INDEPENDENT REMEDIAL ACTION SOIL BIOREMEDIATION CLEANUP REPORT

BIRCHMOUNT ORCHARD FACILITY 3717 CRESTVIEW DRIVE WENATCHEE, WASHINGTON

Prepared for

WELLS & WADE FRUIT COMPANY DEPARTMENT OF PUBLIC WORKS

Prepared By

ERM-ENVIROCLEAN NORTHWEST, INCORPORATED

September 1994

AUG 7 1935

an an ann an tha an an an tha an an an tha Tha parairtí an tha Tha an tha an

23 September 1994

Wells and Wade Fruit Company P.O. Box 259 Wenatchee, Washington 98807

Attention: Mr. Martin Barron

SUBJECT: Independent Remedial Action - Soil Bioremediation Cleanup Report for the Birchmount Orchards Facility, Wenatchee, Washington

Dear Mr. Barron:

Attached, please find three copies of the Independent Remedial Action Report for the Birchmount leaking underground storage tank project. A copy of this report should be forwarded to the Central Division of the Washington State Department of Ecology Toxics Cleanup Program in Yakima, Washington.

Should you have any questions regarding this report, please call me at (206) 827-9574.

Sincerely,

ERM-ENVIROCLEAN NORTHWEST, INC.

Gary L. Galloway President



2821 Northup Way Suite 100 Bellevue, WA 98004-1439 (206) 827-9440 (206) 827-2408 (Fax)

A member of the Environmental Resources Management Group

7 1995

Alig

af an der

BIRCHMOUNT ORCHARDS FACILITY Wenatchee, Washington

INDEPENDENT REMEDIAL ACTION SOIL BIOREMEDIATION CLEANUP REPORT

Prepared for

Wells & Wade

Prepared by

ERM-EnviroClean Northwest, Inc.

September 1994

CONTENTS

,

EXECUTIV	E SUMMARY	ES-1
1.0	INTRODUCTION	1
1.1	GOALS AND OBJECTIVES	1
2.0	SITE BACKGROUND	2
2.1	SITE LOCATION AND SETTING	2
2.2	TOPOGRAPHY AND GEOLOGY	2
2.3	PREVIOUS INVESTIGATIONS	3
3.0	SITE REMEDIATION	4
3.1	BIOTREATMENT PAD CONSTRUCTION	4
3.2	BIOREMEDIATION	5
4.0	SAMPLING AND ANALYSIS	6
4.1	SOIL SAMPLING	6
4,2	CHEMICAL ANALYSIS	8
4.3	QUALITY ASSURANCE/QUALITY CONTROL	8
4.4	SAMPLING PROTOCOLS AND PROCEDURES	8
5.0	CONCLUSIONS AND RECOMMENDATIONS	10

TABLES

,

ł

1	SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA BIOREMEDIATION PAD BASE SAMPLES	A - following page 6
2	SUMMARY OF SOIL CHEMICAL ANALYTICAL DAT. BBIOREMEDIATION PROGRESS SAMPLES	A - following page 7
3	SUMMARY OF SOIL CHEMICAL ANALYTICAL DAT TEMPORARY SOIL STOCKPILE BASE SAMPLES	A - following page 7

FIGURES

1	SITE VICINITY MAP	following page 2
2	SITE PLAN MAP	following page 2
3	BIOREMEDIATION STOCKPILE LOCATIONS	following page 4

APPENDIX

A CHEMICAL ANALYTICAL DATA

EXECUTIVE SUMMARY

The main elements of the remediation project are summarized as follows:

- The range of petroleum hydrocarbons in the soil had been chemically identified using Ecology hydrocarbon-speciation decision tree analysis commonly applied to Leaking Underground Storage Tank (LUST) sites. The analysis indicated that a 100 milligrams per kilogram (mg/kg) cleanup level for gasoline-range hydrocarbons (TPH-G) is appropriate at this site.
- Sampling and chemical analysis has confirmed that the petroleum hydrocarbon-affected soil has been successfully remediated to concentrations of petroleum hydrocarbons less than the MTCA Method A cleanup levels and that petroleum hydrocarbons have not migrated from the treatment pads during treatment.
- Petroleum hydrocarbon-affected soil was identified beneath the former location of a temporary soil stockpile at the site. The hydrocarbons present at this location are not related to release from the stockpile, and likely represent an earlier release in the former debris area cleared prior to the placement of the temporary stockpile.
- Site Health and Safety and Quality Assurance/Quality Control procedures and protocols have been followed and no exceptions have been identified.

1.0 INTRODUCTION

This Bioremediation Closure Report describes environmental restoration at the Wells and Wade Birchmount Orchard facility in Wenatchee, Washington. Three underground storage tanks (USTs) including one 550-gallon steel diesel UST and two 550-gallon steel gasoline USTs were removed from the site in 1993. Petroleumimpacted soil with concentrations of petroleum hydrocarbons greater than the Model Toxics Control Act (MTCA) Method A cleanup levels was encountered during the UST removal. On 22 November, 1993 an Interim Status Report documenting the removal of the USTs and excavation of petroleum-impacted soil was submitted to the Washington State Department of Ecology (WDOE) Central Region in Yakima, Washington [Sage Earth Sciences, Inc. (Sage), 1993].

Sage excavated approximately 600 cubic yards of petroleum-impacted soil from the vicinity of the USTs and stockpiled the soil at the site. In February, 1994 ERM-EnviroClean Northwest, Inc. (EC-NW) was contracted to provide additional site characterization and remedial services at the site. Additional site characterization activities completed by EC-NW are documented in the Interim Supplemental Site Characterization/Cleanup Report submitted to WDOE Central Region in July 1994 (EC-NW, 1994).

Bioremediation was chosen as the most feasible alternative for treatment of the excavated petroleum-impacted soils. EC-NW provided project management at the site, which included overall coordination and oversight during the environmental restoration and the documentation of the cleanup.

1.1

GOALS AND OBJECTIVES

In accordance with WDOE's restoration goals to provide a costeffective, permanent solution to the contamination, the owner selected bioremediation as a remedial method. The on-site bioremediation of the petroleum-impacted soils was completed in engineered biotreatment cells designed to mitigate the migration of these contaminants to other areas. Also, the soil under these affected soils has been sampled and chemically analyzed to confirm that the soil beneath the treatment cell has not been adversely affected by these contaminants.

MTCA Method A soil cleanup standards (100 mg/kg [milligrams per kilogram] gasoline-range hydrocarbons) were targeted as the cleanup levels under this remedial action.

2.0 SITE BACKGROUND

2.1 STIE LOCATION AND SETTING

The site is approximately one mile north of U.S. Highway 97 on Crestview Road in Wenatchee, Washington(*Figure 1, Site Vicinity Map*). The facility's boundaries are Crestview Road on the west, orchard areas owned by Wells & Wade to the north and east, and American Fruit Road to the south.

Structures at the site include an office building, maintenance shop, and equipment storage buildings. *Figure 2*, *Site Plan Map* shows site features, including overhead and underground electrical lines, the location of former USTs, and the new (replacement) UST system. The site has been owned by Wells & Wade Fruit Company since its initial development. Site activities that may have contributed to petroleum impacts to soil and groundwater at the site are limited to the former USTs removed from the vicinity of boring B-4 (*Figure 2*). Adjacent land use consists of orchards and scattered residences.

Wells & Wade Fruit Company operates an agricultural orchard at the site where fruit trees are planted, grown and harvested. As a part of this operation, USTs are used to store fuel for agricultural equipment. The current UST is a vaulted system at the location shown on *Figure 2*.

2.2 TOPOGRAPHY AND GEOLOGY

Topography slopes moderately to the south within the facility area. Intermittent drainage in this semi-arid region is along shallow ditches and gullies. When present, surface water drainage flows toward the High Line Canal, approximately 0.7 miles south of the site. The Wenatchee River is approximately 1.5 miles south and the Columbia River is approximately 2 miles east of the site.

Up to 50 feet of unconsolidated silt, sand, and gravel deposits overlie bedrock in the site vicinity. Bedrock in the site vicinity consists of arkosic sandstone and siltstone.





2.3 PREVIOUS INVESTIGATIONS

In the course of removing USTs, Sage discovered soil suspected to have been impacted by a petroleum release (Sage November, 1993). Sage sampled the soil and the laboratory results confirmed the presence of hydrocarbon-impacted soil.

Sage excavated in the vicinity of the former USTs to a depth of approximately 25 feet and temporarily stockpiled approximately 600 cubic yards of petroleum-impacted soil. No groundwater was encountered in the excavation. Two soil samples collected from the bottom of the excavation contained concentrations of gasoline-range hydrocarbons greater than the MTCA Method A soil cleanup level. Sage backfilled the excavation with clean soil because the available equipment could not excavate deeper, the remaining impacted soil volume appeared to be localized and minor, and the excavation was too deep to safely leave open.

To characterize the vertical extent and nature of the remaining impacted soil, Sage subsequently collected soil samples from borings drilled into and beneath the backfilled soil in the excavation. However, one of these borings unexpectedly encountered ground water.

EC-NW completed a Supplemental Site Characterization in May, 1994. One soil boring (B-5) and two monitoring wells (MW-4 and MW-5) were installed at the site (*Figure 2*). Results of this investigation indicated that subsurface petroleum impacts were limited to the vicinity of the former USTs southward to the location of monitoring well MW-3.

3.0 SITE REMEDIATION

3.1 BIOTREATMENT PAD CONSTRUCTION

Three bioremediation pad areas (Biopad #1, Biopad #2, and Biopad #3) were constructed at the Birchmount Orchards facility to remediate the petroleum-impacted soil excavated from the vicinity of the USTs. Figure 3 shows the location of the bioremediation pads. A bermed revetment was constructed and a geotextile liner was spread over the surface in each area where the contaminated soils were to be placed for treatment. The ground surface below each treatment pad was graded toward the pad's center to effect water flow within the pad away from the perimeter. The earthen berms were constructed at the perimeter to reduce the possibility of overflow of water onto the ground at the perimeter of the pads during heavy precipitation events. The pad liners were fabricated without seams so that the potential for leaks would be minimized. Also, the liners were designed to be tearresistent using a 3-ply reinforced design. The specifications of the liners used at this site were compared against the requirements for liners at soil remediation projects with similar site-specific environmental conditions and the nature of the contaminants to ensure the competence of the liner material.

Using a track dozer and a rubber tire loader, the contaminated material was evenly spread over the three impermeable geofabric liners. The dimensions of the containment units were 38 feet by 87 feet (Biopad #1), 48 feet by 80 feet (Biopad #2) and 45 feet by 95 feet (Biopad #3). Bioremediation-enhancing nutrients were added to the soil during placement on the liner. Water collected in the pad area because of rainfall was allowed to evaporate so that these liquids were not discharged to the ground surface. After the targeted cleanup levels were achieved, the remediated soils were used as fill material at various locations on the Birchmount Orchards property. Soil from Biopad #1 was graded and left in the location of the biopad. Biopad #2 soils were removed to the Biopad #1 area. Biopad #3 soils were used to fill a slope area approximately 1/4 mile southwest of the location of Biopad #3. The location of the filled area is indicated in *Figure 3*.



