Bratcher, Mike, EMNRD

From: Hale, Aaron [Aaron.Hale@tetratech.com]
Sent: Wednesday, October 12, 2011 4:35 PM
To: Bratcher, Mike, EMNRD
Cc: Franklin, Tom K.; Grubbs, Robert; Tavarez, Ike
Subject: SM Energy Parkway 36 State #001
Attachments: SM Energy - Parkway 36 State #1 - Remediation Work Plan.pdf

Hello Mike –

Here is a work plan for a chloride spill from an unknown and unauthorized transport truck. I will put the hard copy in the mail for you tomorrow. Please let me know if you have any questions. We will probably try to work this one into our schedule sometime end of next week.

Thank you

Aaron M. Hale, P.G. | Project Manager III
Office· 432 682.4559 | Cell· 432.634.7287
Aaron.Hale@tetratech.com

Tetra Tech | MMI
1910 N Big Spring Street | Midland, TX 79705 | www.tetratech.com

SITE INFORMATION

Report Type: Work Plan

General Site Information:	
Site:	Parkway 36 State #001
Company:	SM Energy Company
Section, Township and Range	Section 36, T19S, R29E Unit Letter - F
Lease Number:	
County:	Eddy County
GPS:	32.61872° N, 104.03101° W
Surface Owner:	State
Mineral Owner:	
Directions:	From the intersection of Hwy 360 and Co Rd 235, follow Co Rd 235 approximatly 4.75 miles to the NW. Turn south on caliche road and go approximatly 1.1 miles. Site is on the west side of the road.

Release Data:	
Date Released:	8/9/2011
Type Release:	Produced Water
Source of Contamination:	Unknow and unauthorized transport truck
Fluid Released:	125 bbls
Fluids Recovered:	0 bbls

Official Communication:			
Name:	Chad McNeely		Aaron Hale
Company:	SM Energy Company		Tetra Tech
Address:	3300 N A St # 7-200		1910 N. Big Spring
P.O. Box			
City:	Midland, Texas		Midland, Texas
Phone number:	(432) 688-3124		(432) 682-4559
Fax:			
Email:	cmcneely@sm-energy.com		aaron.hale@tetratech.com

Ranking Criteria		
Depth to Groundwater:	Ranking Score	Site Data
<50 ft	20	
50-99 ft	10	
>100 ft	0	0
WellHead Protection:	Ranking Score	Site Data
Water Source <1,000 ft., Private <200 ft.	20	
Water Source >1,000 ft., Private >200 ft.	0	0
Surface Body of Water:	Ranking Score	Site Data
<200 ft.	20	
200 ft - 1,000 ft.	10	
>1,000 ft.	0	0
Total Ranking Score:	0	

Acceptable Soil RRAL (mg/kg)		
Benzene	Total BTEX	TPH
10	50	5,000

TETRA TECH

October 10, 2011

Mr. Mike Bratcher
Environmental Engineer
Oil Conservation Division, District 2
1301 W. Grand Avenue
Artesia, New Mexico 88210

Re: Work Plan for the SM Energy Company
Parkway Delaware Unit 36 State #001
Unit F, Section 36, Township 19 South, Range 29 East
Eddy County, New Mexico

Mr. Bratcher:

Tetra Tech, Inc. (Tetra Tech) was contacted by SM Energy Company (SM Energy) to assess an unauthorized produced water release at the Parkway Delaware Unit 36 State #001 located in Unit F, Section 36, Township 19 South, Range 29 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.61872°, W 104.03101°. The site location is shown on Figures 1 and 2.

Background

According to the State of New Mexico C-141 Initial Report, the leak was discovered on August 9, 2011. Approximately 125 barrels of produced water were released into the pasture from an unknown and unauthorized transport truck. No barrels of produced water were recovered. The initial C-141 is enclosed in Appendix A.

Hydrology

The New Mexico Office of the State Engineers (OSE) Website listed two water wells within a half mile of the site. These wells (identified by the OSE as CP 00742 and CP 00703) had reported depths to water at 115 feet below ground surface (bgs).

The New Mexico Oil Conservation Division (OCD) regional groundwater gradient map for Eddy County shows the depth to groundwater in this section at approximately 100 feet.

According to the Geology and Ground-Water Resources of Eddy County, New Mexico (Report 3), the Rustler Formation is present in most of the area east of the Pecos River. The Rustler Formation consists of anhydrite, gypsum, interbedded sandy clays and shales, and irregular beds of dolomite.

Regulatory

A risk-based evaluation was performed for the Site in accordance with the OCD Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene, and xylene). Based upon the depth to groundwater, the proposed RRAL for TPH is 5,000 mg/kg.

Soil Assessment and Results

On August 17, 2011, Tetra Tech personnel collected soils samples up to 2.5 feet bgs, utilizing a hand auger at five locations within the spill area (identified as AH-1, AH-2, AH-3, AH-4 and AH-5). The spill area was estimated to cover approximately 7,938 square feet. Soil sampling stopped in each location when auger refusal occurred. Soil samples were submitted for laboratory analysis of TPH by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by SM method 4500. The results of the sampling are summarized in Table 1. The laboratory analytical data indicated that chloride impact was limited to the upper 1.0 foot to 1.5 foot of soil. BTEX and TPH concentrations were not detected at the surface level.

All sample locations had chloride concentrations that decreased with depth. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix B.

Work Plan

The proposed excavation plan is intended to minimize disruption to the facility while removing surficial chloride impacted soils. The area around AH-1, AH-2, AH-3, AH-4 and AH-5 will be excavated to a depth not likely to exceed 1 to 2 feet bgs. Once excavation has been concluded the site will be backfilled with clean soils. Soils excavated from all areas will be transported under manifest for proper disposal.

