

**3R - 80**

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# **REPORTS**

**DATE:**

**9/11/1992**

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*TIERRA ENVIRONMENTAL COMPANY, INCORPORATED*

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September 11, 1992

Mr. Jim Hicks  
Hicks Oil and Gas  
P.O. Box Drawer 3307  
Farmington, New Mexico 87401

RE: REMEDIATION PROJECT, Federal Unit N.E. Hogback:

Dear Jim:

On September 4, 1992, at about 10:30 P.M., Tierra Environmental Consultant, Ron Castleberry and I met your construction crew at the remediation site. I left Castleberry at the site.

The existing excavation was examined by Castleberry. He conducted headspace testing of the sides and bottom of the excavation with a portable vapor detector using the "headspace method". An envelope of material was removed from the existing excavation until the "headspace" test was below detectable limits. Soils that had been previously excavated and placed on the plastic liner near the excavation were removed to an area on the location pad. A berm was constructed in order to prevent runoff and the material placed therein in six (6) inch lifts. The liner was then removed and disposed of. Because there was obvious staining of soils under the liner showing through the wall of the excavation, the dirt under the liner was also excavated, removed to the bermed area and also spread in six (6) inch lifts.

Following the excavation of both, random soil samples were taken from within the first excavation and from the excavation under the pit liner. No contamination was detectable using the "headspace test".

Non-contaminated soils taken from the over-excavated material was placed back into the excavation and graded in order to prevent the hole from creating a hazard to persons or animal life.

A total of approximately 150 cubic yards were excavated. Of the 150 about 32 cubic yards were spread for remediation. Part of the over-excavation was due to a ramp that was constructed to allow machine access into the excavation.

Three (3) random samples were obtained from the bermed, landfarm area for analysis using the HNU Hanby Field Test Method. The tests indicated that TPH levels exceeded 500 parts per million. The reduction from the laboratory analysis is most probably due to aeration during excavation, removal of the soils to the bermed area and the spreading of the soils in six (6) inch lifts.

RECOMMENDATIONS:

The spread soils containing contamination should be tilled a minimum of once every two (2) weeks. Moisture should be added each time the soils is turned; however, no standing or pooling of the water should be permitted. It will enhance the possibility of hydraulic drive of the contaminants to beneath the landfarm area. Random "headspace testing should be conducted, taking at least three (3) samples from different location with in the landfarm area.

When the "headspace" tests indicate that TPH is below 100 ppm, we will come back and again take samples for laboratory analysis. If the laboratory analysis collaborates the "headspace" tests, we will recommend closure to the BLM.

As I told you on the phone last week, I strongly recommend the addition of "Bio-Max" in order to enhance and accelerate natural bio-degradation of the contaminated soils. Bio-Max is not a "Superbug" although it does contain microbes. They interact with the natural occurring microbes already in the soil and accelerate their activity, thereby shortening the time frame necessary for successful remediation.

Call me if you have any questions.

Sincerely,



Phillip C. Nobis  
Vice President

cc: OCD  
BLM



## Tierra Environmental

### Case Narrative

On July 20, 1992, a single soil sample was submitted to Inter-Mountain Laboratories, Farmington for analysis. The sample was received intact and was designated "Hicks, Fed. Hogback". Analysis for Total Petroleum Hydrocarbons (TPH) was performed as per the accompanying chain of custody form.

Extraction of the sample was performed using Method 3550, "Sonication Extraction", with 1,1,2,2-tetrachlorotrifluoroethane (Freon) as the extraction solvent. Analysis was by Method 418.1, "Total Recoverable Petroleum Hydrocarbons", using a Beckman Acculab 10 Infrared Spectrophotometer. Petroleum hydrocarbons were detected in the sample above the stated detection limits as indicated in the enclosed report.

It is the policy of this laboratory to employ, whenever possible, preparatory and analytical methods which have been approved by regulatory agencies. The methods used in the analysis of the samples reported here are found in Test Methods for Evaluation of Solid Waste, SW-846, USEPA, 1986 and Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, USEPA, 1983.

Quality control reports have been included for your information. These reports appear at the end of the analytical package and may be identified by title. If there are any questions regarding the information presented in this package, please feel free to call at your convenience.

Sincerely,



Dr. Denise A. Bohemier,

Organic Lab Supervisor



2506 West Main Street  
Farmington, New Mexico 87401  
Tel. (505) 326-4737

EPA Method 418.1  
Total Recoverable Petroleum Hydrocarbons

Client:	Tierra Environmental	Report Date:	8/5/92
Project ID:	Hicks, Fed. Hogback	Date Sampled:	7/20/92
Sample Matrix:	Soil	Date Received:	7/20/96
Preservation:	Cool	Date Extracted:	8/5/92
Condition:	Intact	Date Analyzed:	8/5/92

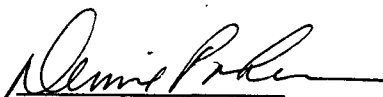
Sample ID	Lab Number	Concentration (ppm)	Detection Limit (ppm)
NE Hogback	9286	81400	8300

ND - Parameter not detected at stated detection limit

Reference: Method 418.1 - Petroleum Hydrocarbons, Total  
Recoverable Chemical Analysis of Water and Waste,  
United States Environmental Protection Agency, 1978.

Extraction by Method 3550 - Sonication Extraction  
Test Methods for Evaluating Solid Waste, SW-846,  
USEPA, November 1986.