3.2 BIOREMEDIATION

Baseline information regarding microbial activity and nutrient geochemistry of the contaminated soil at the property was collected prior to the initiation of this project. This information was used to determine the presence of sufficient numbers of hydrocarbondegrading microbes to treat the soil and to determine what additional nutrient additives were necessary, if any, to optimize microbial action. Proper oxygen and nutrient levels in the soil maximize hydrocarbon degradation as microbes break down the contaminants to simpler nontoxic compounds, namely carbon dioxide and water.

The soils were mixed regularly to provide the necessary oxygen to the soils. Also, the soils were periodically chemically analyzed to monitor the decline of concentrations of petroleum compounds. Confirmation sampling and analysis was performed to verify that remediated soils were below the appropriate Ecology cleanup standard levels of 100 ppm gasoline-range hydrocarbons before this remediation program was considered completed. This Independent Remedial Action Report has been prepared to document that the restoration of the excavated soil has been successful and no further action is required under MTCA.

4.0 SAMPLING AND ANALYSIS

The objective of the sampling program was to verify through laboratory chemical analysis that all of the affected materials have been remediated to agency-acceptable levels. The sampling protocols and procedures followed appropriate state and federal guidance documents, primarily EPA SW-846 and Washington State MTCA and LUST recommendations.

Soil samples were collected to characterize soil prior to remediation, to document that the adjacent sediments have not been affected, and to document that the remediation has degraded the petroleum compounds to concentrations less than MTCA Method A cleanup levels. Based on our review of chemical analytical results of soil samples obtained at the site and our field observations, Ecology Method WTPH-G was chosen to characterize the soil during remediation.

4.1 SOIL SAMPLING

Four sets of samples were collected by EC-NW and submitted for laboratory analysis.

<u>Pre-remediation Base Samples</u> - Pre-remediation samples were collected from the soil beneath the location of the bioremediation pads to define the background hydrocarbon concentrations prior to construction and remediation. This data was compared to postremediation samples to verify that the contamination had not leaked from the pad onto the underlying ground surface.

These samples were collected on April 4 and 6, 1994 using a hand auger or similar tool. The top 6 inches of soil at two to three sampling points at each pad location were sampled. The discrete samples were then composited into one sample at Biopads #1 and #2. The soil samples taken from the base of Biopad # 3 were not composited prior to analysis. Three discrete samples were collected from the location of Biopad #1 and two discrete samples were collected from the locations of Biopads #2 and #3.

Chemical analytical results are summarized in Table 1. Laboratory reports, chain-of-custody documentation and a review of laboratory quality assurance/quality control (QA/QC) procedures are included in Appendix A.

<u>Temporary Stockpile Base Samples -</u> Soil samples OP-1 through OP-6 were collected on April 6, 1994 from the top 6 inches of soil

SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA **BIOREMEDIATION PAD BASE SAMPLES BIRCHMOUNT ORCHARDS FACILITY** WENATCHEE, WASHINGTON **TABLE 1**

تصمك الكاماتك مالهما مالاستعدا بالرقابة

									Discol_range
			Depth of	Gasoline-range		д .			
0		Date	Samole	Hvdrocarbons(1)		m)	(mg/kg)		
Admin	1 contion	Sampled	(feet)	(ma/ka)	в	ш	F	×	(mg/kg)
MULLIDAL				~25	<0.050	<0.050	<0.050	<0.050	
61-C	Biopad #1 base	10/1/1				×0.050	<0.050	<0.050	J
B2-C	Biopad #2 base	4/4/94		C-2×			010		15
•	Dionad #3 hase	4/6/94	0-1	<2.5	<0.050	<u>vev.vs</u>	20.02	20.02	
-20				~2 E	<0.050	<0.050	<0.050	<0.050	1
B3-2	Biopad #3 base	4/0/34	-						1
1.00	Rionad #1 base	7/15/94	0-0.5	<2.5	-	-	•		
		7/15/04	0-0 5	<2.5		ι	1	'	7
8 P- 2	Biopag #2 Date	1010111	2.2				1	,	•
	Rinnad #3 base	7/15/94	0-0.5	C'7>	,	ſ		ľ	
	16			100	0.5	20	40	20	200

<u>Notes:</u>

Chemical analytical services provided by Pacific Northern Analytical, Inc. of Redmond, Washington.

By Ecology Method WTPH-G.
 By EPA Method 8020. B = benzene, E = ethylbenzene, T = toluene, and X = total xylenes.
 By Ecology Method WTPH-D.
 mg/kg = milligrams per kilogram
 = not tested

immediately beneath the location of the temporary soil stockpile north of the location of Biopad #1 (see *Figure 3*) to document that petroleumrelated compounds had not leached from the stockpile into the underlying soil. Soil samples EP-1 and WP-1 were also obtained from beneath the location of temporary soil stockpiles near Biopad #3.

Heavy oil-range hydrocarbons were detected at concentrations greater than the MTCA Method A cleanup level in soil sample OP-5. The location of OP-5 was resampled on August 12, 1994 to characterize and confirm the presence of petroleum hydrocarbons. The type of petroleum hydrocarbons, the concentrations present and the presence of discolored soil at the location of OP-5 indicate that the petroleumaffected soil is not related to release from the temporary soil stockpile at that location. It is planned that this soil will be excavated and bioremediated on site in October-November, 1994. A cleanup report for this remedial action will be prepared at the conclusion of the task.

Chemical analytical results are summarized in Table 3. Laboratory reports, chain-of-custody documentation and a review of laboratory quality assurance/quality control (QA/QC) procedures are included in Appendix A.

<u>Remediation Progress Samples -</u> Monitoring of the soil on the bioremediation pads occurred approximately monthly, beginning one month after the soil had been placed on the treatment pad. Samples were collected using a hand auger or other similar method on May 29, June 17, and June 24, 1994. Each bioremediation pad was separated into four quadrants (northwest, southwest, northeast, and southeast), and four discrete samples were obtained from each quadrant. The four discrete samples were composited into one sample for each quadrant of each bioremediation pad. When the chemical analytical results for the soil samples indicated that the cleanup goals were met, the uppermost lift of approximately 1 foot thickness was removed from the treatment pads until 1 foot thickness or less of soil remained on each bioremediation pad.

Sage had reported arsenic concentrations greater than the MTCA Method A cleanup level in a portion of the soils excavated in November, 1993. The suspected arsenic-affected soil was stockpiled at the southern end of Biopad #3 and was sampled separately from the remainder of the stockpile (samples A-1 and A-2). Arsenic was not detected at a concentration greater than the MTCA Method A cleanup level in samples A-1 and A-2.

Chemical analytical results for the soil samples obtained from the bioremediation pads are summarized in Table 2. Laboratory reports,

TABLE 2 SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA BIOREMEDIATION PROGRESS SAMPLES BIRCHMOUNT ORCHARDS FACILITY WENATCHEE, WASHINGTON

		Depth of	Gasoline-range	Total
Sample	Date	Sample	Hydrocarbons(1)	Arsenic(2)
Number	Sampled	(feet)	(mg/kg)	(mg/kg)
3P-1-NW	5/29/94	0-1	<2.5	•
	6/17/94	0-1	3.5	•
3P-1-SW	5/29/94	0-1	<2,5	<u> </u>
	6/17/94	0-1	5.0	
 3P-1-NE	5/29/94	0-1	<2.5	
	6/17/94	0-1	<2.5	-
3P-1-SE	5/29/94	0-1	<2.5	•
	6/17/94	0-1	3.9	-
3P-2-NW	5/29/94	0-1	<2.5	-
	6/17/94	0-1	<2.5	-
3P-2-SW	5/29/94	0-1	<2.5	•
	6/17/94	0-1	5.5	
BP-2-NE	5/29/94	0-1	<2.5	-
	6/17/94	0-1	<2.5	-
BP-2-SE	5/29/94	0-1	<2.5	
	6/17/94	0-1	<2.5	-
BP-3-NW	5/29/94	0-1	<2.5	_
21 0 1117	6/17/94	0-1	<2.5	•
	6/24/94	0-1	3.3	•
BP-3-SW	5/29/94	0.1	<2.5	
	6/17/94	0-1	<2.5	•
	6/24/94	0-1	<2,5	-
BP-3-NE	5/29/94	0-1	<2.5	•
	6/17/94	0-1	<2.5	-
	6/24/94	0-1	<2,5	•
BP-3-SE	5/29/94	0-1	<2.5	· · ·
	6/17/94	0-1	<2.5	-
	6/24/94	0-1	<2.5	-
A-1	6/24/94	0-2.5	<2.5	8.28
A-2	6/24/94	0-2.5	<2.5	7.10
	d A soil cleanup le		. 100	20

Notes:

Chemical analytical services provided by Pacific Northern Analytical of Redmond, Washington. (1) By Ecology Method WTPH-G.

(2) By EPA Method 7060.

mg/kg = milligrams per kilogram

- = not tested

SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA TEMPORARY SOIL STOCKPILE BASE SAMPLES **BIRCHMOUNT ORCHARDS FACILITY** WENATCHEE, WASHINGTON **TABLE 3**

Gasoline-range Hydrocarbons(1)		BELX(2)		הופפורומוואם	
Hydrocarbons(1)				· · · · · · · · · · · · · · · · · · ·	Undrocarhone(4)
		(mg/kg)		Hydrocarbons(3)	
$(\ldots, \ldots, \ldots, \ldots, \ldots)$			×	(ma/ka)	(mg/kg)
(mg/kg)					
	<0.050 <0.0	<0.050 <0.050	0 <0.050	1	88
	<u>)</u>		0.050	1	49
<2.5	V.U>	0000 0000×			6.7
40		50 <0.0	0 0.050		/0
0.32			I 1		52
<2.5		_	-		
1				•	5/6
<.2>	_				000/2/
,	•	'	•	64	101000
1 1 1	1				53
<2.5					
u c	_	0.0		<15	86
C'7>	+				180
205	_	050 40.0	-		
	+-			200	200
100	_	-			
	İ				
 <2.5 <2.5 <2.5 <2.5 <2.5 100 	<0.050	0.050 0.050 0.050 0.050 2.0	0000 0000 0000 0000 0000 0000 0000 0000 0000	 <0.050 /ul>	 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050 <0.050

<u>Notes:</u>

Chemical analytical services provided by Pacific Northern Analytical, Inc. of Redmond, Washington

(1) By Ecology Method WTPH-G.

(2) By EPA Method 8020. B = benzene, E = ethylbenzene, T = toluene, and X = total xylenes.
(3) By Ecology Method WTPH-D.
(4) By Ecology Method WTPH-D Extended.
(5) By Ecology Method WTPH-D Extended.

mg/kg = milligrams per kilogram

- = not tested

chain-of-custody documentation and a review of laboratory quality assurance/quality control (QA/QC) procedures are included in Appendix A.

<u>Post-remediation Base Samples -</u> Representative soil samples were collected from soil beneath the bioremediation pad areas on July 15, 1994 to confirm that petroleum-related compounds had not leached from the pads during remediation. The top 6 inches of soil at four sampling points at each pad location were sampled. The discrete samples were then composited into one sample for each pad location. Gasoline-range hydrocarbons were not detected in the samples obtained from the base of the bioremediation pads. Chemical analytical results are summarized in Table 1. Laboratory reports, chain-of-custody documentation and a review of laboratory quality assurance/quality control (QA/QC) procedures are included in Appendix A.