Once the remedial activities are performed, a closure report with a final C-141 will be submitted for the soils at the site. If you require any additional

TETRA TECH

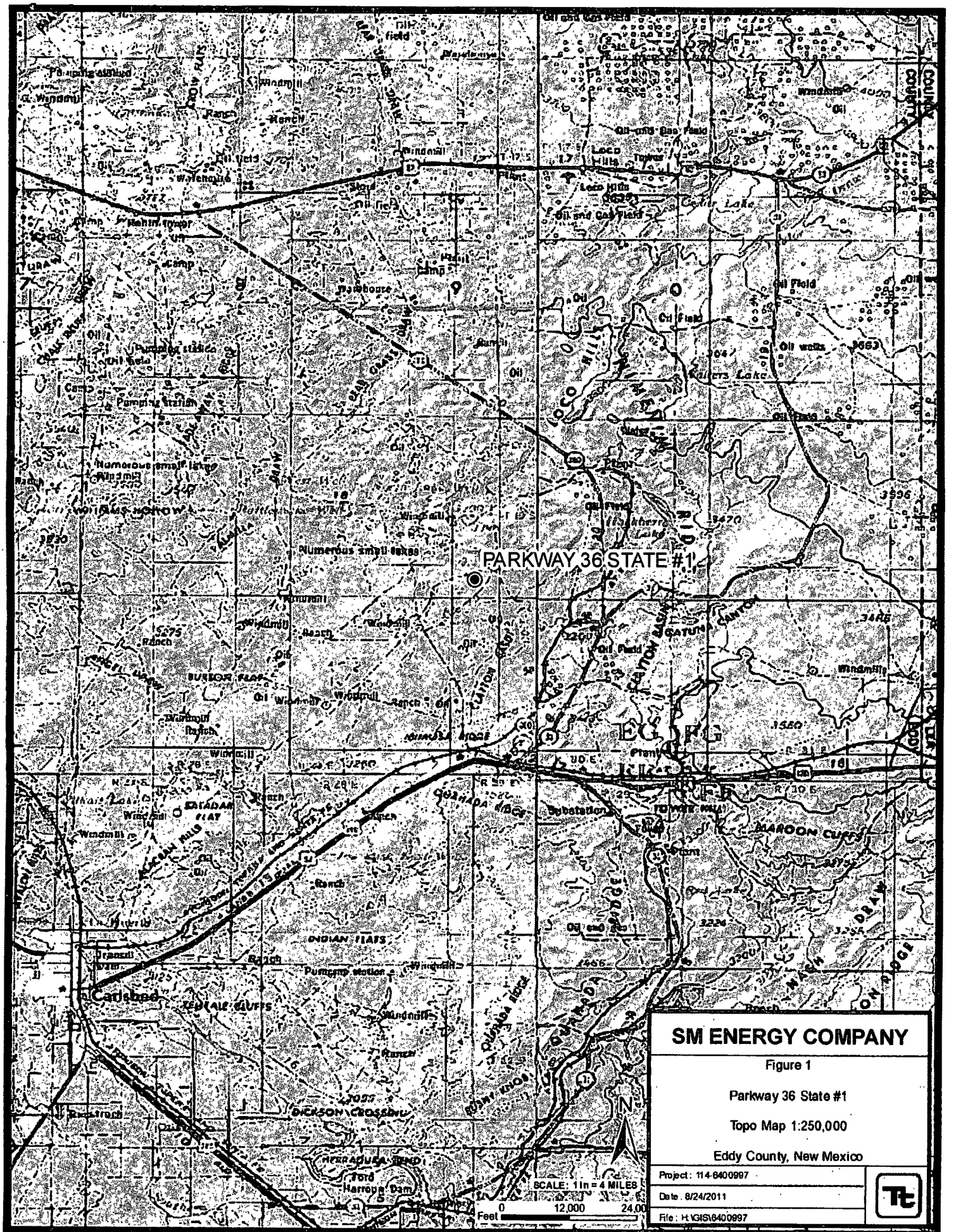
information or have any questions or comments concerning this work plan, please call at (432) 682-4559.

Respectfully submitted,
TETRA TECH, INC.

Aaron Hale
Senior Project Manager

cc: Chad McNeely – SM Energy Company
Don Riggs – SM Energy Company
Mark Bondy – SM Energy Company