Comments:

  
Analyst

  
Review

Quality Control Report  
Total Recoverable Petroleum Hydrocarbons

Duplicate Analysis

Client:	Tierra Environmental	Report Date:	8/5/92
Project ID:	Hicks, Fed. Hogback	Date Sampled:	7/20/92
Sample ID:	NE Hogback	Date Received:	7/20/92
Lab ID:	9286	Date Extracted:	8/5/92
Matrix:	Soil	Date Analyzed:	8/5/92

Sample ID	Duplicate Concentration	Original Concentration	Percent Difference	Acceptance Limit
NE Hogback	69800	81400	15%	<30%

ND- Analyte Not Detected at stated detection limit

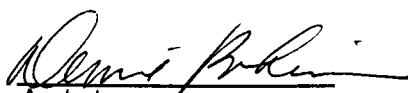
NA- Value not calculated.

Reference:

Method 418.1 - Petroleum Hydrocarbons, Total Recoverable  
Chemical Analysis of Water and Waste, United States  
Environmental Protection Agency, 1978.

Extraction by Method 3550 - Sonication Extraction  
Test Methods for Evaluating Solid Waste, SW-846,  
USEPA, November 1986.

Comments:

  
Analyst

 for Charles Ballen  
Review



2506 West Main Street  
Farmington, New Mexico 87401  
Tel. (505) 326-4737

Quality Control Report  
Total Recoverable Petroleum Hydrocarbons

Method Blank Analysis

Client: Tierra Environmental      Report Date: 8/5/92  
Project ID: Hicks, Fed. Hogback      Date Analyzed: 8/5/92

Lab Number	Concentration (mg/mL)	Detection Limit (mg/kg)
MB0720	ND	2.50

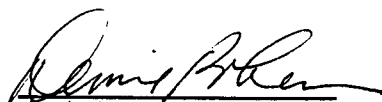
ND- Analyte Not Detected at stated detection limit

Reference:

Method 418.1 - Petroleum Hydrocarbons, Total Recoverable  
Chemical Analysis of Water and Waste, United States  
Environmental Protection Agency, 1978.

Extraction by Method 3550 - Sonication Extraction  
Test Methods for Evaluating Solid Waste, SW-846,  
USEPA, November 1986.

Comments:

  
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2506 West Main Street  
Farmington, New Mexico 87401  
Tel. (505) 326-4737

Quality Control Report  
Total Recoverable Petroleum Hydrocarbons

Matrix Spike Analysis

Client:	Tierra Environmental	Report Date:	8/5/92
Project ID:	Hicks, Fed. Hogback	Date Sampled:	7/20/92
Sample ID:	Fed. NE Hogback	Date Received:	7/20/92
Lab ID:	9286	Date Extracted:	8/5/92
Matrix:	Soil	Date Analyzed:	8/5/92

Sample ID	Spiked Sample Concentration (mg/kg)	Unspiked Sample Concentration (mg/kg)	Spike Added (mg/kg)	Percent Recovery
MBSPK	10.5	0.0	10.0	105%

ND- Analyte Not Detected at stated detection limit


Spike recovery acceptance limit: 42-125%

Reference:

Method 418.1 - Petroleum Hydrocarbons, Total Recoverable  
Chemical Analysis of Water and Waste, United States  
Environmental Protection Agency, 1978.

Extraction by Method 3550 - Sonication Extraction  
Test Methods for Evaluating Solid Waste, SW-846,  
USEPA, November 1986.

Comments:

  
Analyst

  
Review



# CHAIN OF CUSTODY RECORD

Client/Project Name		Project Location		ANALYSES / PARAMETERS			
Terra Environmental Inc.		Eagle NE Highway					
Sampler: (Signature)		Chain of Custody Tape No.		Remarks			
Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers		
Comp 1	7/14/92	11:00 AM		Soil	1	7/14/92	
Comp 2	7/14/92	11:00 AM		"	1	7/14/92	
Comp 3	7/14/92	11:00 AM		"	1	7/14/92	
Relinquished by: (Signature)		Date	Time	Received by: (Signature)		Date	Time
[Signature]		7/21	11:45 AM	[Signature]		7/21/92	11:45
Relinquished by: (Signature)		Date	Time	Received by: (Signature)		Date	Time
Relinquished by: (Signature)		Date	Time	Received by laboratory: (Signature)		Date	Time

☐ 1633 Terra Avenue  
Sheridan, Wyoming 82801  
Telephone (307) 672-8945

☐ 2506 West Main Street  
Farmington, NM 87401  
Telephone (505) 326-4737

☐ 1714 Phillips Circle  
Gillette, Wyoming 82716  
Telephone (307) 682-8945

☐ 3304 Longmire Drive  
College Station, TX 77845  
Telephone (409) 774-4999

Inter-Mountain Laboratories, Inc.

0195

**CASE NARRATIVE**

On July 22, 1992, one sample was received for analysis at Inter-Mountain Labs, Bozeman, Montana. The chain of custody form requested analysis for Toxic Characteristic Leaching Procedure Parameters, Volatiles and Semivolatiles. Client name/Project name was listed as Tierra Environmental/Fed NE Hogback.

Benzene was detected in the sample.

The Toxic Characteristic Leaching Procedure methodology used is outlined in the Federal Register, 40 CFR 261, Vol. 55, No. 126, June 29, 1990. Results are reported in mass per unit volume of leachate (mg/L) and calculated from matrix spike recoveries as prescribed by the TC Rule.

Limits of detection for each instrument/analysis are determined by sample matrix effects, instrument performance under standard conditions, and dilution requirements to maintain chromatography output within calibration ranges.