4.2 CHEMICAL ANALYSIS

Washington State-recommended hydrocarbon analyses were performed on representative samples. Since the contamination has been characterized as gasoline-range hydrocarbons, using the Ecology decision-tree method, the analytical method selected to monitor petroleum hydrocarbon concentrations in the bioremediation pads was WTPH-G, as required under Ecology's guidance for cleanups under MTCA.

4.3

QUALITY ASSURANCE/QUALITY CONTROL

A Quality Assurance/Quality Control (QA/QC) Program was established to ensure that environmental monitoring data of known and acceptable quality were provided. All field sampling and laboratory analysis followed proper quality assurance procedures and were conducted according to EPA guidelines for field test methods (SW-846, Vol. II), recommended Washington State procedures, and the ERM Corporate QA/QC Program.

4.4

SAMPLING PROTOCOLS AND PROCEDURES

Sampling Protocols and Procedures - All field sampling and laboratory analysis followed proper quality assurance procedures and were conducted following EPA guidelines for field test methods (SW-846, Vol. II) and the sampling program described above. Soil samples were collected to investigate contaminant concentrations to determine whether additional remediation was necessary and that the restoration had been successful.

Samples were collected with a stainless-steel spoon from the bioremediation pad soils, placed in a plastic bag, mixed and placed directly into the sample container. All sampling equipment was decontaminated between sample intervals. The samples were stored in coolers, packed in ice, and hand-delivered to the Pacific Northern Analytical's laboratory in Redmond, Washington for chemical analysis (see Appendix A - Chemical Analytical Data).

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on field observations and chemical analytical results of soil samples obtained from the treated soil, the soil treated in the bioremediation pad areas has been remediated to concentrations of petroleum hydrocarbons less than MTCA Method A cleanup levels and that no further remedial action is required to achieve regulatory compliance for these soils.

We recommend the excavation and treatment or disposal of petroleum-affected soil at the location of the former temporary soil stockpile north of Biopad #1. We estimate that less than 5 cubic yards of petroleum-affected soil is present at this location.

<u>APPENDIX A</u>

CHEMICAL ANALYTICAL DATA

APPENDIX A

CHEMICAL ANALYTICAL DATA

Laboratory chemical analyses for samples included in this report were completed by Pacific Northern Analytical (PNA) in Redmond, Washington. Laboratory data sheets and chain-of-custody tracking forms are included in this Attachment.

PNA performed quality control/quality assurance (QA/QC) tests on all fuel sample batches completed for this report.

Our review of the QA/QC data provided by PNA did not identify any QA/QC concerns which would significantly affect our conclusions regarding the chemical analytical data. It is EC-NW's opinion that the laboratory data are acceptable for their intended use.



April 15, 1994

1

Don Clabaugh ERM Northwest 2821 Northup Way Bellevue, WA 98004

Dear Don:

Enclosed are the analytical results of samples submitted on April 08, 1994 from project Wade & Wells, 1022.

If you have any questions regarding this report or if you need any other assistance, please do not hesitate to call me.

Sincerely,

Cynthia Rezania Project Chemist

CLR/lh

15314 N.E. 95th Street Redmond, WA 98052-2517 (206) 881-7538 • Fax 881-8215



ومحتمد المتنادي

1

2

DOE WTPH-G with BTEX (EPA 8020) distinction

والمرادي المؤدران والمرامين كمرم والمرامع

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 B1-C 01172		Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor:	April 4, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Units:	mg/kg	Sample Result	Notes	
Analyte Total Petroleum Hyd as Gasoline		N.D.		2.5
(Toluene to dodecan	ie)	•		0.050
Benzene	٠	N.D.		0.050
		N.D.		
Toluene		N.D.		0.050
Ethylbenzene		-		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		

	% Recovery	Notes	Acceptance Range
Surrogate Recoveries			65%-111%
Fluorobenzene	97%		63%-111%
4-Bromofluorobenzene	93%		

Notes



DOE WTPH-G with BTEX (EPA 8020) distinction

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units: Analyte	ERM Northwest Wade & Wells 1022 B2-C 01172 mg/kg	Sample Result	Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor: Notes	April 4, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Total Petroleum Hyd as Gasoline (Toluene to dodecan		N.D.		2.5
	<i>.</i> ,	N.D.		0.050
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene o-Xylene		N.D.		0.050

_ ***	% Recovery	Notes	Acceptance Range
Surrogate Recoveries	· · · · · · · · · · · · · · · · · · ·		65%-111%
Fluorobenzene	94%		
	88%		63%-111%
4-Bromofluorobenzene			

Notes



والمراسية المعاولا المستحد

7

÷

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units:	ERM Northwest Wade & Wells 1022 B3-1 01172 mg/kg	Sample Result	Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor: Notes	April 6, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Analyte		Sample Resurt		
Total Petroleum Hyd as Gasoline (Toluene to dodecand		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
•		N.D.		0.050
m- & p-Xylene 0-Xylene		N.D.		0.050

	% Recovery	Notes	Acceptance Range
Surrogate Recoveries			65%-111%
Fluorobenzene	93%		
	87%	~	63%-111%
4-Bromofluorobenzene	-		

Notes_

AND S

٢

DOE WTPH-G with BTEX (EPA 8020) distinction

1¥

10.00

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units: Analyte	ERM Northwest Wade & Wells 1022 B3-2 01172 mg/kg	Sample Result	Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor: Notes	April 6, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Total Petroleum Hyd		N.D.		2.5
(Toluene to dodecar	le)	N.D.		0.050
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene				

	% Recovery	Notes Acceptance Range
Surrogate Recoveries		65%-111%
Fluorobenzene	89%	63%-111%
4-Bromofluorobenzene	83%	

Notes



1.1

DOE WTPH-G with BTEX (EPA 8020) distinction

÷.,

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units:	ERM Northwest Wade & Wells 1022 RO-1 01172 mg/kg	Sample Result	Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor: Notes	April 7, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Analyte				
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		. 2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
		N.D.		0.050
Ethylbenzene				0.050
m- & p-Xylene		N.D.		
o-Xylene		N.D.		0.050

	% Recovery	Notes	Acceptance Range
Surrogate Recoveries	101%		65%-111%
Fluorobenzene 4-Bromofluorobenzene	94%		63%-111%

Notes



「ないないないないとうてきませんななないないないないとう

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units:	ERM Northwest Wade & Wells 1022 RO-2 01172 mg/kg		Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor:	April 7, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1
Analyte		Sample Result	Notes	Reporting Limit
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
			65%-111%
Fluorobenzene	89%		03%-11170
4-Bromofluorobenzene	85%		63%-111%

Notes



のないではないである。ことではないではないでしょうです。

Client:	ERM Northwest		Date Sampled:	April 8, 1994
Project Name:	Wade & Wells		Date Received:	April 8, 1994
Project Number:	1022		Date Extracted:	April 11, 1994
Client Sample ID:	WP-1		Date Analyzed:	April 12, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	73%		65%-111%
4-Bromofluorobenzene	70%		63%-111%

Notes



ALC: N

Client:	ERM Northwest		Date Sampled:	April 7, 1994
Project Name:	Wade & Wells		Date Received:	April 8, 1994
Project Number:	1022		Date Extracted:	April 11, 1994
Client Sample ID:	OP-1		Date Analyzed:	April 12, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit
	rooshong			
Total Petroleum Hyd	rocaroons	N,D.		2.5
as Gasoline		11,27,		·
(Toluene to dodecane	e)			
Benzene	-	N.D.		0.050
Toluene		N.D.		0.050
		N.D.		0.050
Ethylbenzene		N.D.		0,000
m- & p-Xylene		N.D.		0.050
wy rijenis				
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	71%		65%-111%
4-Bromofluorobenzene	76%		63%-111%
			· · ·

Notes



11.715

Client:	ERM Northwest		Date Sampled:	April 7, 1994
Project Name:	Wade & Wells		Date Received:	April 8, 1994
Project Number:	1022		Date Extracted:	April 11, 1994
Client Sample ID:	OP-2		Date Analyzed:	April 12, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	90%		65%-111%
4-Bromofluorobenzene	. 88%		63%-111%

Notes



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units:	ERM Northwest Wade & Wells 1022 OP-3 01172 mg/kg		Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor:	April 7, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Analyte		Sample Result	Notes	
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	85%		65%-111%
4-Bromofluorobenzene	77%		63%-111%

Notes



こうしょう しょうしょう しんしょう うちょう うちょう うちょう しょうしょう
Client:	ERM Northwest		Date Sampled:	April 7, 1994
Project Name:	Wade & Wells		Date Received:	April 8, 1994
Project Number:	1022		Date Extracted:	April 11, 1994
Client Sample ID:	OP-4		Date Analyzed:	April 12, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		2.5
Benzene		N.D.	·	0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	90%		65%-111%
4-Bromofluorobenzene	85%		63%-111%

Notes


DOE WTPH-G with BTEX (EPA 8020) distinction

ないのとうないないというないないとうでいましょう

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units:	ERM Northwest Wade & Wells 1022 OP-5 01172 mg/kg	Sample Result	Date Received: Date Extracted: Date Analyzed:	April 7, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Analyte		Sample xoout		
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes Acceptance Range
Fluorobenzene	90%	65%-111%
4-Bromofluorobenzene	88%	63%-111%

Notes



DOE WTPH-G with BTEX (EPA 8020) distinction

المنتخف محدقاتهم ومعا

Client: Project Name: Project Number: Client Sample ID: Laboratory Batch # Units:	ERM Northwest Wade & Wells 1022 OP-6 01172 mg/kg		Date Sampled: Date Received: Date Extracted: Date Analyzed: Sample Matrix: Dilution Factor:	April 7, 1994 April 8, 1994 April 11, 1994 April 12, 1994 Soil 1 Reporting Limit
Analyte		Sample Result	Notes	Keporung Linne
Total Petroleum Hyd as Gasoline (Toluene to dodecane		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	74%		65%-111%
4-Bromofluorobenzene	83%		63%-111%
			. .

Notes



DOE WTPH-G with BTEX (EPA 8020) distinction Quality Control Data

Client: Project Name: Project Number: Sample ID:	ERM Northwest Wade & Wells 1022 Method Blank 01172		Date Extracted: Date Analyzed: Dilution Factor: Units:	April 11, 1994 April 12, 1994 1 mg/kg
Laboratory Batch #	VIIIZ	Sample Result	Notes	Reporting Limit
Analyte Total Petroleum Hyd as Gasoline (Toluene to dodecan		N.D.		2.5
Benzene		N.D.		0.050
Toluene		N.D.		0.050
Ethylbenzene		N.D.		0.050
m- & p-Xylene		N.D.		0.050
o-Xylene		N.D.		0.050

	% Recovery	Notes	Acceptance Range
Surrogate Recoveries			65%-111%
Fluorobenzene	97%		0070 2220-
	89%		63%-111%
4-Bromofluorobenzene	-		

Notes

N.D.-Not detected above the reporting limit.