FIGURES



SM ENERGY COMPANY

Figure 1

Parkway 36 State #1

Topo Map 1:250,000

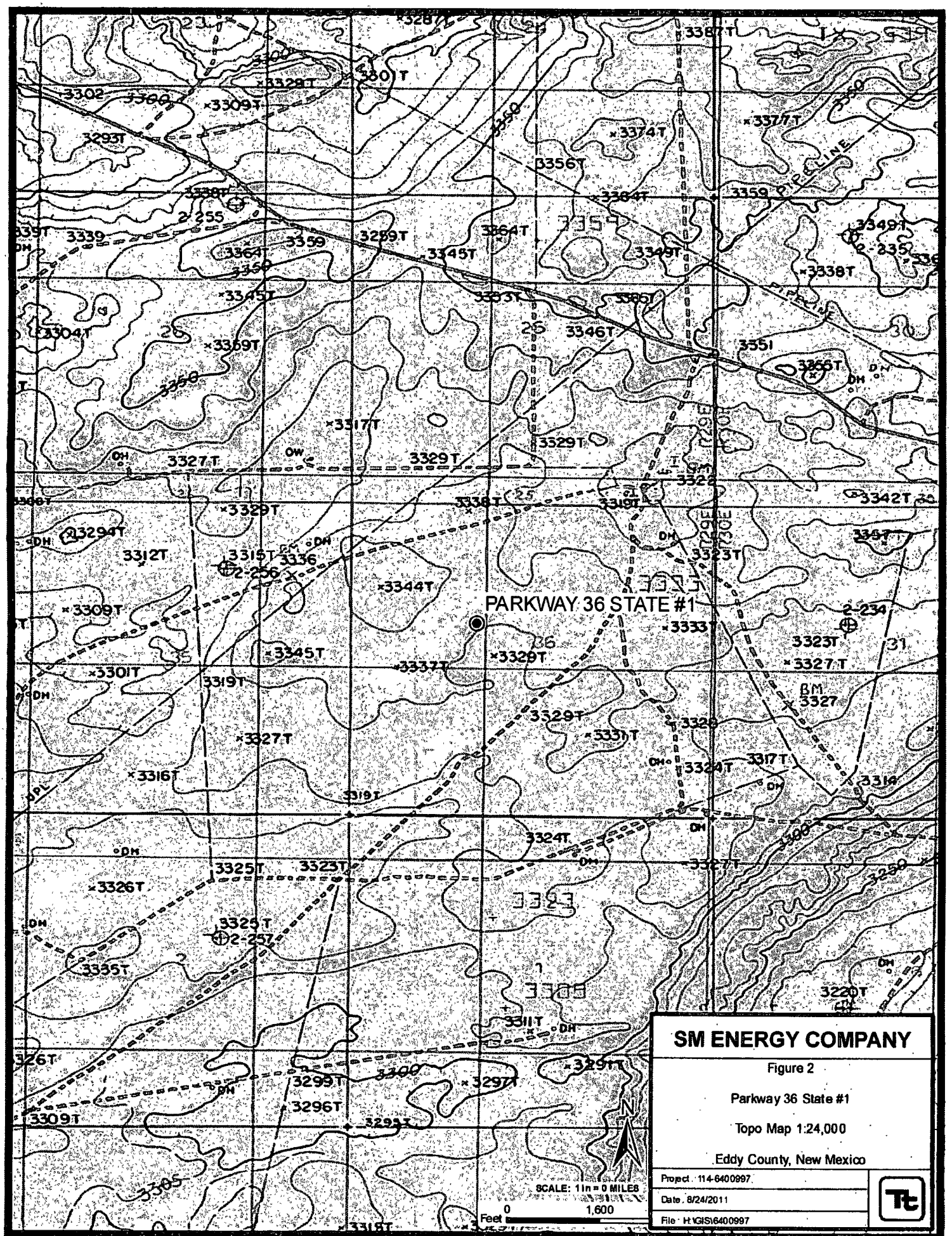
Eddy County, New Mexico

Project : 114-6400997

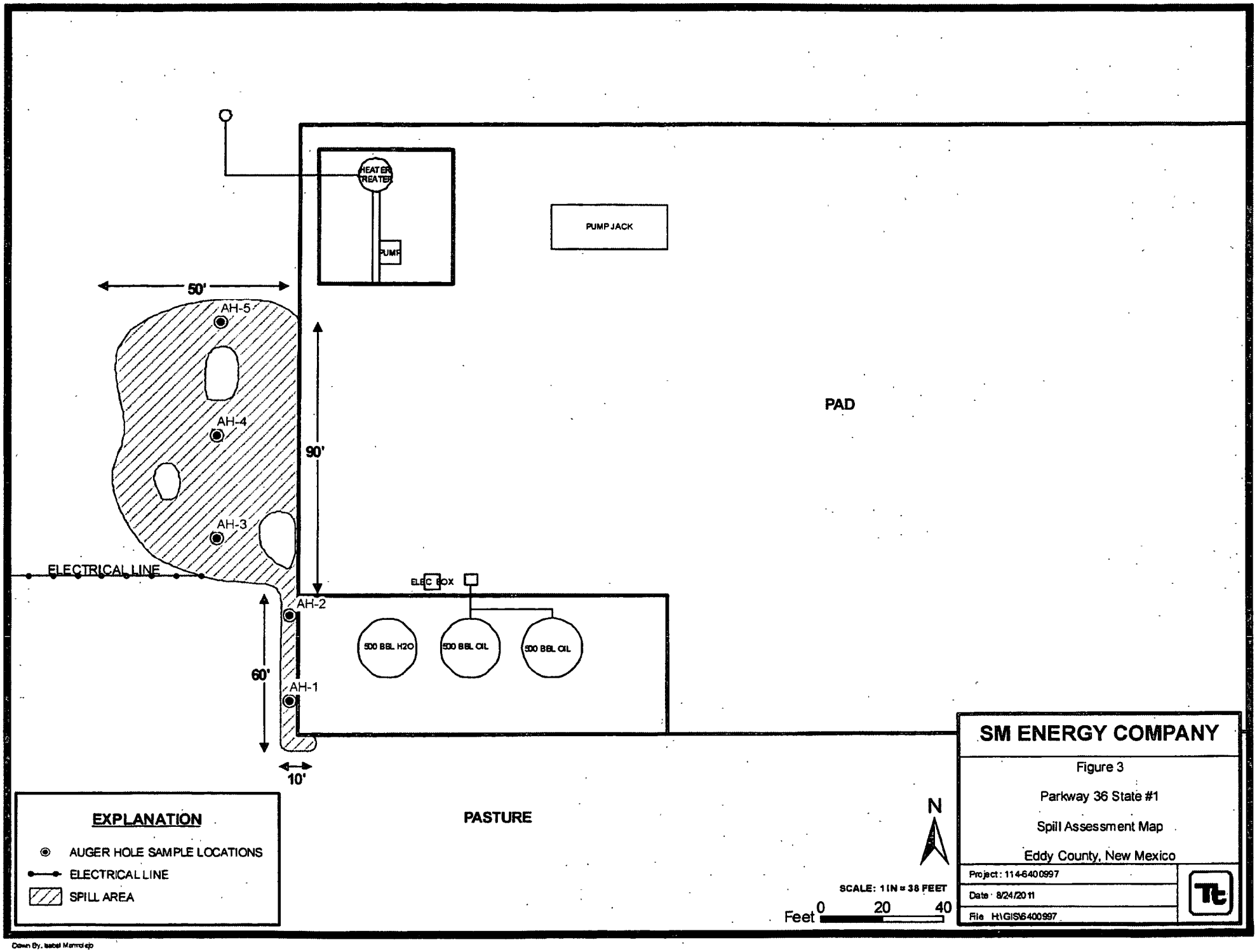
Date : 8/24/2011

File : H:\GIS\6400997

Drawn By: Isabel Marmolejo



Down By: Isabel Marmolejo



Drawn By: Isabel Marmolejo

TABLES

Table 1
SM Energy
PDU 36 State #001
Eddy County, New Mexico

Sample ID	Sample Date	Sample Depth (ft)	Soil Status		TPH (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethlybenzene (mg/kg)	Xylene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
			In-Situ	Removed	GRO	DRO	Total						
AH-1	8/17/2011	0-1'	X		<2.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	4,870
	"	1-1.5'	X		-	-	-	-	-	-	-	-	217
	"	2-2.5'	X		-	-	-	-	-	-	-	-	<200
AH-2	8/17/2011	0-1'	X		<2.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	4,020
	"	1-1.5'	X		-	-	-	-	-	-	-	-	<200
	"	1.5-2'	X		-	-	-	-	-	-	-	-	216
AH-3	8/17/2011	0-1'	X		<2.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	10,200
	"	1-1.5'	X		-	-	-	-	-	-	-	-	<200
	"	2-2.5'	X		-	-	-	-	-	-	-	-	<200
AH-4	8/17/2011	0-1'	X		<2.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	4,360
	"	1-1.5'	X		-	-	-	-	-	-	-	-	8,980
	"	2-2.5'	X		-	-	-	-	-	-	-	-	<200
AH-5	8/17/2011	0-1'	X		<2.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	5,850
	"	1-1.5'	X		-	-	-	-	-	-	-	-	<200
	"	2-2.5'	X		-	-	-	-	-	-	-	-	<200