Wynn Sudtelgte  
IML-Bozeman

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
TENTATIVELY IDENTIFIED COMPOUNDS**

Client:	TIERRA ENVIRONMENTAL		
Sample ID:	Comp 1	Date Reported:	07/30/92
Laboratory ID:	B923229	Date Sampled:	07/21/92
Sample Matrix:	Soil	Date Analyzed:	07/29/92

Tentative Identification	Retention Time (min)	Concentration	Units
Toluene	14.11	0.04	mg/L
Ethylbenzene	16.64	0.06	mg/L
Xylene(total)	16.85, 17.47	0.29	mg/L
Unknown Hydrocarbon	9.30	0.07	mg/L
Unknown Aromatic	19.54	0.08	mg/L

Unknown concentrations calculated assuming a Relative Response Factor = 1.



**QUALITY CONTROL:**

Surrogate Recovery	%
1,2-Dichloroethane-d4	91
Toluene-d8	101
Bromofluorobenzene	98

**References:**

Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics,  
Test Methods for Evaluating Solid Wastes, SW-846, United States  
Environmental Protection Agency, Third Edition, November 1986.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register,  
40 CFR 261-302, Part V, Environmental Protection Agency, Vol. 55, No. 126,  
June 29, 1990.

  
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Analyst  
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**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL VOLATILE COMPOUNDS**

Client: **TIERRA ENVIRONMENTAL**  
Sample ID: **Comp 1**  
Project ID: **Fed NE Hogback**  
Laboratory ID: **B923229**  
Sample Matrix: **Soil**  
Preservation: **Cool**  
Condition: **Intact**

Date Reported: **07/30/92**  
Date Sampled: **07/21/92**  
Date Received: **07/22/92**  
Date Extracted TCLP: **07/24/92**  
Date Analyzed: **07/29/92**

Parameter	Analytical Result (mg/L)	Detection Limit (mg/L)	Regulatory Limit (mg/L)
1,1-Dichloroethene	ND	0.02	0.7
1,2-Dichloroethane	ND	0.02	0.5
2-Butanone	ND	0.1	200
Benzene	0.057	0.02	0.5
Carbon Tetrachloride	ND	0.02	0.5
Chlorobenzene	ND	0.02	100
Chloroform	ND	0.02	6
Tetrachloroethene	ND	0.02	0.7
Trichloroethene	ND	0.02	0.5
Vinyl Chloride	ND	0.02	0.2

ND - Compound not detected at stated Detection Limit.

J - Meets identification criteria, below Detection Limit.

B - Compound detected in Method Blank.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
TENTATIVELY IDENTIFIED COMPOUNDS**

Client: **TIERRA ENVIRONMENTAL**  
Sample ID: **Comp 3**  
Laboratory ID: **B923229**  
Sample Matrix: **Soil**

Date Reported: **07/29/92**  
Date Sampled: **07/21/92**  
Date Analyzed: **07/27/92**

Parameter	Retention Time(min.)	Concentration	Units
2,4-Dimethylphenol	13.89	0.012	mg/L
Naphthalene	14.26	0.043	mg/L
2-Methylnaphthalene	16.21	0.040	mg/L
1-Methylnaphthalene	16.48	0.03	mg/L
Unknown hydrocarbon	20.56	0.2	mg/L

Unknown concentrations calculated assuming Relative Response Factor = 1.

**QUALITY CONTROL:**

Surrogate Recoveries	%
2-Fluorophenol	53
Phenol-d6	41
Nitrobenzene-d5	66
2-Fluorobiphenyl	66
2,4,6-Tribromophenol	88
Terphenyl-d14	77

**References:**

Method 8270, Gas Chromatography/Mass Spectrometry for Semi-Volatile Organics, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, December 1987.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register, 40 CFR 261-302, Part V, Environmental Protection Agency, Vol. 55, No. 126, June 29, 1990.

  
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**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL SEMI-VOLATILE COMPOUNDS**

Client: TIERRA ENVIRONMENTAL  
Sample ID: Comp 3  
Project ID: Fed NE Hogback  
Laboratory ID: B923229  
Sample Matrix: Soil  
Preservation: Cool  
Condition: Intact

Report Date: 07/29/92  
Date Sampled: 07/21/92  
Date Received: 07/22/92  
Date Extracted-TCLP: 07/24/92  
Date Analyzed: 07/27/92  
Date Extracted-BNA: 07/27/92

Parameter	Analytical Result (mg/L)	Detection Limit (mg/L)	Regulatory Limit (mg/L)
1,4-Dichlorobenzene	ND	0.02	7.5
Hexachloroethane	ND	0.02	3
Nitrobenzene	ND	0.02	2
Hexachloro-1,3-butadiene	ND	0.02	0.5
2,4,6-Trichlorophenol	ND	0.02	2
2,4,5-Trichlorophenol	ND	0.02	400
2,4-Dinitrotoluene	ND	0.02	0.13
Hexachlorobenzene	ND	0.02	0.13
Pentachlorophenol	ND	0.02	100
o-Cresol	ND	0.02	200 **
m & p-Cresol *	ND	0.02	200 **
Pyridine	ND	0.2	5

ND - Compound not detected at stated Detection Limit

B - Compound detected in Method Blank.

\* - Compounds coelute by GCMS.

\*\* - Regulatory Limit of combined Cresols.