DOE WTPH-G with BTEX (EPA 8020) distinction Quality Control Data

				Concret 2 min	Quanty		
994 994	April 11, 1994 April 12, 1994 Soil mg/kg	ate Extracted: ate Analyzed: ample Matrix: nits:	D S:			ERM Northwest Wade & Wells 1022 01172 QA	Client: Project Name: Project Number: Batch Sample ID:
		Acceptance	-	Duplicate	Sample	01172	Laboratory Batch #
tes	Notes	Lim <u>it</u>	RPD	Result	-	Reporting	
					Result	Limit	Analyte
		20%		N.D.	N.D.	2.5	Total Petroleum Hydrocarbons as Gasoline
		20%		N.D.	N.D.	0.050	Benzene
		20%		N.D.	N.D.	0.050	Toluene
		20%		N.D.	N.D.	0.050	Ethylbenzene
۰.	,	20%		N.D.	N.D.	0.050	m- & p-Xylene
		20%		N.D.	N.D.	0.050	o-Xylene
•	Acceptanc Limit	RPD	Spike Dup Recovery	Acceptance Range	Spike Recovery	Spike Added	.
20%	. 20%	<1%	88%	60%-140%	88%	1.0	
20%	20%	<1%	86%	60%-140%	86%	1.0	o-Xylene
[<u>I</u>	<u>RPD</u>	Spike Dup Recovery 88%	Acceptance Range 60%-140%	Spike Recovery 88%	Spike Added 1.0	Analyte Benzene

Notes

N.D.-Not detected above the reporting limit.



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 B1-C 01172		Date Received: Date Extracted:	April 4, 1994 April 8, 1994 April 14-15,1994 April 15, 1994 Soil 1
Units:	mg/kg	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

37

30

「ないないない」をいたいで、「ないいない」

Notes



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 B2-C 01172		Date Received:	April 15, 1994
Units: Analyte	mg/kg	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

44

30

Notes



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 B3-1 01172		Date Received:	Soil
Units: Analyte	mg/kg	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

32

30

1

Notes



Client: Project Name: Project Number:	ERM Northwest Wade & Wells 1022		Date Received: Date Extracted:	April 6, 1994 April 8, 1994 April 14-15, 1994
Client Sample ID: Laboratory Batch # Units:	B3-2 01172 mg/kg		Date Analyzed: Sample Matrix: Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

34

30

「おいないので、ないとうないとうないとうないので、ころうちの

Notes



Client: Project Name: Project Number: Client Sample ID:	ERM Northwest Wade & Wells 1022 HEC1 01172		Date Received:	April 7, 1994 April 8, 1994 April 14-15, 1994 April 15, 1994 Soil
Laboratory Batch # Units:	mg/kg		Dilution Factor:	1 Deventione Limit
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

40

30

「「「「「「「」」」をないていていたいないとうないです。ここ

Notes

2



Project Name: Project Number: Client Sample ID:	Wade & Wells 1022 RO-1		Date Extracted:	
Laboratory Batch # Units:	01172 mg/kg	·	Sample Matrix: Dilution Factor:	Soil 1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

32

· 30

213

Notes



Units:	mg/kg	Sample Result	Notes	Reporting Limit
Laboratory Batch #	01172		Sample Matrix: Dilution Factor:	Soil 1
Client Sample ID:	RO-2		Date Analyzed:	April 15, 1994
Project Name: Project Number:	Wade & Wells 1022		Date Extracted:	April 14-15, 1994
Client:	ERM Northwest			April 7, 1994 April 8, 1994

Total Petroleum Hydrocarbons

68

30

 \sim

Notes



Units: mg/kg Dilution Factor: 1	Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 WP-1 01172			April 8, 1994 April 8, 1994 April 14-15, 1994 April 15, 1994 Soil
Analyte Sample Result Notes Reporting Linut	Units:	• · ·	Sample Result	Dilution Factor: Notes	1 Reporting Limit

Total Petroleum Hydrocarbons

180

Notes



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 EP-1 01172		Date Received: Date Extracted:	April 15, 1994 Soil
Units: Analyte	mg/kg	Sample Result	Notes	Reporting Limit
······				30

Total Petroleum Hydrocarbons

86

30

「「ない」というというないないないないとうないないです。

Notes



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 OP-1 01172 mg/kg		Date Received:	April 7, 1994 April 8, 1994 April 14-15, 1994 April 15, 1994 Soil 1
Units: Analyte	шрив	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

99

30

294

Notes

,



Project Name: Project Number: Client Sample ID: Laboratory Batch #	Wade & Wells 1022 OP-2 01172			April 8, 1994 April 14-15, 1994 April 15, 1994 Soil 1
Units:Analyte	mg/kg	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

49

30

Notes



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 OP-3 01172		Date Received: Date Extracted:	April 15, 1994
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit
				20

Total Petroleum Hydrocarbons

57

30

Notes

AND S

WTPH-418.1

Chefit.ExclaimedProject Name:Wade & WellsProject Number:1022Client Sample ID:OP-4Laboratory Batch #01172Units:mg/kgDate Received:April 8, 1994Date Extracted:April 14-15, 1994Date Analyzed:April 15, 1994				Date Sampled:	April 7, 1994
Project Name:Wade & WensProject Number:1022Date Extracted:April 14-15, 1994Client Sample ID:OP-4Laboratory Batch #01172Units:mg/kgDate Extracted:April 15, 1994Date Analyzed:Sample Matrix:SoilDilution Factor:1Notes	Client:	ERM Northwest			-
Project Number:1022Date Extracted:April 14-15, 1994Client Sample ID:OP-4Date Analyzed:April 15, 1994Laboratory Batch #01172Sample Matrix:SoilUnits:mg/kgDilution Factor:1	Project Name:	Wade & Wells			•
Client Sample ID: OP-4 Date Analyzed: April 15, 1994 Laboratory Batch # 01172 Sample Matrix: Soil Units: mg/kg Dilution Factor: 1	· · · · · · · · · · · · · · · · · · ·	1022		Date Extracted:	April 14-15, 1994
Laboratory Batch # 01172 Sample Matrix: Soil Units: mg/kg Dilution Factor: 1	•	OP-4		Date Analyzed:	April 15, 1994
Units: mg/kg Dilution Factor: 1 Notes Reporting Limit		Q		Sample Matrix:	Soil
Constant Notes Reporting Limit				Dilution Factor:	1
			Sample Result	Notes	Reporting Limit
	2 mar 10	· · · · · · · · ·			

Total Petroleum Hydrocarbons

52

30

おうちょう ちょうちょう ちょうかん ちまんかん ちょうちょう ちょうしょう ちょうしょう

Notes



Client: Project Name: Project Number: Client Sample ID: Laboratory Batch #	ERM Northwest Wade & Wells 1022 OP-5 01172		Date Analyzed: Sample Matrix:	April 7, 1994 April 8, 1994 April 14-15, 1994 April 15, 1994 Soil
Units: Analyte	mg/kg	Sample Result	Dilution Factor: Notes	1 Reporting Limit

Total Petroleum Hydrocarbons

576

30

and which it

Notes



Client:	ERM Northwest		Date Sampled:	April 7, 1994
Project Name:	Wade & Wells		Date Received:	April 8, 1994
Project Number:	1022		Date Extracted:	April 14-15, 1994
Client Sample ID:	OP-6		Date Analyzed:	April 15, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons

53

30

.

Notes



a dha a th

WTPH-418.1 Quality Control Data

 $\mathbf{\hat{\gamma}}$

- A.

			· · · ·
Wade & Wells		Date Extracted:	April 14-15, 1994
1022		Date Analyzed:	April 15, 1994
01172		Sample Matrix:	Soil
Method Blank		Units:	mg/kg
Dilution Factor	Sample Result	Notes	Reporting Limit
			•
1	N.D.		30
	01172 Method Blank	Wade & Wells 1022 01172 Method Blank	Wade & WellsDate Extracted:1022Date Analyzed:01172Sample Matrix:Method BlankUnits:Dilution FactorSample ResultNotes

Batch Sample ID:	01172 QA				Units:	mg/kg
Analyte	Reporting Limit	Dilution Factor	Sample Result	Duplicate Result	RPD	Acceptance Limit
Total Petroleum Hydrocarbons	30	1	86	78	10%	20%

Notes

N.D.-Not detected above the given reporting limit

19 A 1

WTPH-418.1 Quality Control Data

Client:	ERM Northwest			-
Project Name:	Wade & Wells		Date Extracted:	April 14-15, 1994
Project Number:	1022		Date Analyzed:	April 15, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Sample ID:	Method Blank		Units:	mg/kg
Analyte	Dilution Factor	Sample Result	Notes	Reporting Limit
Total Petroleum		N.D.		30
Hydrocarbons	T	N.D.		50

Batch Sample ID:	01172 QA				Units:	mg/kg
Analyte	Reporting Limit	Dilution Factor	Sample Result	Duplicate Result	RPD	Acceptance Limit
Total Petroleum Hydrocarbons	30	1	53	49	8%	20%

Notes

N.D.-Not detected above the given reporting limit



1

DOE WTPH-G

Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-2-SE		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit
			<u> </u>	-

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	79%		65%-111%
4-Bromofluorobenzene	86%		63%-111%

Notes

18



FRM Northwest		Date Sampled:	June 17, 1994
			June 20, 1994
			June 22, 1994
		-	Soil
•==•		Dilution Factor:	1
шукд	Sample Result	Notes	Reporting Limit
	ERM Northwest Birchmount 94023.00 BP-2-NE 01370 mg/kg	Birchmount 94023.00 BP-2-NE 01370	Erkin NorthwestDate Received:BirchmountDate Received:94023.00Date Extracted:BP-2-NEDate Analyzed:01370Sample Matrix:mg/kgDilution Factor:

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	82%		65%-111%
4-Bromofluorobenzene	89%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received: Date Extracted:	June 20, 1994 June 22, 1994
Project Number: Client Sample ID:	94023.00 BP-3-NW		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	74%		65%-111%
4-Bromofluorobenzene	78%		63%-111%

Notes



Client:	ERM Northwest	1	Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-3-SW		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte	<u> </u>	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	81%		65%-111%
4-Bromofluorobenzene	87%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 17, 1994
-	Birchmount		Date Received:	June 20, 1994
Project Name: Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-3-SE		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N,D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	79%		65%-111%
4-Bromofluorobenzene	81%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-3-NE		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Durioguto recording			
Fluorobenzene	86%		65%-111%
			(20) 1110/
4-Bromofluorobenzene	92%		63%-111%

Notes



DOE WTPH-G Quality Control Data

Client:	ERM Northwest			
Project Name:	Birchmount		Date Extracted:	June 22, 1994
Project Number:	94023.00		Date Analyzed:	June 22, 1994
Sample ID:	Method Blank		Dilution Factor:	1
Laboratory Batch #	01370		Units:	mg/kg
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	100%		65%-111%
4-Bromofluorobenzene	100%		63%-111%

Notes

N.D.-Not detected above the reporting limit.



DOE WTPH-G Quality Control Data

Client: Project Name: Project Number: Batch Sample ID: Laboratory Batch #	ERM Northwest Birchmount 94023.00 01370 QA 01370	_			Date Extracted: Date Analyzed: Sample Matrix: Units:	June 22, 1994
Analyte	Reporting Limit	Sample Result	Duplicate Result	RPD	Acceptance Limit	Notes
Total Petroleum Hydrocarbons as Gasoline	2.5	3.2	3.2	<1%	20%	

Analyte	Spike Added	Spike Recovery	Acceptance Range	Spike Dup Recovery	RPD	Acceptance Limit
Total Petroleum Hydrocarbons as Gasoline	50	100%	60%-140%	97%	3%	20%

Notes

N.D.-Not detected above the reporting limit.