(--) Not Analyzed

Proposed Excavation Depths

APPENDIX A

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

0497

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised October 10, 2003

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company SM ENERGY COMPANY	Contact VICKIE MARTINEZ
Address 3300 N "A" ST BLDG 7-200 MIDLAND, TX 79705	Telephone No. (432)688-1709
Facility Name PARKWAY 36 STATE #001	Facility Type BATTERY

Surface Owner COMMISSIONER OF PUBLIC LANDS	Mineral Owner COMMISSIONER OF PUBLIC LANDS	Lease No. 30-015-26112

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
F	36	19S	29E					EDDY

Latitude_____ **Longitude**_____

NATURE OF RELEASE

Type of Release PRODUCED WATER	Volume of Release 125	Volume Recovered 0
Source of Release UNKNOWN	Date and Hour of Occurrence 8/9/11	Date and Hour of Discovery 8/9/11
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? MIKE BRATCHER	
By Whom? BILL HEARNE	Date and Hour 8/9/11 1:58 PM	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

SOMETIME BETWEEN 8/8/11 AND 8/9/11 AN UNKNOWN WATER TRANSPORT TRUCK BACKED UP TO LOCATION AND DUMPED A LOAD IN PASTURE NEAR SM ENERGY'S PARKWAY 36 STATE #001

Describe Area Affected and Cleanup Action Taken.*

AFFECTED AREA - PASTURE LAND 36'X126' WHICH EQUALLED 7938 SQ FT AREA
CLEAN UP ACTION TAKEN - NO WATER RECOVERED AND WILL TURN OVER TO TETRA TECH ENVIRONMENTAL FOR ASSESSMENT AND CLEAN UP

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: Vickie Martinez

Printed Name: VICKIE MARTINEZ

Title: ENGINEER TECH II

E-mail Address: VMARTINEZ@SM-ENERGY.COM

Date: 08/10/2011 Phone: (432)688-1709

OIL CONSERVATION DIVISION

Approved by District Supervisor:

Approval Date: Expiration Date:

Conditions of Approval: Attached ☐

* Attach Additional Sheets If Necessary

APPENDIX B

TRACEANALYSIS, INC.
6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298
2501 East Sunset Road, Suite 1 El Paso, Texas 79922 915•585•3443 FAX 915•585•4944
5002 Basin Street, Suite A1 Midland, Texas 79703 432•689•6301 FAX 432•689•6313
3615 Harris Parkway, Suite 310 Fort Worth, Texas 76132 817•201•5260
e-Mail: lab@traceanalysis.com

Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report

Aaron Hale
Tetra Tech
1910 N. Big Spring Street
Midland, TX, 79705

Report Date: August 24, 2011

Work Order: 11081826

Project Location: Eddy Co., NM
Project Name: SM Energy/PDU 36 State #001
Project Number: 114-6400997

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
274908	AH-1 0-1'	soil	2011-08-17	00:00	2011-08-18
274909	AH-1 1-1.5'	soil	2011-08-17	00:00	2011-08-18
274910	AH-1 2-2.5'	soil	2011-08-17	00:00	2011-08-18
274911	AH-2 0-1'	soil	2011-08-17	00:00	2011-08-18
274912	AH-2 1-1.5'	soil	2011-08-17	00:00	2011-08-18
274913	AH-2 1.5-2'	soil	2011-08-17	00:00	2011-08-18
274914	AH-3 0-1'	soil	2011-08-17	00:00	2011-08-18
274915	AH-3 1-1.5'	soil	2011-08-17	00:00	2011-08-18
274916	AH-3 2-2.5'	soil	2011-08-17	00:00	2011-08-18
274917	AH-4 0-1'	soil	2011-08-17	00:00	2011-08-18
274918	AH-4 1-1.5'	soil	2011-08-17	00:00	2011-08-18
274919	AH-4 2-2.5'	soil	2011-08-17	00:00	2011-08-18
274920	AH-5 0-1'	soil	2011-08-17	00.00	2011-08-18
274921	AH-5 1-1.5'	soil	2011-08-17	00:00	2011-08-18
274922	AH-5 2-2.5'	soil	2011-08-17	00:00	2011-08-18

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 27 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director
Dr. Michael Abel, Project Manager

Report Contents

Case Narrative

Samples for project SM Energy/PDU 36 State #001 were received by TraceAnalysis, Inc. on 2011-08-18 and assigned to work order 11081826. Samples for work order 11081826 were received intact at a temperature of 3.4 C.

Samples were analyzed for the following tests using their respective methods.

Test	Method	Prep Batch	Prep Date	QC Batch	Analysis Date
BTEX	S 8021B	71411	2011-08-19 at 10:58	84101	2011-08-19 at 10:58
Chloride (Titration)	SM 4500-Cl B	71416	2011-08-19 at 15:42	84136	2011-08-22 at 16:26
Chloride (Titration)	SM 4500-Cl B	71416	2011-08-19 at 15:42	84205	2011-08-24 at 12:20
TPH DRO - NEW	S 8015 D	71417	2011-08-19 at 09:19	84108	2011-08-19 at 09:19
TPH GRO	S 8015 D	71411	2011-08-19 at 10:58	84102	2011-08-19 at 10:58

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11081826 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Analytical Report

Sample: 274908 - AH-1 0-1'

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5035
QC Batch:	84101	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0 0200	mg/Kg	1	0.0200
Toluene	U	1	<0.0200	mg/Kg	1	0.0200
Ethylbenzene	U	1	<0.0200	mg/Kg	1	0.0200
Xylene	U	1	<0.0200	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.79	mg/Kg	1	2 00	140	82.8 - 143.1
4-Bromofluorobenzene (4-BFB)			2.53	mg/Kg	1	2.00	126	70 6 - 179