## **QUALITY ASSURANCE / QUALITY CONTROL**



**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL VOLATILE COMPOUNDS  
METHOD BLANK**

Client:	TIERRA ENVIRONMENTAL		
Sample ID:	Method Blank	Date Reported:	07/30/92
Project ID:	Fed NE Hogback	Date Sampled:	NA
Laboratory ID:	Q210A	Date Received:	NA
Sample Matrix:	Water	Date Extracted TCLP:	NA
Preservation:	NA	Date Analyzed:	07/29/92
Condition:	NA		

Parameter	Analytical Result (mg/L)	Detection Limit (mg/L)	Regulatory Limit (mg/L)
1,1-Dichloroethene	ND	0.005	0.7
1,2-Dichloroethane	ND	0.005	0.5
2-Butanone	ND	0.02	200
Benzene	ND	0.005	0.5
Carbon Tetrachloride	ND	0.005	0.5
Chlorobenzene	ND	0.005	100
Chloroform	ND	0.005	6
Tetrachloroethene	ND	0.005	0.7
Trichloroethene	ND	0.005	0.5
Vinyl Chloride	ND	0.005	0.2

ND - Compound not detected at stated Detection Limit.

J - Meets identification criteria, below Detection Limit.

B - Compound detected in Method Blank.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
TENTATIVELY IDENTIFIED COMPOUNDS**

Client: **TIERRA ENVIRONMENTAL**  
Sample ID: **Method Blank**  
Laboratory ID: **Q210A**  
Sample Matrix: **Water**

Date Reported: **07/30/92**  
Date Sampled: **NA**  
Date Analyzed: **07/29/92**

Tentative Identification	Retention Time (min)	Concentration	Units
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No additional compounds found at reportable levels.

Unknown concentrations calculated assuming a Relative Response Factor = 1.

**QUALITY CONTROL:**

Surrogate Recovery	%
1,2-Dichloroethane-d4	93
Toluene-d8	104
Bromofluorobenzene	94

**References:**

Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics,  
Test Methods for Evaluating Solid Wastes, SW-846, United States  
Environmental Protection Agency, Third Edition, November 1986.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register,  
40 CFR 261-302, Part V, Environmental Protection Agency, Vol. 55, No. 126,  
June 29, 1990.

  
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Analyst

  
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Reviewed

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL VOLATILE COMPOUNDS  
METHOD BLANK**

Client:	TIERRA ENVIRONMENTAL		
Sample ID:	Extraction Blank	Date Reported:	07/30/92
Project ID:	Fed NE Hogback	Date Sampled:	NA
Laboratory ID:	T210A	Date Received:	NA
Sample Matrix:	Extraction Fluid	Date Extracted TCLP:	07/24/92
Preservation:	NA	Date Analyzed:	07/29/92
Condition:	NA		

Parameter	Analytical Result (mg/L)	Detection Limit (mg/L)	Regulatory Limit (mg/L)
1,1-Dichloroethene	ND	0.02	0.7
1,2-Dichloroethane	ND	0.02	0.5
2-Butanone	ND	0.1	200
Benzene	ND	0.02	0.5
Carbon Tetrachloride	ND	0.02	0.5
Chlorobenzene	ND	0.02	100
Chloroform	ND	0.02	6
Tetrachloroethene	ND	0.02	0.7
Trichloroethene	ND	0.02	0.5
Vinyl Chloride	ND	0.02	0.2

ND - Compound not detected at stated Detection Limit.

J - Meets identification criteria, below Detection Limit.

B - Compound detected in Method Blank.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
TENTATIVELY IDENTIFIED COMPOUNDS**

Client: **TIERRA ENVIRONMENTAL**  
Sample ID: Extraction Blank  
Laboratory ID: T210A  
Sample Matrix: Extraction Fluid

Date Reported: 07/30/92  
Date Sampled: NA  
Date Analyzed: 07/29/92

Tentative Identification	Retention Time (min)	Concentration	Units
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No additional compounds found at reportable levels.

Unknown concentrations calculated assuming a Relative Response Factor = 1.

**QUALITY CONTROL:**

Surrogate Recovery	%
1,2-Dichloroethane-d4	93
Toluene-d8	104
Bromofluorobenzene	94

**References:**

Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics,  
Test Methods for Evaluating Solid Wastes, SW-846, United States  
Environmental Protection Agency, Third Edition, November 1986.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register,  
40 CFR 261-302, Part V, Environmental Protection Agency, Vol. 55, No. 126,  
June 29, 1990.

  
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Analyst  
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Reviewed

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL SEMI-VOLATILE COMPOUNDS  
METHOD BLANK ANALYSIS**

Client:	TIERRA ENVIRONMENTAL	Report Date:	07/29/92
Sample ID:	TCLP Method Blank	Date Sampled:	NA
Project ID:	Fed NE Hogback	Date Received:	NA
Laboratory ID:	Blank 67	Date Extracted-TCLP:	07/24/92
Sample Matrix:	Extraction Fluid	Date Analyzed:	07/27/92
Preservation:	NA	Date Extracted-BNA:	07/27/92
Condition:	NA		

Parameter	Analytical Result	Detection Limit	Units
1,4-Dichlorobenzene	ND	0.02	mg/L
Hexachloroethane	ND	0.02	mg/L
Nitrobenzene	ND	0.02	mg/L
Hexachloro-1,3-butadiene	ND	0.02	mg/L
2,4,6-Trichlorophenol	ND	0.02	mg/L
2,4,5-Trichlorophenol	ND	0.02	mg/L
2,4-Dinitrotoluene	ND	0.02	mg/L
Hexachlorobenzene	ND	0.02	mg/L
Pentachlorophenol	ND	0.02	mg/L
o-Cresol	ND	0.02	mg/L
m & p-Cresol *	ND	0.02	mg/L
Pyridine	ND	0.2	mg/L

ND - Compound not detected at stated Detection Limit.