Moisture Content Report

Client: Project Name: Project Number: Laboratory Batch # Units:	ERM Northwest Birchmount 94023.00 01370 % Moisture		Date Sampled: Date Received: Date Analyzed: Sample Matrix:	June 17, 1994 June 20, 1994 June 22, 1994 Soil
Client Sample ID	<u> </u>	Sample Result	Notes	Reporting Limit
BP-1-NW		9%		1% 1%
BP-1-SW BP-1-SE		12% 15%		1% 1%
BP-1-NE BP-2-NW		9% 6%		1%
BP-2-SW BP-2-SE		7% 9%		1% 1%
BP-2-NE		13% 20%		1% 1%
BP-3-NW BP-3-SW		9% 13%		1% 1%
BP-3-SE BP-3-NE		9%		1%

Distribution: White - Return to Originator: llow - Lab; Pink - Retained by Originator

م به مالو می معاود مدولاد می ا

Ξ
Ξ
U.
-
C
Ξ
Ξ
-
4
C
C
Ills Iulii, you are agreening to the terms and contained because on the sec
4
ā
.,
۵
ē
Ξ
đ
đ
1
.3
ιC
-
C
-
5
2
2
g
-
- 2
G
- 6
- 5
<u>د</u>
~
- >
2
2
1
ŝ
Č
- 2
ĩ
-
_ (
- 7
- >
1
•
5
- 5
•
,
- 5

ç

Pacific Northern Analytical	nalytic	al										ြန္း ငည္း	ain	tor of	Ba	ich d	Chain of Custody/Analy Laboratory Batch Number:	Chain of Custody/Analysis Laboratory Batch Number:		Request	Jue	¢ st ∓	Form	' _'
Client: ERM - EC		Report to: λ	Mile A	Ain	old		-	P	Project Nar		ne:	57	irchmount	۲ ۲		Proj	ect N	Project Number:		940	23	ė	1	
Northup	E Star						80		50	0		BTEX	418.1				d)							
100				taine	824(8/808		s 815	/8240		<u>G</u>	PH-4	CID	D		olved							
Acri marin	48004									s 624)	TPH-	EQ T	EQ H	трн-	ded	r Diss	/ VO/	t &He					
728	0440		2			5/827		/8310	Her	ganic:	/8270	GW	8.1/D	ID/D	DEQ	Exten	otal o		/ Pes			<u> </u>		
Fax Number: Zote タイナン	2408								natec	e Org	625	трн	H-41	H-HC	H-D/	H-D I	•							
	Date	Time	Matrix						Chlori	/olati	BNA's	DEQ	WTP	WTP	WTP	WTP	Metal List b							
	h9/4/1	0942	Se. I									$\overline{\ }$												
RP-)-SW		٥٩٩٢										$\overline{\}$										\vdash		1
39-		0950								\square		$\overline{\}$								+	╉──	+	1	\top
BP-		0953		—		-	<u> </u>				1	\mathbb{N}	1					-	-	+	<u> -</u> -	+	\top	1-
BP-2-		0959			-		$\left - \right $		+									╎	-	┼╾		+	+	1
		1001		┢╴	 				┼╌	-	1	Ν	Ţ,		1								1	
-7 RP-2-SE		1005		–			-			1	-	\land						+		╞	+		\uparrow	
RP-2-		8 001		~										\square								+	\uparrow	1
		iolu										\setminus					T		+	╞	+	┢	+	\uparrow
BP-		1019					┣		┝─		╞		Γ,								\vdash	\vdash	┢	-
		und	Requester	н		Sample		Receipt:	p		ဂ္ဂ	mm	ents	/Spe	Cial	Inst	Comments/Special Instructions	ons:						
Bill to:		24 hr 48 hr	(+100%) (+50%)				Condition			1														
		Date needed	đ			00	Cool? Yes	s No	0		<u> </u>													
Relinguished By:							Date:			ļ														
Company:						ן 1	Time			ļ														
Received By:					1	 • -					-													
Company:						, ,		I.		ļ	1													
Reinquisned by						[יי	Time			ł														
Received By:						ון	Date:																	
Company:						<u> </u>	Time			ļ	\vdash													1
By signing this form, you are agreeing to the terms and conditions listed on the back	eing to the	terms and c	onditions li	isted	on ti	ne b:	ack.																	

Page lof 2

Distribution: White - Return to Originator IIc
llow
-Lab;
Pink -
llow - Lab; Pink - Retained by Originator
Originator

đ

مكفي سنوري والمنصف المحمود الإلي

- 2	
Ū	
2	
2	
- ē	
2	
ģ	
ō	ļ
	ļ
Ľ	
- 2	
- C	
7	
- 1	
9	
i	
i	ļ
	i
:	
1	
;	
	ļ

Pacific Northern Analytical	Chain of Custody/Analysis Kequest Form Laboratory Batch Number: 0/ 3 2 0
Client: ERM-EC Report to: Mile Arnold	Project Name: Birchmannt Project Number: 94023.00
ainers 8240	3240
Phone Number: Zola 827-9440 of Col d Volatile matics 6	8.1/DEQ CID/DEQ DEQ TPI Extended
n ber enate	le Ors s 625. TPH- H-418 H-HC H-D/I H-D/I H-D I Is: (Tc selow S M VOA
Date Time Sampled Sampled Matrix N Halog	Volati BNA's DEQ WTP WTP WTP Metal List b TCLF Semi
SE ALLA	
RD-3-NF 1026	
4	
5	
-6	
-7	
P.O.# Turnaround Requested: Sample Receipt. 24 hr (+100%) Condition	
(+50%) (+50%) (+51/9 ~	
Relinquished By // // half (dared Date: Le	hold the
1-EC - VI-M	Lev som
Received By Date: Date: Date: Time:	A CON
led By:	
Received By:	
By signing this form, you are agreeing to the terms and conditions listed on the back.	
By signing this form, you are agreeing to the companie construction are and	

Chain of Custody/Analysis Request Form

Page 2 of 2



July 7, 1994

Mike Arnold ERM Northwest 2821 Northup Way Bellevue, WA 98004

Dear Mike:

{ }

ł

i I

Enclosed are the analytical results of samples submitted on June 28, 1994 from project Birchmount, 94023.00.

If you have any questions regarding this report or if you need any other assistance, please do not hesitate to call me.

Sincerely,

Cynthia Rezania Project Chemist

CLR/lh

15314 N.E. 95th Street Redmond, WA 98052-2517 (206) 881-7538 • Fax 881-8215 i,



Client:	ERM Northwest		Date Sampled:	June 24, 1994
Project Name:	Birchmount		Date Received:	June 28, 1994
Project Number:	94023.00		Date Extracted:	June 29, 1994
Client Sample ID:	BP-3-SW		Date Analyzed:	June 29, 1994
Laboratory Batch #	01394		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte	<u> </u>	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	80%		65%-111%
4-Bromofluorobenzene	90%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 24, 1994
Project Name:	Birchmount		Date Received:	June 28, 1994
Project Number:	94023.00		Date Extracted:	June 29, 1994
Client Sample ID:	BP-3-SE		Date Analyzed:	June 29, 1994
Laboratory Batch #	01394		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	85%		65%-111%
4-Bromofluorobenzene	93%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 24, 1994
Project Name:	Birchmount		Date Received:	June 28, 1994
Project Number:	94023.00		Date Extracted:	June 29, 1994
Client Sample ID:	BP-3-NE		Date Analyzed:	June 29, 1994
Laboratory Batch #	01394		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	85%		65%-111%
4-Bromofluorobenzene	94%		63%-111%

Notes


Analyte		Sample Result	Notes	Reporting Limit
Units:	mg/kg		Dilution Factor:	1
Laboratory Batch #	01394		Sample Matrix:	Soil
Client Sample ID:	A-1		Date Analyzed:	June 29, 1994
Project Number:	94023.00		Date Extracted:	June 29, 1994
Project Name:	Birchmount		Date Received:	June 28, 1994
Client:	ERM Northwest		Date Sampled:	June 24, 1994

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
			CEO(1110/
Fluorobenzene	84%		65%-111%
4-Bromofluorobenzene	95%		63%-111%

Notes



Analyte		Sample Result	Notes	Reporting Limit
Units:	mg/kg		Dilution Factor:	1
Laboratory Batch #	01394		Sample Matrix:	Soil
Client Sample ID:	A-2		Date Analyzed:	June 29, 1994
Project Number:	94023.00		Date Extracted:	June 29, 1994
Project Name:	Birchmount		Date Received:	June 28, 1994
Client:	ERM Northwest		Date Sampled:	June 24, 1994

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	85%		65%-111%
4-Bromofluorobenzene	94%		63%-111%

Notes



DOE WTPH-G Quality Control Data

Client:	ERM Northwest			
Project Name:	Birchmount		Date Extracted:	June 29, 1994
Project Number:	94023.00		Date Analyzed:	June 29, 1994
Sample ID:	Method Blank		Dilution Factor:	1
Laboratory Batch #	01394		Units:	mg/kg
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	93%		65%-111%
4-Bromofluorobenzene	95%		63%-111%

Notes

N.D.-Not detected above the reporting limit.



DOE WTPH-G Quality Control Data

Client: Project Name: Project Number: Batch Sample ID: Laboratory Batch #	ERM Northwest Birchmount 94023.00 01403 QA 01394			·	Date Extracted: Date Analyzed: Sample Matrix: Units:	June 29, 1994
Analyte	Reporting Limit	Sample Result	Duplicate Result	RPD	Acceptance Limit	Notes
Total Petroleum Hydrocarbons as Gasoline	2.5	36	52	36%	20%	L

Analyte	Spike Added	Spike Recovery	Acceptance Range	Spike Dup Recovery	RPD	Acceptance Limit
Benzene	1	90%	60%-140%	84%	7%	20%
o-Xylene	1	91%	60%-140%	84%	8%	20%

Notes

L-RPD outside control limits due to low analyte concentration.



Total Metals Analyses

Client:	ERM Northwest			
Project Name:	Birchmount		Date Sampled:	June 24, 1994
Project Number:	94023.00		Date Received:	June 28, 1994
Client Sample ID:	A-1		Date Digested:	July 6, 1994
Laboratory Batch #	01394		Date Analyzed:	July 7, 1994
Units:	mg/kg		Sample Matrix:	Soil
Analyte	Method	Sample Result	Notes	Reporting Limit
Arsenic	7060	8.28		0.5



Total Metals Analyses

Client:	ERM Northwest			
Project Name:	Birchmount		Date Sampled:	June 24, 1994
Project Number:	94023.00		Date Received:	June 28, 1994
Client Sample ID:	A-2		Date Digested:	July 6, 1994
Laboratory Batch #	01394		Date Analyzed:	July 7, 1994
Units:	mg/kg		Sample Matrix:	Soil
Analyte	Method	Sample Result	Notes	Reporting Limit
Arsenic	7060	7.10		0.5



Metals Analyses
Quality Control Data

		Quanty control 2		
Client:	ERM Northwest			
Project Name:	Birchmount			
Project Number:	94023.00		Date Digested:	July 6, 1994
Laboratory Batch #	01394		Date Analyzed:	July 7, 1994
Sample ID:	Method Blank		Units:	mg/kg
Analyte	Method	Sample Result	Notes	Reporting Limit
Arsenic	7060	N.D.		0.5

Notes

N.D.-Not detected above the reporting limit.