Sample: 274908 - AH-1 0-1'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84136	Date Analyzed:	2011-08-22	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation.	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			**4870**	mg/Kg	100	4.00

Sample: 274908 - AH-1 0-1'

Laboratory:	Midland				
Analysis:	TPH DRO - NEW	Analytical Method:	S 8015 D	Prep Method:	N/A
QC Batch:	84108	Date Analyzed:	2011-08-19	Analyzed By:	kg
Prep Batch:	71417	Sample Preparation:	2011-08-19	Prepared By:	kg

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
DRO	U	1	<50.0	mg/Kg	1	50.0

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			86.1	mg/Kg	1	100	86	67.5 - 147.1

Sample: 274908 - AH-1 0-1'

Laboratory:	Midland				
Analysis:	TPH GRO	Analytical Method:	S 8015 D	Prep Method:	S 5035
QC Batch:	84102	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	U	1	<2.00	mg/Kg	1	2.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.47	mg/Kg	1	2.00	124	30 - 134.6
4-Bromofluorobenzene (4-BFB)			2.14	mg/Kg	1	2.00	107	22.4 - 149

Sample: 274909 - AH-1 1-1.5'

Laboratory.	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84136	Date Analyzed:	2011-08-22	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation.	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			**217**	mg/Kg	50	4.00

Sample: 274910 - AH-1 2-2.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84136	Date Analyzed:	2011-08-22	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

continued ..

sample 274910 continued . .

Parameter	Flag	Cert	RL Result	Units	Dilution	RL

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	U		<200	mg/Kg	50	4.00

Sample: 274911 - AH-2 0-1'

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5035
QC Batch:	84101	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.0200	mg/Kg	1	0.0200
Toluene	U	1	<0.0200	mg/Kg	1	0.0200
Ethylbenzene	U	1	<0.0200	mg/Kg	1	0.0200
Xylene	U	1	<0.0200	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.74	mg/Kg	1	2.00	137	82.8 - 143.1
4-Bromofluorobenzene (4-BFB)			2.50	mg/Kg	1	2.00	125	70.6 - 179

Sample: 274911 - AH-2 0-1'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84136	Date Analyzed:	2011-08-22	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			**4020**	mg/Kg	100	4.00

Sample: 274911 - AH-2 0-1'

Laboratory:	Midland				
Analysis:	TPH DRO - NEW	Analytical Method:	S 8015 D	Prep Method:	N/A
QC Batch:	84108	Date Analyzed:	2011-08-19	Analyzed By:	kg
Prep Batch:	71417	Sample Preparation:	2011-08-19	Prepared By:	kg

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
DRO	U	1	<50.0	mg/Kg	1	50.0

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			91.4	mg/Kg	1	100	91	67.5 - 147.1

Sample: 274911 - AH-2 0-1'

Laboratory:	Midland				
Analysis:	TPH GRO	Analytical Method:	S 8015 D	Prep Method:	S 5035
QC Batch:	84102	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
GRO	U	1	<2.00	mg/Kg	1	2.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.40	mg/Kg	1	2.00	120	30 - 134.6
4-Bromofluorobenzene (4-BFB)			2.10	mg/Kg	1	2.00	105	22.4 - 149

Sample: 274912 - AH-2 1-1.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84136	Date Analyzed:	2011-08-22	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Chloride	U		<200	mg/Kg	50	4.00

Sample: 274913 - AH-2 1.5-2'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Chloride			**216**		mg/Kg	50	4.00

Sample: 274914 - AH-3 0-1'

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5035
QC Batch:	84101	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Benzene	U	1	<0.0200		mg/Kg	1	0.0200
Toluene	U	1	<0.0200		mg/Kg	1	0.0200
Ethylbenzene	U	1	<0.0200		mg/Kg	1	0.0200
Xylene	U	1	<0.0200		mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.74	mg/Kg	1	2.00	137	82.8 - 143.1
4-Bromofluorobenzene (4-BFB)			2.51	mg/Kg	1	2.00	126	70.6 - 179

Sample: 274914 - AH-3 0-1'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	Result	RL	Units	Dilution	RL
Chloride			**10200**		mg/Kg	100	4.00

Sample: 274914 - AH-3 0-1'

Laboratory:	Midland				
Analysis:	TPH DRO - NEW	Analytical Method:	S 8015 D	Prep Method:	N/A
QC Batch:	84108	Date Analyzed:	2011-08-19	Analyzed By:	kg
Prep Batch:	71417	Sample Preparation:	2011-08-19	Prepared By:	kg

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
DRO	U	1	<50.0	mg/Kg	1	50.0

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			87.2	mg/Kg	1	100	87	67.5 - 147.1

Sample: 274914 - AH-3 0-1'

Laboratory:	Midland				
Analysis:	TPH GRO	Analytical Method:	S 8015 D	Prep Method:	S 5035
QC Batch:	84102	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	U	1	<2.00	mg/Kg	1	2.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.42	mg/Kg	1	2.00	121	30 - 134.6
4-Bromofluorobenzene (4-BFB)			2.10	mg/Kg	1	2.00	105	22.4 - 149

Sample: 274915 - AH-3 1-1.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	U		<200	mg/Kg	50	4.00

Sample: 274916 - AH-3 2-2.5'

Laboratory:	Midland				
Analysis	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	U		<200	mg/Kg	50	4.00

Sample: 274917 - AH-4 0-1'

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method.	S 8021B	Prep Method:	S 5035
QC Batch:	84101	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.0200	mg/Kg	1	0.0200
Toluene	U	1	<0.0200	mg/Kg	1	0.0200
Ethylbenzene	U	1	<0 0200	mg/Kg	1	0.0200
Xylene	U	1	<0.0200	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.39	mg/Kg	1	2.00	120	82.8 - 143.1
4-Bromofluorobenzene (4-BFB)			2.21	mg/Kg	1	2.00	110	70.6 - 179

Sample: 274917 - AH-4 0-1'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method.	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			**4360**	mg/Kg	100	4.00

Sample: 274917 - AH-4 0-1'

Laboratory:	Midland				
Analysis:	TPH DRO - NEW	Analytical Method:	S 8015 D	Prep Method:	N/A
QC Batch:	84108	Date Analyzed:	2011-08-19	Analyzed By:	kg
Prep Batch:	71417	Sample Preparation:	2011-08-19	Prepared By:	kg