\* - Compounds coelute by GCMS.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
TENTATIVELY IDENTIFIED COMPOUNDS  
METHOD BLANK ANALYSIS**

Client: **TIERRA ENVIRONMENTAL**  
Sample ID: **TCLP Method Blank** Date Reported: **07/29/92**  
Laboratory ID: **Blank 67** Date Sampled: **01/19/00**  
Sample Matrix: **Extraction Fluid** Date Analyzed: **07/27/92**

Parameter	Retention Time(min)	Concentration	Units
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No additional compounds found at reportable levels.

Unknown concentration calculated assuming Relative Response Factor = 1.

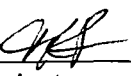
**QUALITY CONTROL:**

Surrogate Recoveries	%
2-Fluorophenol	54
Phenol-d6	38
Nitrobenzene-d5	75
2-Fluorobiphenyl	70
2,4,6-Tribromophenol	90
Terphenyl-d14	83

**References:**

Method 8270, Gas Chromatography/Mass Spectrometry for Semi-Volatile  
Organics, Test Methods for Evaluating Solid Wastes, United States  
Environmental Protection Agency, December 1987.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal  
Register, 40 CFR 261-302, Part V, Environmental Protection Agency,  
Vol. 55, No. 126, June 29, 1990.

  
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Analyst

  
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Reviewed

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL VOLATILE COMPOUNDS  
MATRIX SPIKE SUMMARY**

Client:	TIERRA ENVIRONMENTAL	Date Reported:	07/30/92
Sample ID:	Matrix Spike	Date Sampled:	NA
Laboratory ID:	W3229	Date Received:	NA
Sample Matrix:	Extraction Fluid	Date Extracted TCLP:	07/24/92
Preservation:	NA	Date Analyzed:	07/29/92
Condition:	NA		

Parameter	Spike Added (ug/L)	Sample Concentration (ug/L)	Matrix Spike Concentration (ug/L)	Matrix Spike Recovery (%)
Vinyl Chloride	100	0	109	109
1,1-Dichloroethene	100	0	99	99
1,2-Dichloroethane	100	0	94	94
Chloroform	100	0	99	99
Carbon Tetrachloride	100	0	98	98
Trichloroethene	100	1	105	104
Benzene	100	14	125	111
Tetrachloroethene	100	0	101	101
Chlorobenzene	100	0	108	108
Methyl Ethyl Ketone	100	0	66	66

**References:**

Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics,  
Test Methods for Evaluating Solid Wastes, SW-846, United States  
Environmental Protection Agency, Third Edition, November 1986.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register,  
40 CFR 261-302, Part V, Environmental Protection Agency, Vol. 55, No. 126,  
June 29, 1990.

  
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Analyst  
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Reviewed

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL SEMI-VOLATILE COMPOUNDS  
MATRIX SPIKE SUMMARY**

Client:	TIERRA ENVIRONMENTAL	Date Reported:	07/29/92
Sample ID:	Blank Matrix Spike	Date Sampled:	NA
Project ID:	Fed NE Hogback	Date Received:	NA
Laboratory ID:	TBS-210	Date Extracted:	07/28/92
Sample Matrix:	Extraction Fluid	Date Analyzed:	07/29/92
Preservation:	NA		
Condition:	NA		

Parameter	Matrix Spike Conc.	Sample Conc.	Matrix Spike Recovery	Spike Amount	Percent Recovery
1,4-Dichlorobenzene	60	0	60	100	60
Hexachloroethane	56	0	56	100	56
Nitrobenzene	68	0	68	100	68
Hexachloro-1,3-butadiene	65	0	65	100	65
2,4,6-Trichlorophenol	85	0	85	100	85
2,4,5-Trichlorophenol	78	0	78	100	78
2,4-Dinitrotoluene	68	0	68	100	68
Hexachlorobenzene	77	0	77	100	77
Pentachlorophenol	18	0	18	100	18
o-Cresol	68	0	68	100	68
m,p-Cresol	66	0	66	100	66
Pyridine	58	0	58	100	58


All values are total nanograms.

**Reference:**

Method 8270, Semivolatile Organics - GC/MS, Test Methods for Evaluating  
Solid Waste, United States Environmental Protection Agency,  
SW-846, Vol. IB, November 1986.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal  
Register, 40 CFR 261-302, Part V, Environmental Protection  
Agency, Vol. 55, No. 126, June 29, 1990.

  
\_\_\_\_\_  
Analyst

  
\_\_\_\_\_  
Reviewed



**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
HSL SEMI-VOLATILE COMPOUNDS**

Client: **TIERRA ENVIRONMENTAL**  
Sample ID: Comp 3  
Project ID: Fed NE Hogback  
Laboratory ID: B923229 Duplicate  
Sample Matrix: Soil  
Preservation: Cool  
Condition: Intact

Report Date: 07/29/92  
Date Sampled: 07/21/92  
Date Received: 07/22/92  
Date Extracted-TCLP: 07/24/92  
Date Analyzed: 07/27/92  
Date Extracted-BNA: 07/27/92

Parameter	Analytical Result (mg/L)	Detection Limit (mg/L)	Regulatory Limit (mg/L)
1,4-Dichlorobenzene	ND	0.02	7.5
Hexachloroethane	ND	0.02	3
Nitrobenzene	ND	0.02	2
Hexachloro-1,3-butadiene	ND	0.02	0.5
2,4,6-Trichlorophenol	ND	0.02	2
2,4,5-Trichlorophenol	ND	0.02	400
2,4-Dinitrotoluene	ND	0.02	0.13
Hexachlorobenzene	ND	0.02	0.13
Pentachlorophenol	ND	0.02	100
o-Cresol	ND	0.02	200 **
m & p-Cresol *	ND	0.02	200 **
Pyridine	ND	0.2	5

ND - Compound not detected at stated Detection Limit

B - Compound detected in Method Blank.