					Control Data			
Client: Project Name: Project Numbe Laboratory Ba Sample ID:	er:	ERM Nor Birchmou 94023.00 01394 01394 QA	int				Date Digested: Date Analyzed: Sample Matrix: Units:	July 6, 1994 July 7, 1994 Soil mg/kg
Analyte	Reporting Limit	Sample Result	Duplicate Result	RPD	Acceptance Limit	Spike Added	Percent Recovery	Acceptance Range
Arsenic	0,5	7.10	6.80	4.3%	20%	3.77	119%	75%-125%



Moisture Content Report

Client: Project Name: Project Number: Laboratory Batch # Units:	ERM Northwest Birchmount 94023.00 01394 % Moisture		Date Sampled: Date Received: Date Analyzed: Sample Matrix:	June 24, 1994 June 28, 1994 June 30, 1994 Soil
Client Sample ID		Sample Result	Notes	Reporting Limit
BP-3-NW		9%		1%
BP-3-SW		8%		1%
BP-3-SE		9%		1%
BP-3-NE		10%		1%
A-1		8%		1%
A-2		8%		1%

Client-FRM-EC		Report to: A	M. t. A	Arnold	2			Proje	Project Nar	ame: 🛐	12	irchmount	ş	3	Proj	ect N	Project Number:		94023.00	μ	ğ		
Address: 2821 Northino Way				rs)) 		TEX	8.1											
Y				aine	8240 /8020		3/8080		8150	0240	€ €	PH-41	CID))		olved)	/ rb						
Relieve wA 98004	04						S 608			624/			EQ H	TPH-I	ded	Diss	VOA &He						
428	gyyo					5/827	РСВ	8310		8270			ID/D	DEQ	Exten	otal or	etals / / Pes	(TX					
428	2408					_	ides/						- HC	H-D/[H-D 8		M /OA						
	Date	Time	Matrix	-			estic		_				VTPI	VTPI	VTPI	letals	CLP Semi\						
	Sampied	Sampied	Nanty				Р	+			_	<u>+</u>	v	v	V		-	-	┥				
-1 BP-3-NW 6	6/24/94	1518	50:1	E		-			+	+	\mathbf{k}					No.		┦	┢			_	
-2 BP-3-SW		1521		-	<u> </u>	-					\leftarrow		1	1		Ma	MAL WAL	╉──	1				
-3 BP-3-5E		1525	 	-		+			╞ -	-	\mathbf{k}	╞	+					+	\uparrow			1	ł
4 BP-3-NE		1529		-					-		\mathbf{k}			1			<u>`</u>	+	\top			<u> </u>	
5 A-1		1535		2	 	<u> </u>				+		<u> </u>				Ν			\uparrow				1
-6 A-2	Ł	OhSI	4	2		$\left \right $						+	1			\mathbb{N}		-					
-7					+		1		-	+		+	+	+					1				
8					-					-								┢	+-				
6-					-	\vdash	+				+	+	+			Ţ	-		1	1-			ł
-10							<u> </u>				┝		┝──					┝					1
P.O.#		Turnaround Requested:	Requeste	ď	0	Sample Receipt:	· e Re	ceipt		. 0	- mn	-nent:	နှိ	- cial	Inst	Comments/Special Instructions	$\sim \cdot \cdot$	5	camples A-		and	4 4 2	ю́
Bill to:		24 hr (24 hr (+100%) 48 hr (+50%),	•		Condition				_	Metals:	21.5		1072	_	עג ארוי ה	\sim	only /					
CAL A		Date needed	1 6 715	14/4	 	Cool? Yes	Yes	S											•				
Relinquished By:	とろ	10				(⁰ 1	Date:	202	<u>א</u> ן (•													
Company: ERM-EC		₽ ₽				, 1	Time:		Ìč	<u>`</u> }													
Received By		Ŷ				빌딩	Date 2/ Time: 9		2	}													
Relinquished By:						ן ס	Date:																
Company:						י בי	Time:_	ļ	ł	**													
Received By: Deanuel S	hopen	Å				D D	Date: (12	3/44														
Company: 0 PNA						ľ⊒.	Time:	10:0	A	12										1			
By signing this form, you are agreeing to the terms and conditions listed on the back.	ing to the	terms and c	onditions	listed	on th	e bac	×																

Pacific Northern Analytical

Chain of Custody/Analysis Request Form Laboratory Batch Number:_____

01394



July 20, 1994

Mike Arnold ERM Northwest 2821 Northup Way Bellevue, WA 98004

ERM-NORTHWEST FILE # BELLEVUE, WA

Dear Mike:

Enclosed are the analytical results of samples submitted on July 18, 1994 from project Birchmount, 94023.00.

If you have any questions regarding this report or if you need any other assistance, please do not hesitate to call me.

Sincerely,

Cynthia Rezania Project Chemist

CLR/lh

15314 N.E. 95th Street Redmond, WA 98052-2517 (206) 881-7538 • Fax 881-8215



Client:	ERM Northwest		Date Sampled:	July 15, 1994
Project Name:	Birchmount		Date Received:	July 18, 1994
Project Number:	94023.00		Date Extracted:	July 18, 1994
Client Sample ID:	BP-3		Date Analyzed:	July 19, 1994
Laboratory Batch #	01454		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
			6504 11104
Fluorobenzene	84%		65%-111%
4-Bromofluorobenzene	93%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	July 15, 1994
Project Name:	Birchmount		Date Received:	July 18, 1994
Project Number:	94023.00		Date Extracted:	July 18, 1994
Client Sample ID:	BP-2		Date Analyzed:	July 19, 1994
Laboratory Batch #	01454		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	82%		65%-111%
4-Bromofluorobenzene	94%		63%-111%

Notes



Units:	mg/kg	 Dilution Factor:	1
Laboratory Batch #	01454	Sample Matrix:	Soil
Client Sample ID:	BP-1	Date Analyzed:	July 19, 1994
Project Number:	94023.00	Date Extracted:	July 18, 1994
Project Name:	Birchmount	Date Received:	July 18, 1994
Client:	ERM Northwest	Date Sampled:	July 15, 1994

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	88%		65%-111%
4-Bromofluorobenzene	100%		63%-111%

Notes



DOE WTPH-G Quality Control Data

Client:	ERM Northwest			
Project Name:	Birchmount		Date Extracted:	July 18, 1994
Project Number:	94023.00		Date Analyzed:	July 18, 1994
Sample ID:	Method Blank		Dilution Factor:	1
Laboratory Batch #	01454		Units:	mg/kg
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	99%		65%-111%
4-Bromofluorobenzene	109%		63%-111%

Notes

N.D.-Not detected above the reporting limit.

,



DOE WTPH-G **Quality Control Data**

Client: Project Name: Project Number: Batch Sample ID: Laboratory Batch #	ERM Northwest Birchmount 94023.00 01454 QA 01454				Date Extracted: Date Analyzed: Sample Matrix: Units:	July 18, 1994
Analyte	Reporting Limit	Sample Result	Duplicate Result	RPD	Acceptance Limit	Notes
Total Petroleum Hydrocarbons as Gasoline	2.5	N.D.	3.0		20%	L

Analyte	Spike Added	Spike Recovery	Acceptance Range	Spike Dup Recovery	RPD	Acceptance Limit
Total Petroleum Hydrocarbons as Gasoline	50	93%	60%-140%	95%	2%	20%

Ś

Notes L-RPD unavailable due to low analyte concentration. N.D.-Not detected above the reporting limit.

ient: ERM-Ec Idress: 2821 Northup L Suite IOD Bellevie WA 986 imple ID BP-3 BP-2 BP-2 BP-1	1/5/2	Time Sampled 07:30 07:30	Mike A So. 1	Number of Containers S Halogenated Volatiles 8240	Volatile Aromatics 602/8020	Phenols 625/8270	Pesticides/ PCB'S 608/8080	PAH's 610/8310 Dot Chlorinated Herbloides 8150 Chlorinated Herbloides 8150 Volatile Organics 624/8240 Subscription	Chlorinated Herbicides 8150	Volatile Organics 624/8240 5 BNA's 625/8270 0		DEQ TPH-GAVTPH-QW/BTEX WTPH-418.1/DEQ TPH-418.1 WTPH-HCID/DEQ HCID	WTPH-418.1/DEQ TPH-418.1		WTFR-D/DEQ (FR-D	WTPH-D Extended	Metals: (Total or Dissolved) (요 List below 고고	WTPH-D Extended Dot Metals: (Total or Dissolved) C List below Z TCLP Metals / VOA / D SemiVOA / Pest & Herb D			
	×	02.60	<																		
5												<u> </u>							 		1
6				-								ļ							 		
-7						<u> </u>			ļ		<u> </u>								 		
\$					┢																
-9																			ļ		
-10																					_
P.O.# Bill to:		Turnaround Requested: 24 hr (+100%)	Requested +100%)	••	င္ လူ	Sample Receipt: Condition		ceipt			Con	Ime	nts/	Spe	cial	Instr	Comments/Special Instructions	SI			•
		$\frac{48 \text{ hr}}{2000 \text{ peeded}} + \frac{1}{7}$	(+50%) 1 7/25/	4 4 4	<u> </u> 	C001?	Yes	8 V													
Relinquished By: U. U. M.							jā.	- - - -		1											
Received By:		VV				Date:	ړ ا ه	N	Ì	×											
Company:	N/AT-	,				Time:	Je:		3	' }											
Relinquished By:						. Date:	ie: 														
Company:						Time:	5.9			۱ 											
Company:						Time	<u>פ</u> פו פו														
By signing this form, you are agreeing to the terms and conditions listed on the back.	eing to the	terms and co	nditions lis	ted o	n the	bac			1												

Distribution: White - Return to Originator; low - Lab; Pink - Retained by Originator

é V

「一ていた

l

Chain of Custody/Analysis Request Form

Pacific Northern Analytical



ERM-NORTHWEST FILE # BELLEVUE, WA

VE

August 30, 1994

Mike Arnold ERM Northwest 2821 Northup Way Bellevue, WA 98004

Dear Mike:

Enclosed are the analytical results of samples submitted on August 18, 1994 from project Birchmount, 94023.00.

If you have any questions regarding this report or if you need any other assistance, please do not hesitate to call me.

Sincerely,

Cynthia Rezania Project Chemist

CLR/lh

15314 N.E. 95th Street Redmond, WA 98052-2517 (206) 881-7538 • Fax 881-8215



DOE WTPH-D Extended

Client:	ERM Northwest		Date Sampled:	August 12, 1994
Project Name:	Birchmount		Date Received:	August 18, 1994
Project Number:	94023		Date Extracted:	August 19, 1994
Client Sample ID:	OP-5		Date Analyzed:	August 27, 1994
Laboratory Batch #	01592		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit
Total Petroleum Hyd	rocarbons	C A		15
as Diesel Fuel	``	64		15
(Dodecane to tetracos	sane)			
rt-4-1 D-4 I II	us south on a			
Total Petroleum Hyd	rocardons	890		50
as Motor Oil		070		50
(Beyond tetracosane)				
Surrogate Recovery		% Recovery	Notes	Acceptance Range
		101%		50%-150%
o-terphenyl				

Notes

1

Sample results have been corrected to their dry weight values.