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
DRO	U	1	<50.0	mg/Kg	1	50.0

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			87.1	mg/Kg	1	100	87	67.5 - 147.1

Sample: 274917 - AH-4 0-1'

Laboratory:	Midland				
Analysis:	TPH GRO	Analytical Method:	S 8015 D	Prep Method:	S 5035
QC Batch:	84102	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	U	1	<2.00	mg/Kg	1	2.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.09	mg/Kg	1	2.00	104	30 - 134.6
4-Bromofluorobenzene (4-BFB)	1		1.86	mg/Kg	1	2.00	93	22.4 - 149

Sample: 274918 - AH-4 1-1.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			**8980**	mg/Kg	100	4.00

Sample: 274919 - AH-4 2-2.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	U		<200	mg/Kg	50	4.00

Sample: 274920 - AH-5 0-1'

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5035
QC Batch:	84101	Date Analyzed:	2011-08-19	Analyzed By:	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	U	1	<0.0200	mg/Kg	1	0.0200
Toluene	U	1	<0.0200	mg/Kg	1	0.0200
Ethylbenzene	U	1	<0.0200	mg/Kg	1	0.0200
Xylene	U	1	<0.0200	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.71	mg/Kg	1	2.00	136	82.8 - 143.1
4-Bromofluorobenzene (4-BFB)			2.48	mg/Kg	1	2.00	124	70.6 - 179

Sample: 274920 - AH-5 0-1'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			**5850**	mg/Kg	100	4.00

Sample: 274920 - AH-5 0-1'

Laboratory:	Midland				
Analysis:	TPH DRO - NEW	Analytical Method:	S 8015 D	Prep Method:	N/A
QC Batch:	84108	Date Analyzed:	2011-08-19	Analyzed By:	kg
Prep Batch:	71417	Sample Preparation:	2011-08-19	Prepared By:	kg

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
DRO	U	1	<50.0	mg/Kg	1	50.0

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			89.5	mg/Kg	1	100	90	67.5 - 147.1

Sample: 274920 - AH-5 0-1'

Laboratory:	Midland				
Analysis:	TPH GRO	Analytical Method:	S 8015 D	Prep Method.	S 5035
QC Batch:	84102	Date Analyzed:	2011-08-19	Analyzed By	ME
Prep Batch:	71411	Sample Preparation:	2011-08-19	Prepared By:	ME

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
GRO	U	1	<2.00	mg/Kg	1	2.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.38	mg/Kg	1	2.00	119	30 - 134.6
4-Bromofluorobenzene (4-BFB)			2.09	mg/Kg	1	2.00	104	22.4 - 149

Sample: 274921 - AH-5 1-1.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	Result	RL Units	Dilution	RL
Chloride	U		<200	mg/Kg	50	4.00

Sample: 274922 - AH-5 2-2.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	Sample Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	U		<200	mg/Kg	50	4.00

Method Blanks

Method Blank (1) QC Batch: 84101

QC Batch: 84101 | Date Analyzed: 2011-08-19 | Analyzed By: ME
Prep Batch: 71411 | QC Preparation: 2011-08-19 | Prepared By: ME

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		1	<0.0118	mg/Kg	0.02
Toluene		1	<0.00600	mg/Kg	0.02
Ethylbenzene		1	<0.00850	mg/Kg	0.02
Xylene		1	<0.00613	mg/Kg	0.02

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.10	mg/Kg	1	2.00	105	65.9 - 111.8
4-Bromofluorobenzene (4-BFB)			2.07	mg/Kg	1	2.00	104	48.4 - 123.1

Method Blank (1) QC Batch: 84102

QC Batch: 84102 | Date Analyzed: 2011-08-19 | Analyzed By: ME
Prep Batch: 71411 | QC Preparation: 2011-08-19 | Prepared By: ME

Parameter	Flag	Cert	MDL Result	Units	RL
GRO		1	<0.753	mg/Kg	2

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			1.88	mg/Kg	1	2.00	94	67.6 - 150
4-Bromofluorobenzene (4-BFB)			1.77	mg/Kg	1	2.00	88	52.4 - 130

Method Blank (1) QC Batch: 84108

QC Batch: 84108 | Date Analyzed: 2011-08-19 | Analyzed By: kg
Prep Batch: 71417 | QC Preparation: 2011-08-19 | Prepared By: kg

Parameter	Flag	Cert	MDL Result	Units	RL
DRO		1	<14.5	mg/Kg	50

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			83.7	mg/Kg	1	100	84	52.7 - 133.8

Method Blank (1) QC Batch: 84136

QC Batch:	84136	Date Analyzed:	2011-08-22	Analyzed By:	AR
Prep Batch:	71416	QC Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	MDL Result	Units	RL
Chloride			<3.85	mg/Kg	4

Method Blank (1) QC Batch: 84205

QC Batch:	84205	Date Analyzed:	2011-08-24	Analyzed By:	AR
Prep Batch:	71416	QC Preparation:	2011-08-19	Prepared By:	AR

Parameter	Flag	Cert	MDL Result	Units	RL
Chloride			<3.85	mg/Kg	4

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 84101 | Date Analyzed: 2011-08-19 | Analyzed By: ME
Prep Batch: 71411 | QC Preparation: 2011-08-19 | Prepared By: ME

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	1.99	mg/Kg	1	2.00	<0.0118	100	77.4 - 121.7
Toluene		1	2.16	mg/Kg	1	2.00	<0.00600	108	88.6 - 121.6
Ethylbenzene		1	2.23	mg/Kg	1	2.00	<0.00850	112	74.3 - 117.9
Xylene		1	6.71	mg/Kg	1	6.00	<0.00613	112	73.4 - 118.8

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	2.06	mg/Kg	1	2.00	<0.0118	103	77.4 - 121.7	3	20
Toluene		1	2.23	mg/Kg	1	2.00	<0.00600	112	88.6 - 121.6	3	20
Ethylbenzene		1	2.28	mg/Kg	1	2.00	<0.00850	114	74.3 - 117.9	2	20
Xylene		1	6.90	mg/Kg	1	6.00	<0.00613	115	73.4 - 118.8	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	2.22	2.17	mg/Kg	1	2.00	111	108	65.5 - 116.7
4-Bromofluorobenzene (4-BFB)	2.38	2.36	mg/Kg	1	2.00	119	118	56.2 - 132.1

Laboratory Control Spike (LCS-1)

QC Batch: 84102 | Date Analyzed: 2011-08-19 | Analyzed By: ME
Prep Batch: 71411 | QC Preparation: 2011-08-19 | Prepared By: ME

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
GRO		1	17.4	mg/Kg	1	20.0	<0.753	87	60.9 - 95.4

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

continued ...

control spikes continued ...