\* - Compounds coelute by GCMS.

\*\* - Regulatory Limit of combined Cresols.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
TENTATIVELY IDENTIFIED COMPOUNDS**

Client: **TIERRA ENVIRONMENTAL**  
Sample ID: **Comp 3**  
Laboratory ID: **B923229 Duplicate**  
Sample Matrix: **Soil**

Date Reported: **07/29/92**  
Date Sampled: **07/21/92**  
Date Analyzed: **07/27/92**

Parameter	Retention Time(min.)	Concentration	Units
2,4-Dimethylphenol	13.88	0.011	mg/L
Naphthalene	14.24	0.036	mg/L
2-Methylnaphthalene	16.22	0.035	mg/L
1-Methylnaphthalene	16.49	0.03	mg/L
Unknown hydrocarbon	20.57	0.1	mg/L

Unknown concentrations calculated assuming Relative Response Factor = 1.

**QUALITY CONTROL:**

Surrogate Recoveries	%
2-Fluorophenol	50
Phenol-d6	44
Nitrobenzene-d5	59
2-Fluorobiphenyl	70
2,4,6-Tribromophenol	94
Terphenyl-d14	82

**References:**

Method 8270, Gas Chromatography/Mass Spectrometry for Semi-Volatile Organics, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, December 1987.

Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register, 40 CFR 261-302, Part V, Environmental Protection Agency, Vol. 55, No. 126, June 29, 1990.

  
\_\_\_\_\_  
Analyst

  
\_\_\_\_\_  
Reviewed


## CASE NARRATIVE

On 07/27/92, one TCLP extract was received by Inter-Mountain Laboratories, Inc. at 1633 Terra Ave., Sheridan, Wyoming. The sample custody document indicated request for analysis of parameters from the TC Rule analyte list. The sample arrived cool and intact, custody sheets remained with the extract.

The TCLP preparation and extraction was performed following the steps defined by the EPA using Method 1311, SW-846, November 1990, and found in the Federal Register, 40 CFR 261, Volume 55, No. 126, June 1990. A duplicate analysis was prepared to evaluate the extraction reproducibility. Relative percent differences were reported only if the analyte concentrations exceeded five times the detection levels. A matrix spike was used to determine matrix effect on the recovery of the target analytes. Matrix spike information was used, via the TC Rule, for the final calculation of the analyte concentrations. Method blanks were used to determine any method induced contamination.

Limits of detection for each instrument or analysis were determined with respect to matrix effect, instrument performance under standard operating conditions and sample dilution. TCLP results were reported as mass per unit volume of leachate. Data qualifiers may have been used in accordance with USEPA data validation guidelines.

Reviewed by:

  
Chris L. Brackeen  
Environmental Chemist  
IML-Sheridan

Data File ID: \_\_\_\_\_00-586\_\_\_\_\_

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE  
TRACE METAL CONCENTRATIONS**

Client: **Tierra Environmental**  
Sample ID: **Comp. 3**  
Lab ID: **9294B/5601**  
Matrix: **Water**  
Preservation: **Cool/Intact**

Report Date: **08/04/92**  
Date Sampled: **07/21/92**  
Date Received: **07/21/92**  
TCLP Extract: **07/24/92**  
Date Analyzed: **07/28/92**

Parameter:	Analytical Result	Regulatory Level	(Units)
Arsenic	<0.1	5.0	mg/L
Barium	0.8 B	100	mg/L
Cadmium	<0.005	1.0	mg/L
Chromium	<0.01	5.0	mg/L
Lead	<0.2	5.0	mg/L
Mercury	<0.001	0.20	mg/L
Selenium	<0.1	1.0	mg/L
Silver	<0.01	5.0	mg/L

**Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register, 40 CFR 261-302, Part V, EPA Vol. 55, No. 126 June 29, 1990.**

**Method 6010A :** Inductively Coupled Plasma-Atomic Emission Spectroscopy, SW-846, Nov. 1990.

**Method 7470A :** Mercury in Liquid Waste (Manual Cold Vapor Technique), SW-846, Nov. 1990.

Reviewed by: C.B.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE**  
**TRACE METAL CONCENTRATIONS**  
Quality Control/Duplicate Analysis

Client: **Tierra Environmental**  
Sample ID: **Comp. 3**  
Lab ID: **9294B/5601**  
Date: **08/04/92**

Parameter:	Initial Sample Result mg/L	Second Sample Result mg/L	Relative Percent Difference
Arsenic	<0.1	<0.1	
Barium	0.8	0.8	0.0
Cadmium	<0.005	<0.005	
Chromium	<0.01	<0.01	
Lead	<0.2	<0.2	
Mercury	<0.001	<0.001	
Selenium	<0.1	<0.1	
Silver	<0.01	<0.01	

**Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register, 40 CFR 261-302, Part V, EPA Vol. 55, No. 126 June 29, 1990.**

**Method 6010A :** Inductively Coupled Plasma-Atomic Emission Spectroscopy, SW-846, Nov. 1990.

**Method 7470A :** Mercury in Liquid Waste (Manual Cold Vapor Technique), SW-846, Nov. 1990.

**Laboratory Data Validation, Functional Guidelines for Evaluating Inorganics Analyses, USEPA, July 1988.**

Reviewed by: C.B.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE**  
**TRACE METAL CONCENTRATIONS**  
Quality Control/Matrix Spike

