hazard quotients for individual substances or fractions cannot exceed 1.0												
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0												
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.												
6. The risk for the total cannot exceed 1x10E-05 for any land use.												
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.												
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.												
1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	13									0.01	0.2	0.012
EC >6 - 8	13									0.01	0.03	0.001
EC >8 -10	31									0.01	0.004	0.0002
EC >10 -12	212									0.07	0.0019	0.00009
EC >12 -16	1080									0.30	0.00018	0.00001
EC >16 - 21	802									0.16	0.0000002	0.000000
Total aliphatic	2150	0.06		0.45		0.11		0.01				
Aromatics												
EC >8 - 10	92									0.04	2.7	0.137
EC >10 - 12	260									0.11	2.8	0.138
EC >12 - 16	300									0.11	0.64	0.032
EC >16 - 21	540									0.16	0.080	0.0040
EC >21 - 35	80									0.02	0.00012	0.0000
Total aromatic	1272	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.068		7.3		4.96E-07		1.24E-07		3.78E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	1272	0.03		0.53		0.13		0.01				
Total				0.98	4.96E-07	0.24	1.24E-07	0.02	3.78E-08	1.00000		0.3
*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways:												
"direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water												
must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L,												
there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.												

BNSF Leavenworth	996022.1											
Sample Number:	TP5-10											

Worksheet:

Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*

1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."
3. Hazard quotients for individual substances or fractions cannot exceed 1.0
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.
6. The risk for the total cannot exceed 1x10E-05 for any land use.
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	13									0.01	0.4	0.020
EC >6 - 8	13									0.01	0.05	0.002
EC >8 -10	22									0.02	0.005	0.0003
EC >10 -12	128									0.07	0.0019	0.00010
EC >12 -16	574									0.26	0.00016	0.00001
EC >16 - 21	400									0.14	0.0000001	0.000000
Total aliphatic	1149	0.06		0.24		0.06		0.01				
Aromatics												
EC >8 - 10	75									0.06	3.7	0.186
EC >10 - 12	240									0.17	4.2	0.212
EC >12 - 16	168									0.10	0.60	0.030
EC >16 - 21	292									0.14	0.072	0.0036
EC >21 - 35	42									0.02	0.00011	0.0000
Total aromatic	817	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.05		7.3		3.65E-07		9.13E-08		2.78E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	817	0.03		0.34		0.09		0.01				
Total				**0.58**	**3.65E-07**	**0.14**	**9.13E-08**	**0.01**	**2.78E-08**	**1.00000**		**0.5**

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

BNSF Leavenworth	996022.1											
Sample Number:	TP6-8											
Worksheet:												
Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*												
1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.												
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."												
3. Hazard quotients for individual substances or fractions cannot exceed 1.0												
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0												
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.												
6. The risk for the total cannot exceed 1x10E-05 for any land use.												
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.												
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.												
1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.01	0.1	0.007
EC >6 - 8	3									0.00	0.02	0.001
EC >8 -10	10									0.01	0.004	0.0002
EC >10 -12	71									0.07	0.0019	0.00009
EC >12 -16	368									0.30	0.00018	0.00001
EC >16 - 21	269									0.16	0.0000002	0.000000
Total aliphatic	723	0.06		0.15		0.04		0.00				
Aromatics												
EC >8 - 10	24									0.03	2.1	0.107
EC >10 - 12	95									0.12	3.0	0.150
EC >12 - 16	90									0.10	0.57	0.029
EC >16 - 21	186									0.16	0.082	0.0041
EC >21 - 35	36									0.02	0.00016	0.0000
Total aromatic	431	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.043		7.3		3.14E-07		7.85E-08		2.39E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	431	0.03		0.18		0.04		0.00				
Total				**0.33**	**3.14E-07**	**0.08**	**7.85E-08**	**0.01**	**2.39E-08**	**1.00000**		**0.3**
*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways:												
"direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water												
must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L,												
there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.												

BNSF Leavenworth	996022.1											
Sample Number:	TP6-10											

Worksheet:

Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*

1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."
3. Hazard quotients for individual substances or fractions cannot exceed 1.0
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.
6. The risk for the total cannot exceed 1x10E-05 for any land use.
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	3									0.00	0.1	0.005
EC >6 - 8	3									0.00	0.01	0.001
EC >8 -10	14									0.01	0.004	0.0002
EC >10 -12	95									0.07	0.0019	0.00010
EC >12 -16	489									0.30	0.00018	0.00001
EC >16 - 21	357									0.16	0.0000002	0.000000
Total aliphatic	960	0.06		0.20		0.05		0.00				
Aromatics												
EC >8 - 10	29									0.03	2.0	0.098
EC >10 - 12	99									0.09	2.4	0.118
EC >12 - 16	133									0.11	0.64	0.032
EC >16 - 21	276									0.18	0.092	0.0046
EC >21 - 35	44									0.02	0.00015	0.0000
Total aromatic	581	0.03										
Benzene			0.029		0.00E+00		0.00E+00		0.00E+00			
c-PAHs	0.046		7.3		3.36E-07		8.40E-08		2.56E-08			
Ethylbenzene		0.10										
Toluene		0.20										
Xylenes		2.00										
Total aromatic:+B-E-X	581	0.03		0.24		0.06		0.01				
Total				**0.44**	**3.36E-07**	**0.11**	**8.40E-08**	**0.01**	**2.56E-08**	**1.00000**		**0.3**

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

Groundwater Sampling Data - Well I.D. MW-5

Project Glacier Park Inn
Job No 5802
Project Manager
Field Reps A. Wood

Date/Time Sampled 2/19/98
Tidally Influenced Yes ☐ No ☐
Well Depth in Feet
Screened Interval in Feet 61-76