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
GRO		1	17.8	mg/Kg	1	20.0	<0.753	89	60.9 - 95.4	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	2.05	2.07	mg/Kg	1	2.00	102	104	61.9 - 142
4-Bromofluorobenzene (4-BFB)	2.09	1.84	mg/Kg	1	2.00	104	92	68.2 - 132

Laboratory Control Spike (LCS-1)

QC Batch: 84108 | Date Analyzed: 2011-08-19 | Analyzed By: kg
Prep Batch: 71417 | QC Preparation: 2011-08-19 | Prepared By: kg

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
DRO		1	228	mg/Kg	1	250	<14.5	91	64.5 - 146.9

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
DRO		1	238	mg/Kg	1	250	<14.5	95	64.5 - 146.9	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Tricosane	89.1	91.4	mg/Kg	1	100	89	91	65.3 - 135.8

Laboratory Control Spike (LCS-1)

QC Batch: 84136 | Date Analyzed: 2011-08-22 | Analyzed By: AR
Prep Batch: 71416 | QC Preparation: 2011-08-19 | Prepared By: AR

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			92.2	mg/Kg	1	100	<3.85	92	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride			103	mg/Kg	1	100	<3.85	103	85 - 115	11	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 84205 | Date Analyzed: 2011-08-24 | Analyzed By: AR
Prep Batch: 71416 | QC Preparation: 2011-08-19 | Prepared By: AR

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			95.9	mg/Kg	1	100	<3.85	96	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride			108	mg/Kg	1	100	<3.85	108	85 - 115	12	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result

Matrix Spike (MS-1) Spiked Sample: 274943

QC Batch: 84101 | Date Analyzed: 2011-08-19 | Analyzed By: ME
Prep Batch: 71411 | QC Preparation: 2011-08-19 | Prepared By: ME

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	1.88	mg/Kg	1	2.00	<0.0118	94	69.4 - 123.6
Toluene		1	2 14	mg/Kg	1	2.00	<0.00600	107	75.4 - 134.3
Ethylbenzene		1	2.34	mg/Kg	1	2.00	<0.00850	117	58.8 - 133.7
Xylene		1	7.15	mg/Kg	1	6.00	<0.00613	119	57 - 134.2

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		1	1.83	mg/Kg	1	2 00	<0.0118	92	69.4 - 123.6	3	20
Toluene		1	2.08	mg/Kg	1	2.00	<0.00600	104	75.4 - 134.3	3	20
Ethylbenzene		1	2.28	mg/Kg	1	2.00	<0.00850	114	58.8 - 133.7	3	20
Xylene		1	6.92	mg/Kg	1	6.00	<0.00613	115	57 - 134.2	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	2.68	2.44	mg/Kg	1	2	134	122	79.4 - 141.1
4-Bromofluorobenzene (4-BFB)	2.55	2.29	mg/Kg	1	2	128	114	71 - 167

Matrix Spike (MS-1) Spiked Sample: 274920

QC Batch: 84102 | Date Analyzed: 2011-08-19 | Analyzed By: ME
Prep Batch: 71411 | QC Preparation: 2011-08-19 | Prepared By: ME

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
GRO		1	17.4	mg/Kg	1	20.0	<0.753	87	61.8 - 114

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
GRO		1	16.6	mg/Kg	1	20.0	<0.753	83	61.8 - 114	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	2.39	2.27	mg/Kg	1	2	120	114	29.4 - 161.7
4-Bromofluorobenzene (4-BFB)	2.25	2.13	mg/Kg	1	2	112	106	37.3 - 162

Matrix Spike (MS-1) Spiked Sample: 274920

QC Batch: 84108 | Date Analyzed: 2011-08-19 | Analyzed By: kg
Prep Batch: 71417 | QC Preparation: 2011-08-19 | Prepared By: kg

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
DRO		1	217	mg/Kg	1	250	<14.5	87	38.8 - 153.3

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
DRO		1	218	mg/Kg	1	250	<14.5	87	38.8 - 153.3	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
n-Tricosane	83.9	85.2	mg/Kg	1	100	84	85	54.6 - 149.8

Matrix Spike (MS-1) Spiked Sample: 274912

QC Batch: 84136 | Date Analyzed: 2011-08-22 | Analyzed By: AR
Prep Batch: 71416 | QC Preparation: 2011-08-19 | Prepared By: AR

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			10100	mg/Kg	100	10000	<385	101	79.4 - 120.6

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride			10700	mg/Kg	100	10000	<385	107	79.4 - 120.6	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 274922

QC Batch: 84205 | Date Analyzed: 2011-08-24 | Analyzed By: AR
Prep Batch: 71416 | QC Preparation: 2011-08-19 | Prepared By: AR

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			8670	mg/Kg	100	10000	<385	87	79.4 - 120.6

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride			9470	mg/Kg	100	10000	<385	95	79.4 - 120.6	9	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Calibration Standards

Standard (CCV-1)

QC Batch: 84101 | Date Analyzed: 2011-08-19 | Analyzed By: ME

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/Kg	0.100	0.0954	95	80 - 120	2011-08-19
Toluene		1	mg/Kg	0.100	0.102	102	80 - 120	2011-08-19
Ethylbenzene		1	mg/Kg	0.100	0.106	106	80 - 120	2011-08-19
Xylene		1	mg/Kg	0.300	0.320	107	80 - 120	2011-08-19

Standard (CCV-2)

QC Batch: 84101 | Date Analyzed: 2011-08-19 | Analyzed By: ME

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/Kg	0.100	0.0984	98	80 - 120	2011-08-19
Toluene		1	mg/Kg	0.100	0.108	108	80 - 120	2011-08-19
Ethylbenzene		1	mg/Kg	0.100	0.107	107	80 - 120	2011-08-19
Xylene		1	mg/Kg	0.300	0.325	108	80 - 120	2011-08-19