Client: **Tierra Environmental**  
Sample ID: **Comp. 3**  
Lab ID: **9294B/5601**  
Date: **08/04/92**

Parameter:	Spiked Sample Result mg/L	Sample Result mg/L	Spike Added mg/L	Percent Spike Recovery
Arsenic	2.2	<0.1	2.5	88.0
Barium	2.5	0.7	2.0	90.0
Cadmium	0.457	<0.005	0.500	91.4
Chromium	0.86	<0.01	1.00	86.0
Lead	1.6	<0.2	2.0	80.0
Mercury	0.009	<0.001	0.010	90.0
Selenium	2.4	<0.1	2.5	96.0
Silver	0.48	<0.01	0.50	96.0

**Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register, 40 CFR 261-302, Part V, EPA Vol. 55, No. 126 June 29, 1990.**

**Method 6010A :** Inductively Coupled Plasma-Atomic Emission Spectroscopy, SW-846, Nov. 1990.

**Method 7470A :** Mercury in Liquid Waste (Manual Cold Vapor Technique), SW-846, Nov. 1990.

Laboratory Data Validation, Functional Guidelines for Evaluating Inorganics Analyses, USEPA, July 1988.

Reviewed by: CB.

**TOXICITY CHARACTERISTIC LEACHING PROCEDURE**  
**TRACE METAL CONCENTRATIONS**  
Quality Control/Blank Analysis

Client: **Tierra Environmental**  
Sample ID: **IML Blank**  
Lab ID: **5602**  
Matrix: **Fluid**

Report Date: **08/04/92**  
TCLP Extract: **07/24/92**  
Date Analyzed: **07/28/92**

Parameter:	Analytical Result	Regulatory Level	(Units)
Arsenic	<0.1	5.0	mg/L
Barium	1.0	100	mg/L
Cadmium	<0.005	1.0	mg/L
Chromium	<0.01	5.0	mg/L
Lead	<0.2	5.0	mg/L
Mercury	<0.001	0.20	mg/L
Selenium	<0.1	1.0	mg/L
Silver	<0.01	5.0	mg/L

**Toxicity Characteristic Leaching Procedure, Final Rule, Federal Register, 40 CFR 261-302, Part V, EPA Vol. 55, No. 126 June 29, 1990.**

**Method 6010A :** Inductively Coupled Plasma-Atomic Emission Spectroscopy, SW-846, Nov. 1990.

**Method 7470A :** Mercury in Liquid Waste (Manual Cold Vapor Technique), SW-846, Nov. 1990.

Reviewed by: CB

## TCLP REFERENCE LIST:

1.0 Date of Sampling: 7-21-92  
Date of Laboratory Receipt: 7-21-92  
Date of TCLP Extraction: 7-24-92

## 2.0 Quality Control Parameters:

Holding Times Maintained: ✓ Yes        No  
Method Blank Data: ✓ Yes        No  
Matrix Spike Data: ✓ Yes        No  
Data Qualifiers: ✓ Yes        No

J = Estimated Quantity; B = Present in Blank; R = Data Unusable;  
UJ = Analyzed but Not Detected, Sample Detection Value.

## 3.0 Analyte Information:

Parameter:	CAS #:	Regulatory Level (mg/L)	Detection Level (mg/L)	Method
Arsenic	7440-38-2	5.0	0.1	6010A
Barium	7440-39-3	100	0.5	6010A
Cadmium	7440-43-9	1.0	0.005	6010A
Chromium	7440-47-3	5.0	0.01	6010A
Lead	7439-92-1	5.0	0.2	6010A
Mercury	7439-97-6	0.2	0.001	7470A
Selenium	7782-22-4	1.0	0.1	6010A
Silver	7440-22-4	5.0	0.01	6010A