① **Purging Data/Field Measurements:** *All Measurements Relative to Top of Casing (TOC)*

Well Depth 75.9
Depth to Sediment (DTS) in Feet 75.9
Depth to Water (DTW) in Feet 64.16
(DTS - DTW) 10.64

Casing Volume in Gallons 1.8
[2" diam = x .163 gal/ft 4" diam = x .653 gal/ft]
Purge Volume in Gallons 5.3
Actual Purge in Gallons 5.3

Time	No. of Gallons Purged	pH	Temp in °C	Conduct in	Diss. Oxygen in	Turbidity	Comments: quality, recovery, color, odor, sheen, accumulated silt/sand
Sample: 2:20	5.3	6.96	10.0	—	—	—	Slightly Turbid

Comments:

	Method	Pumping Rate in GPM	Depth of Equip. in Feet
Purge			
Sample			

Bails dry? Yes ☐ No ☒
At no. of casing volumes
Purge Water Disposal Method/Volume:

② **Sampling Data**

Bottle Type	# of Containers	Analyses	Preserv.	Filter

Total number of Bottles
Duplicate Sample I.D MW-2
Field Blank I.D.
Rinseate Sample I.D.

③ **Field Equipment** — **Type/Brand/Serial No./Material/Units**

Pump Type/Tubing Type
Bailer Type
Filter Type
Temp/pH/E.C. meter
Water Level Probe
Other

④ **Well Conditions** OK ☒ Not OK ☐ Explain

79248

Sound Analytical Services, Inc.
ANALYTICAL & ENVIRONMENTAL CHEMISTS
4813 Pacific Hwy East • Tacoma, WA 98424
(253) 922-2310 • FAX (253) 922-5047
e-mail: SoundL@aol.com

TRANSMITTAL MEMORANDUM

DATE: March 8, 1999

TO: Norm Nielsen
Olympus Environmental, Inc.
P.O. Box 1084
Kent, WA 98035

PROJECT: 5802 Glacier Park West

REPORT NUMBER: 79248

Enclosed are the test results for two samples received at Sound Analytical Services on February 22, 1999.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Analytical Narrative: The relative percent difference value for BTEX compounds for the blank spike analysis was outside of QC acceptance limits. No corrective action was taken due to insufficient sample volume available for reanalysis.

The percent recovery of o-terphenyl (surrogate) for the WTPH-D analysis was outside of QC acceptance limits. No corrective action was taken due to insufficient sample volume available for reanalysis.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Tom Boyden
Project Manager

SOUND ANALYTICAL SERVICES, INC.

Client Name	Olympus Environmental, Inc.
Client ID:	MW-3
Lab ID:	79248-01
Date Received:	2/22/99
Date Prepared:	2/26/99
Date Analyzed:	2/26/99
% Solids	-
Dilution Factor	1

Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
Trifluorotoluene	94		63	138
Bromofluorobenzene	136		41	157

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	ND	0.001	0.00064	
Toluene	ND	0.001	0.00051	
Ethylbenzene	ND	0.001	0.00037	
m&p-Xylene	ND	0.002	0.00083	
o-Xylene	ND	0.001	0.00063	

SOUND ANALYTICAL SERVICES, INC.

Client Name	Olympus Environmental, Inc.
Client ID:	MW-3
Lab ID:	79248-01
Date Received:	2/22/99
Date Prepared:	2/26/99
Date Analyzed:	2/26/99
% Solids	-
Dilution Factor	1

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
Trifluorotoluene	92		50	150
Bromofluorobenzene	99		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	ND	0.1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	Olympus Environmental, Inc.
Client ID:	MW-3
Lab ID:	76248-01
Date Received:	2/22/99
Date Prepared:	2/24/99
Date Analyzed:	3/4/99
% Solids	-
Dilution Factor	5

Diesel by WTPH-D Modified with Silica Gel Cleanup

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-terphenyl	80		50	150

Analyte	Result (mg/L)	PQL	MDL	Flags
Diesel (>nC12-nC24)	ND	0.25	0.13	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1713
Date Received:	-
Date Prepared:	2/26/99
Date Analyzed:	2/26/99
% Solids	-
Dilution Factor	1

Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
Trifluorotoluene	91		63	138
Bromofluorobenzene	130		41	157

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	ND	0.001	0.00084	
Toluene	ND	0.001	0.00051	
Ethylbenzene	ND	0.001	0.00037	
m&p-Xylene	ND	0.002	0.00063	
o-Xylene	ND	0.001	0.00083	

8

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1940
Date Received:	-
Date Prepared:	2/24/99
Date Analyzed:	3/4/99
% Solids	-
Dilution Factor	5

Diesel by WTPH-D Modified with Silica Gel Cleanup

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-terphenyl	75		60	150

Analyte	Result (mg/L)	PQL	MDL	Flags
Diesel (>nC12-nC24)	ND	0.25	0.13	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	DI1940
Date Prepared:	2/24/99
Date Analyzed:	3/4/99
QC Batch ID:	DI1940

Diesel by WTPH-D Modified with Silica Gel Cleanup

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	0	5.01	3.67	73.3	3.13	62.4	-16	

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (253) 922-2310 - FAX: (253) 922-5047

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be ≤ 40%.

C2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 40%. The higher result was reported unless anomalies were noted.

M: GC/MS confirmation was performed. The result derived from the original analysis was reported.

D: The reported result for this analyte was calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL Method Detection Limit

N: See analytical narrative.

ND Not Detected

PQL Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.

X2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

X4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5 Matrix spike recovery was not determined due to the required dilution.

X6 Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8. Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.