Moisture Content Report

OP-5		2%		1%
Client Sample ID		Sample Result	Notes	Reporting Limit
Units:	% Moisture		Sample Matrix:	Soil
Laboratory Batch #	01592		Date Analyzed:	August 23, 1994
Project Number:	94023		Date Received:	August 18, 1994
Project Name:	Birchmount		Date Sampled:	August 12, 1994
Client:	ERM Northwest			

	1
rchmount Project Number: 94023.	
0 0 30 50 0 8TEX 18.1	
aine 8240 8/808 8/808 5 815 8240 0 9/-4 CID D	
WA 98004 - 1439 Conft atiles atiles is 602 is 602 is 602 is 602 is 602 is 602 is 602 is 602 is 602 is 624/ is 602 is 624/ is 624/	
of (d Vol matic 5/827 PCB (8310 I Hert ganics (8270 G/W 3.1/DI G/W 3.1/DI DEQ 5xten tal or etals /	
ber enate e Aro ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ ides/ id	
Sampled Matrix Num Halogy /olatil Phenc Pestic Chlori Volatil BNA's DEQ WTPI WTPI WTPI WTPI Volatil Volatil	
<u> </u>	-
ted:	
Bill to: 24 hr (+100%) Condition 48 hr (+50%)	
Cool? Yes No	
ed By: fr from Un al Date: 8/18/94	
Company:	
led By: Date:	
Company:	
By:	
Company:Time:	
By signing this form, you are agreeing to the terms and conditions listed on the back.	

Distribution: White - Return to Originator

llow - Lab; Pink - Retained by Originator

Pacific Northern Analytical

Chain of Custody/Analysis Request Form



DOE WTPH-D

Client:	ERM Northwest		Date Sampled:	April 6, 1994
Project Name:	Wade & Wells		Date Received:	April 8, 1994
Project Number:	1022		Date Extracted:	April 13, 1994
Client Sample ID:	B3-1		Date Analyzed:	April 13, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte	<u></u>	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Diesel Fuel

(Dodecane to tetracosane)

N.D.

15

Surrogate Recovery% RecoveryNotesAcceptance Rangeo-terphenyl99%50%-150%

Notes



DOE WTPH-D

Client:	ERM Northwest		Date Sampled:	April 8, 1994
Project Name:	Wade & Wells		Date Received:	April 8, 1994
Project Number:	1022		Date Extracted:	April 13, 1994
Client Sample ID:	EP-1		Date Analyzed:	April 13, 1994
Laboratory Batch #	01172		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Diesel Fuel (Dodecane to tetracosane)

N.D.

15

Surrogate RecoveryNotesAcceptance Rangeo-terphenyl105%50%-150%

Notes



			Quality Cont	rol Data		
Client:	ERM North		,			
Project Name:	Wade & We	lls			Date Extracted:	April 13, 1994
Project Number:	1022				Date Analyzed:	April 13, 1994
Sample ID:	Method Bla	ınk			Dilution Factor:	1
Laboratory Batch #	01172			<u> </u>	Units:	mg/kg
Analyte			Sample Result	. <u> </u>	Notes	Reporting Limit
Total Petroleum Hydr as Diesel Fuel (Dodecane to tetracos			N.D.			15
	·····,					
Surrogate Recovery			% Recovery		Notes	Acceptance Range
o-terphenyl			135%			50%-150%
Batch Sample ID:	01172 QA				Date Extracted: Date Analyzed: Sample Matrix:	April 13, 1994 April 13, 1994 Soil
Units:	mg/kg		<u></u>			Acceptance
Analyte		Reporting Limit	Sample Result	Duplicate Result	RPD	Limit
Total Petroleum						
Hydrocarbons			ND	N.D.		24%
as Diesel Fuel		15	N.D.	N.D.		2470
(Dodecane to tetracc				0.11. D.		Acceptance
	Spike	Spike	Acceptance	Spike Du		Limit
Analyte	Added	Recovery	Range	Recovery	RPD	
Total Petroleum						
Hydrocarbons as Diesel Fuel	100	87%	60%-140%	79%	10%	27%
(Dodecane to tetrace						

DOE WTPH-D

les conve

Notes

N.D.-Not detected above the reporting limit.

.



Moisture Content Report

Client: Project Name: Project Number: Laboratory Batch # Units:	ERM Northwest Wade & Wells 1022 01172 % Moisture		Date Sampled: Date Received: Date Analyzed: Sample Matrix:	April 7, 1994 April 8, 1994 April 12, 1994 Soil
Client Sample ID		Sample Result	Notes	Reporting Limit
Chene Dumpro 20			_	
B1-C		9%		1%
B2-C		6%		1%
B3-1		7%		1%
B3-2		12%		1%
HEC1		7%		1%
RO-1		5%		1%
RO-2		12%		1%
WP-1		11%		1%
EP-1		9%		1%
OP-1		21%		1%
OP-2		16%		1%
OP-3		15%		1%
OP-4		13%		1%
OP-5		13%		1%
OP-6		9%		1%

WDM: Project Num of $M_{eff}(T) = M_{eff}(T)$ Number of Model Numer of Model Number of Model </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>									
$\begin{array}{c c c c c c c c c c c c c c c c c c c $									
$\begin{array}{c c c c c c c c c c c c c c c c c c c $									
Id 2.2 Project Name W_{a} Annel W_{a} Number W_{a} Number of M Number M Number M Date Time G G G G G Date Time M A Sample Location G G $U/7$ $3:00$ X A A A A $U/7$ $3:00$ X A A A $U/7$ $3:00$ X A A A $U/7$ $3:00$ X A A X $U/7$ $3:00$ X A A X $U/7$ A A A A X $U/7$ A A A X A $U/7$ A A A A X $U/7$ A A A A A $U/7$ X A A A A $U/7$ X A A A A $U/7$ X X A A A $U/7$ X X X A		2:200-	<i></i>	(hour)	6.'0	4/4	Sayl	L .	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Reason for Transfer	Time		Received	Time	Date	uished		
$\begin{array}{c c c c c c } \hline I_{0} & C_{1} & C_{2} & C_$									
Is 2.2 Project Name: $W_a d c T_a + W e d f_a$ Number Not Not Not Not Not Not Not Not Not Not									
$\begin{array}{c c c c c c c c c c c c c c c c c c c $								ſ	ļ
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			<u> </u>			~		<u>_</u>	<u>)</u> 0
$\begin{array}{c c c c c c c c c c c c c c c c c c c $									0
$\begin{array}{c c c c c c c c c c c c c c c c c c c $									$\frac{1}{2}$
$\begin{array}{c c c c c c c c c c c c c c c c c c c $								- 2	10
Id 2.2 Project Name: Dom $C/4 d = J d$ W_a $d \in \mathbb{Z} + W = I/J$ Number Dom $C/4 d = J d$ W_a $d \in \mathbb{Z} + W = I/J$ Number Dom $C/4 d = J d$ G G G $Date$ $Time$ G G Sample Location $Date$ $Time$ M A Sample Location			× × × ×	~			3:00	4	QF
1022 Project Name: 1024 Well's Numb	Remarks		Itainers H. A.	Location	Sample			<u> </u>	
1022 Project Name: Wedet wells			of B	N			146003	Den	Sam
			Tex		det + w	oject Name: いっ	Pro	No.: 10 2 2	W.0

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $									
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			4/2/14	Alamon	6:00	\leftarrow	bayl	2	Dar
True Number $Made + wells$ C/kdavsh Number of other of other	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Reason for Transfer	Time		Received	Time	Date	quished		Sam
Index name Number of Sample Location Time R Sample Location Number of Sample Sample Location 2:45 X Present. beauth B1 1 2:45 X Present. beauth B2 1 2:45 X Present. beauth B3 1 2:36 X Present. beauth B3 1 3:15 X Present. beauth B3 1 3:15 X Present. beauth B3 1 3:16 X Present. beauth B3 1 4 Y Present.beauth B3 1 9 X Present.beauth B3 1 1 Y Present.beauth B3 1 1 Y Present.beauth B3 1	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			7		1	×	6:40	4	
right name. Cledersh Cledersh Sample Location Number of US Time B Sample Location Soft P.	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			7	west	Soil Sen	\times	9:30	4	wp_
Truper Name: Ward + wells Cledsush Rade + wells Time R M A Sample Location Ime M A P B Sample Location Z:45 X Present. downth. Z:45 X Present. downth. Z:45 X Present. downth. Z:45 X Present. downth. Z:18 X Present. Seneath. Z:18 X Present. Z:38 X Bottom East B3 Z:38 X Bottom DSA exc. samte	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			7	2		×	3.30	4	20-2
Inject name: Wards + weils Cledeush R Number of or of other of the strength Time R Sample Location Number of the strength Time R B Sample Location Containers of the strength Z:45 X Placent Barent B Z:45 X Placent B Sample Location Z:45 X Placent B Sample Location Z:45 X Placent B I Z:45 X Placent B I Z:16 X Placent B I I Z:18 X Placent Eact B I Z:18 X Placent Eact B I Z:18 X Placent Eact B I	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			۲ ۲	<i>t</i>	5	<u> </u>	3:15		~ -
$\begin{array}{c c c c c c c } \hline C & G & Sample \ Location \\ \hline Time & M & A \\ \hline Time & M & A \\ \hline Time & M & A \\ \hline 2:45 \times & Piz-rem. \ bencut & B & I \\ \hline 1:35 \times & Piz-rem. \ bencut & B & I \\ \hline 2:16 \times & Piz-rem. \ bencut & B & I \\ \hline 2:16 \times & Piz-rem. \ Eact \ B & I \\ \hline 1 & 1 \\ \hline$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			<	exc. sarrh		×	7 2:30	4	HE c
$\begin{array}{c c c c} \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			\downarrow		1	×	2:18	41	33 - 2
$\begin{array}{c c c c c c c } \hline C & G & & & & & & & & & & & & & & & & &$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			\ \ \ \	B		×	2:00	\sim	83-1
Cladaush Cladaush Time G G Sample Location 2:45 X Piz rem. beneuth B 1	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			77	3		×	1:30	4	B2 -C
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	SDG#INCOMPLETE $\$			\ \ \		Cent.		<u> </u>	41	31-0
cledaush Wade + wells Number to	SDG#INCOMPLETE INCOMPLETE	Remarks	STRA-	WTPH.		Sample	·	Time	Date	ERM T.R. Number
rules name. Wade + wells	SDG#INCOMPLETE			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Nu		2			ampler:
Project Mannor	SDG#INCOMPLETE			TEX	vells	Wade +	roject Nam		022	1.0.No.:

ï



ERM-NORTHWEST BELLEVUE, WA

DECEIVE JUN 0 6 1994

June 3, 1994

Mike Arnold ERM Northwest 2821 Northup Way Bellevue, WA 98004

Dear Mike:

Enclosed are the analytical results of samples submitted on May 31, 1994 from project Birchmount, 94023.00.

If you have any questions regarding this report or if you need any other assistance, please do not hesitate to call me.