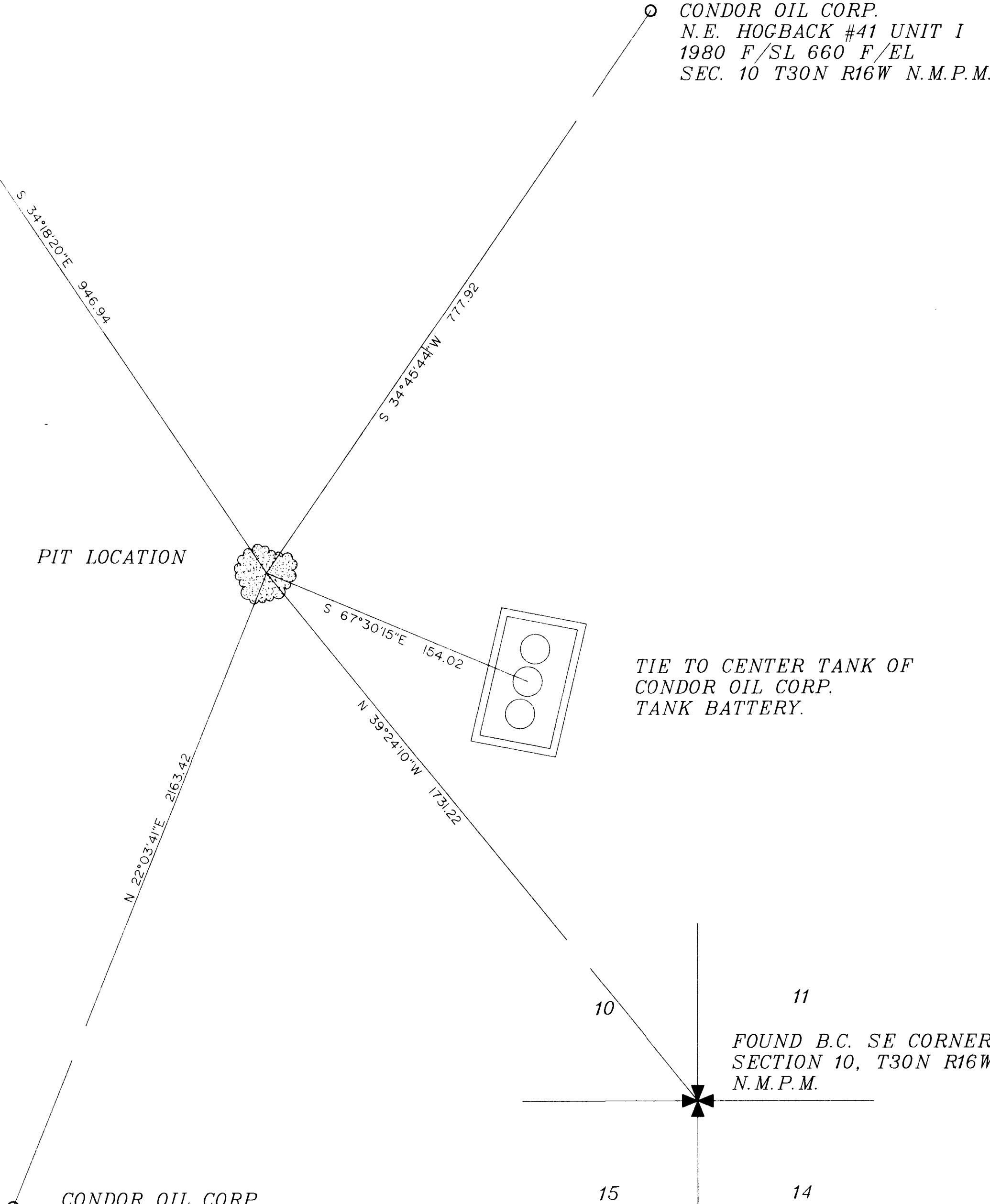
4.0 Comments: Barium detected in the  
blank.



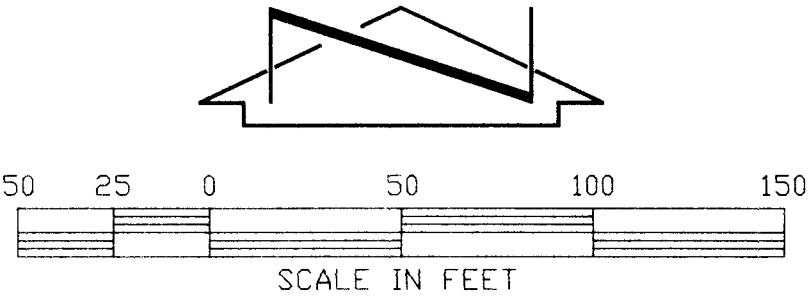
CONDOR OIL CORP.  
N.E. HOGBACK #40 UNIT J  
1980 F/SL 660 F/EL  
SEC. 10 T30N R16W N.M.P.M.

**HICKS OIL AND GAS, INC.**  
**REMEDATION PROJECT SITE SURVEY**  
**FEDERAL UNIT N.E., HOGBACK, SE1/4 SE1/4,**  
**SECTION 10, T30N R16W, N.M.P.M.**  
**SAN JUAN COUNTY, NEW MEXICO**

CONDOR OIL CORP.  
N.E. HOGBACK #41 UNIT I  
1980 F/SL 660 F/EL  
SEC. 10 T30N R16W N.M.P.M.

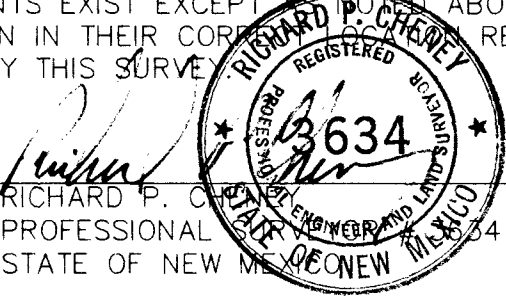


CONDOR OIL CORP.  
N.E. HOGBACK #6 UNIT B  
650 F/NL 1910 F/EL  
SEC. 15 T30N R16W N.M.P.M.  
(SIGN READS SEC. 14)



I, RICHARD P. CHENEY, A REGISTERED PROFESSIONAL SURVEYOR UNDER THE LAWS OF THE STATE IN WHICH THIS SURVEY WAS PERFORMED, HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY MEETING THE MINIMUM REQUIREMENTS OF THE STANDARDS FOR LAND SURVEYS AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT NO ENCROACHMENTS EXIST EXCEPT AS SHOWN ABOVE, AND THAT ALL IMPROVEMENTS ARE SHOWN IN THEIR CORRECT RELATIVE RECORD BOUNDARIES AS LOCATED BY THIS SURVEY.

7/20/92  
DATE  
7/17/92  
REVISION DATE



JUL 20 1992

CHENEY - WALTERS - ECHOLS  
**BREWER ASSOCIATES, INC.**  
909 W. APACHE, FARMINGTON, N.M.

MORTGAGE PLAT? NO	PROPERTY SURVEY? NO	MONUMENTS SET? NO
DRAWN BY: LH	PARTY CHIEF: GT	APPROVED: RC
DATE: 7/17/92	DATE OF FIELD SURVEY: 7/17/92	DEED: NONE
BASIS OF BEARING: EAST LINE OF SECTION PRESUMED NORTH		PROJECT NO. 92031 FILE: 2031COND