Sincerely,

Cynthia Rezaniá Project Chemist

CLR/lh

15314 N.E. 95th Street Redmond, WA 98052-2517 (206) 881-7538 • Fax 881-8215



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-1-SW		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg	_	Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	87%		65%-111%
4-Bromofluorobenzene	97%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-1-NW		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte	•	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	89%		65%-111%
4-Bromofluorobenzene	98%		63%-111%

Notes

ų



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-1-NE		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

(Toluene to dodecane)

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	89%		65%-111%
4-Bromofluorobenzene	99%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-1-SE		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	84%		65%-111%
4-Bromofluorobenzene	96%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-2-NW		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	90%		65%-111%
4-Bromofluorobenzene	101%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-2-NE		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	87%		65%-111%
4-Bromofluorobenzene	97%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-2-SE		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	87%		65%-111%
4-Bromofluorobenzene	99%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-2-SW		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	86%		65%-111%
4-Bromofluorobenzene	98%		63%-111%

Notes


Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-3-NW		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte	<u> </u>	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	86%		65%-111%
4-Bromofluorobenzene	96%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	May 29, 1994
Project Name:	Birchmount		Date Received:	May 31, 1994
Project Number:	94023.00		Date Extracted:	June 2, 1994
Client Sample ID:	BP-3-SE		Date Analyzed:	June 2, 1994
Laboratory Batch #	01302		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

N.D.

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

2,5

Surrogate Recoveries% RecoveryNotesAcceptance RangeFluorobenzene83%65%-111%4-Bromofluorobenzene95%63%-111%

Notes



Project Name: Bir	M Northwest chmount 23.00	Date Sampled: Date Received: Date Extracted:	May 29, 1994 May 31, 1994
Project Name: Bir	chmount		•
•	23.00	Data Extracted:	Tune 0 1004
		Daie Exilation.	June 2, 1994
Client Sample ID: BP	-3-NE	Date Analyzed:	June 2, 1994
Laboratory Batch # 013	•••	Sample Matrix:	Soil
	/kg	Dilution Factor:	1
Analyte	Sample Result	Notes	Reporting Limit

(Toluene to dodecane)

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	84%		65%-111%
4-Bromofluorobenzene	94%		63%-111%

Notes



DOE WTPH-G Quality Control Data

Client:	ERM Northwest			
Project Name:	Birchmount		Date Extracted:	June 2, 1994
Project Number:	94023.00		Date Analyzed:	June 2, 1994
Sample ID:	Method Blank		Dilution Factor:	1
Laboratory Batch #	01302		Units:	mg/kg
Analyte	· · · · · · · · · · · · · · · · · · ·	Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	93%		65%-111%
4-Bromofluorobenzene	98%		63%-111%

Notes

N.D.-Not detected above the reporting limit.



		Qua	lity Control Dat	a		
Client: Project Name:	ERM Northwest Birchmount				Date Extracted:	
Project Number: Batch Sample ID: Laboratory Batch #	94023.00 01300 QA 01302				Date Analyzed: Sample Matrix: Units:	
Analyte	Reporting Limit	Sample Result	Duplicate Result	RPD	Acceptance Limit	Notes
Total Petroleum Hydrocarbons as Gasoline	2.5	80	62	25%	20%	L

Analyte	Spike Added	Spike Recovery	Acceptance Range	Spike Dup Recovery	RPD	Acceptance Limit
Total Petroleum Hydrocarbons						
as Gasoline	50	97%	60%-140%	84%	14%	20%

Notes

L-RPD outside control limits due to low analyte concentration. N.D.-Not detected above the reporting limit.

Moisture Conte	nt Report
-----------------------	-----------

Client: Project Name: Project Number: Laboratory Batch # Units:	ERM Northwest Birchmount 94023.00 01302 % Moisture		Date Sampled: Date Received: Date Analyzed: Sample Matrix:	May 29, 1994 May 31, 1994 June 3, 1994 Soil
Client Sample ID		Sample Result	Notes	Reporting Limit
BP-1-SW		3%		1%
BP-1-NW		5%		1%
BP-1-NE		6%		1%
BP-1-SE		8%		1%
BP-2-NW		5%		1%
BP-2-NE		10%		1%
BP-2-SE		5%		1%
BP-2-SW		6%		1%
BP-3-NW		7%		1%
BP-3-SW		10%		1%
BP-3-SE		6%		1%
BP-3-NE		6%		1%

Pesticides/ PCB'S 608/8080 Pesticides/ PCB'S 608/8080 PAH's 610/8310 PAH's 610/8310 Chlorinated Herblcides 8150 Volatile Organics 624/8240 BNA's 625/8270 DEQ TPH-G/WTPH-G w/BTEX WTPH-418.1/DEQ TPH-418.1 WTPH-418.1/DEQ TPH-418.1 WTPH-Dizeq TPH-D WTPH-Dizeq TPH-D WTPH-Dizeq TPH-D Volatile Croal or Dissolved) List below TCLP Metals / VOA / SemiVOA / Pest & Herb	Provide Provide	Relinquished By: Date: Company: Time: Received By: Date: Dat	$ \frac{-SF}{-NE} = 1528 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1530 + 1547 + 100\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 1547 + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% + 150\% +$	dress: 28 21 Northup Way Suite 100 Bellevue WA 98024 - one Number: (2012) 827-9440 Number: (2012) 827-9440 Snife 827-9440 Shife 827-9440 Shife 827-9440 Sample ID 827-2408 BP-1-NU 5/29/44 BP-1-NE 5/29/44
Omments/Special DEQ TPH-G/WTPH-G w/BTEX WTPH-418.1/DEQ TPH-418.1 WTPH-HCID/DEQ HCID WTPH-D/DEQ TPH-D WTPH-D/DEQ TPH-D WTPH-D/DEQ TPH-D WTPH-D Extended Metals: (Total or Dissolved) List below TCLP Metals / VOA / SemiVOA / Pest & Herb	DEQ TPH-G/WTPH-G w/BTEX WTPH-418.1/DEQ TPH-418.1 WTPH-HCID/DEQ TPH-418.1 WTPH-D/DEQ TPH-D WTPH-D/DEQ TPH-D WTPH-D/DEQ TPH-D WTPH-D Extended Metals: (Total or Dissolved) List below TCLP Metals / VOA / SemiVOA / Pest & Herb TOC/ TOX / TX WTP I+-G	Date:	Receipt: n $e: \frac{5/31}{9}$ $e: \frac{1718}{5:000}$	PAH's 610/8310 Chlorinated Herblcides 8150 Volatile Organics 624/8240
Image: Second	Instructions: WTPH-D Extended Provention Metals: (Total or Dissolved) List below Number: TCLP Metals / VOA / SemiVOA / Pest & Herb TOC/ TOX / TX WTPIH-G W			DEQ TPH-G/WTPH-G w/BTEX
Image: State of the state o	Instruction WTPH-D Extended Pole Metals: (Total or Dissolved) List below Number: TCLP Metals / VOA / SemiVOA / Pest & Herb TOC/ TOX / TX WTPIH-G VOA /		(\$/Speci	
	TOC/TOX/TX WTPIt-G			WTPH-D Extended Metals: (Total or Dissolved)
	wtpit-G		ctions:	List below TCLP Metals / VOA / SemiVOA / Pest & Herb

Pacific Northern Analytical

Chain of Custody/Analysis Request Form Laboratory Batch Number:______

01302

Page 1 of 2

Distribution: White - Return to Originator: Vellow - Lab; Pink - Retained by Originator

į,

۵۰۰۰ میلیدین به دورو میک مکنه ماده وازمواری از مالی از م

1

Distribution: White - Return to Originator: Vellow - Lab; Pink - Retained by Originator

1

Sample ID Phone Number: (206 Address: 2821 Northup Client: ERM-E-C Bill to: P.O.# -2 BP-3-NE -1 BP-3-Fax Number: -10 <u>7-</u> ά 4 ሬ Received By: Relinquished By: Company: 丘心 6 φ By signing this form, you are agreeing to the terms and conditions listed on the back. Company: Received By: Company: Company: Relinquished By: Juite 100 Blevue wA S M 902 <u>ک</u>ر س 827-2408 0 hhs - Ez 8 2 7 さらく 5/29/94 Key 5/29/94 Sampled 18croy-Date Report to: Mile Date needed Le / 7 Turnaround Requested: Sampled 1555 15s <u>-</u> Time _24 hr (+100%) ω 48 hr (+50%) Ω So lè. Matrix Ano 2 Number of Containers 6 Halogenated Volatiles 8240 Condition Sample Receipt: Volatile Aromatics 602/8020 Cool? Yes Date:<u>.</u> Phenols 625/8270 Time: Date: Time: Date: Time: Time: 17(8 Date: 5/ Pesticides/ PCB'S 608/8080 Project Name: PAH's 610/8310 2 0 31/94 Chlorinated Herbicides 8150 Volatile Organics 624/8240 Comments/Special Instructions: BNA's 625/8270 <u>y</u> DEQ TPH-G/WTPH-G w/BTEX **Maun** WTPH-418.1/DEQ TPH-418.1 WTPH-HCID/DEQ HCID t WTPH-D/DEQ TPH-D Project Number: 9402/3-WTPH-D Extended Metals: (Total or Dissolved) List below TCLP Metals / VOA / SemiVOA / Pest &Herb TOC/ TOX / TX utrit-G ģ

Chain of Custody/Analysis Request Form Laboratory Batch Number:______

01302



June 23, 1994

Mike Arnold ERM Northwest 2821 Northup Way Bellevue, WA 98004

Dear Mike:

Enclosed are the analytical results of samples submitted on June 20, 1994 from project Birchmount, 94023.00.

If you have any questions regarding this report or if you need any other assistance, please do not hesitate to call me.

Sincerely,

Cynthia Rezania Project Chemist

CLR/lh

15314 N.E. 95th Street Redmond, WA 98052-2517 (206) 881-7538 • Fax 881-8215



Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount	·	Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-1-SW		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

5.0

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	82%		65%-111%
4-Bromofluorobenzene	88%		63%-111%

Notes

Sample results have been corrected to their dry weight values.



Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-1-SE		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

3.9

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	75%		65%-111%
4-Bromofluorobenzene	82%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-1-NE		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370	1	Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
			<i>CC0/</i> 1110/
Fluorobenzene	80%		65%-111%
4-Bromofluorobenzene	87%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-2-NW		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

N.D.

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	87%		6 5%-111%
4-Bromofluorobenzene	93%		63%-111%

Notes



Client:	ERM Northwest		Date Sampled:	June 17, 1994
Project Name:	Birchmount		Date Received:	June 20, 1994
Project Number:	94023.00		Date Extracted:	June 22, 1994
Client Sample ID:	BP-2-SW		Date Analyzed:	June 22, 1994
Laboratory Batch #	01370		Sample Matrix:	Soil
Units:	mg/kg		Dilution Factor:	1
Analyte		Sample Result	Notes	Reporting Limit

Total Petroleum Hydrocarbons as Gasoline (Toluene to dodecane)

5.5

2.5

Surrogate Recoveries	% Recovery	Notes	Acceptance Range
Fluorobenzene	83%		65%-111%
4-Bromofluorobenzene	91%		63%-111%

Notes

Sample results have been corrected to their dry weight values.