Standard (CCV-1)

QC Batch: 84102 | Date Analyzed: 2011-08-19 | Analyzed By: ME

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		1	mg/Kg	1.00	1.04	104	80 - 120	2011-08-19

Standard (CCV-2)

QC Batch: 84102 | Date Analyzed: 2011-08-19 | Analyzed By: ME

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		1	mg/Kg	1.00	1.02	102	80 - 120	2011-08-19

Standard (CCV-2)

QC Batch: 84108 Date Analyzed: 2011-08-19 Analyzed By: kg

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		1	mg/Kg	250	254	102	80 - 120	2011-08-19

Standard (CCV-3)

QC Batch: 84108 Date Analyzed. 2011-08-19 Analyzed By: kg

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		1	mg/Kg	250	237	95	80 - 120	2011-08-19

Standard (ICV-1)

QC Batch: 84136 Date Analyzed: 2011-08-22 Analyzed By: AR

Param	Flag	Cert	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	101	101	85 - 115	2011-08-22

Standard (CCV-1)

QC Batch: 84136 Date Analyzed: 2011-08-22 Analyzed By: AR

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	98.9	99	85 - 115	2011-08-22

Standard (ICV-1)

QC Batch: 84205 Date Analyzed: 2011-08-24 Analyzed By: AR

Param	Flag	Cert	Units	ICVs True Conc	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	102	102	85 - 115	2011-08-24

Standard (CCV-1)

QC Batch: 84205 Date Analyzed: 2011-08-24 Analyzed By: AR

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	97.8	98	85 - 115	2011-08-24

Appendix

Laboratory Certifications

C	Certifying Authority	Certification Number	Laboratory Location
-	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	NELAP	T104704392-10-TX	Midland

Standard Flags

F	Description
B	Analyte detected in the corresponding method blank above the method detection limit
H	Analyzed out of hold time
J	Estimated concentration
Jb	The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
Je	Estimated concentration exceeding calibration range.
Qc	Calibration check outside of laboratory limits.
Qr	RPD outside of laboratory limits
Qs	Spike recovery outside of laboratory limits.
Qsr	Surrogate recovery outside of laboratory limits
U	The analyte is not detected above the SDL

Attachments

The scanned attachments will follow this page.
Please note, each attachment may consist of more than one page.

Analysis Request of Chain of Custody Record

WO #: 11081826

PAGE: 1 OF: 2

TETRA TECH
1910 N. Big Spring St.
Midland, Texas 79705
(432) 682-4559 • Fax (432) 682-3946

CLIENT NAME: SM Energy
SITE MANAGER: Aaron Hale
PROJECT NO.: 114-40099
PROJECT NAME: SM Energy / PDU 3C State #001 Eddy Co. NM

ANALYSIS REQUEST (Circle or Specify Method No.)

LAB I.D. NUMBER	DATE 2011	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8021B	TPH TX1005 (Ext. to C35)	TPH 8015 MOD	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Vr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Major Anions/Cations, pH, TDS
274908	8/17		S		X	AH-1 0-1'	1				X		X	X												X				
909						AH-1 1'-1.5'																								
910						AH-1 2'-2.5'																								
911						AH-2 0-1'							X	X																
912						AH-2 1'-1.5'																								
913						AH-2 1.5'-2'																								
914						AH-3 0-1'							X	X																
915						AH-3 1'-1.5'																								
916						AH-3 2'-2.5'																								
917						AH-4 0-1'							X	X																

RELINQUISHED BY: (Signature) Date: 8/18/11 Time: 1445
RECEIVED BY: (Signature) Date: 8/18/11 Time: 14:45
SAMPLED BY: (Print & Initial) JT/TF Date: 8/17/11 Time:

RELINQUISHED BY: (Signature) Date: Time:
RECEIVED BY: (Signature) Date: Time:
SAMPLE SHIPPED BY: (Circle) FEDEX BUS HAND DELIVERED UPS AIRBILL #: OTHER:

RELINQUISHED BY: (Signature) Date: Time:
RECEIVED BY: (Signature) Date: Time:
TETRA TECH CONTACT PERSON: Aaron Hale
Results by:

RECEIVING LABORATORY: Trace
ADDRESS:
CITY: Midland STATE: TX ZIP:
CONTACT: PHONE: DATE: TIME:
RECEIVED BY: (Signature)
RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED: 3.4°C intact
REMARKS: If total TPH exceeds 1,000 mg/kg run deeper samples / If total BTEX exceeds 50 mg/kg or Benzene exceeds 10 mg/kg run deeper samples

Please fill out all copies - Laboratory retains Yellow copy - Return Orginal copy to Tetra Tech - Project Manager retains Pink copy - Accounting receives Gold copy.

ATWO #: 1108826

Analysis Request of Chain of Custody Record

TETRA TECH
1910 N. Big Spring St.
Midland, Texas 79705
(432) 682-4559 • Fax (432) 682-3946

CLIENT NAME: SM Energy

SITE MANAGER: Aaron Hale

PROJECT NO.: 114-6400597

PROJECT NAME: SM Energy / PDH 3C State #001 Eddy Co. NM

LAB I.D. NUMBER	DATE 2011	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8021B	TPH TX1005 (Ext. to C35)	TPH 8015 MOD	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Vr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC-MS Vol. 8240/8260/624	GC-MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Major Anions/Cations, pH, TDS
274918	8/17		S		X	AH-4 ~~1'~~ 1-1.5'	1				X															X				
919						AH-4 2'-2.5'																									
920						AH-5 0-1'								X	X																
921						AH-5 1'-1.5'																									
922						AH-5 2'-2.5'																									

RELINQUISHED BY: (Signature) Date: 8/18/11 Time: 1445

RECEIVED BY: (Signature) Date: 8/18/11 Time: 1445

SAMPLED BY. (Print & Initial) JT/TF Date: 8/17/11 Time:

RELINQUISHED BY: (Signature) Date: Time:

RECEIVED BY: (Signature) Date: Time:

SAMPLE SHIPPED BY: (Circle) FEDEX BUS HAND DELIVERED UPS

AIRBILL #:

OTHER:

RELINQUISHED BY: (Signature) Date: Time:

RECEIVED BY: (Signature) Date: Time:

RECEIVING LABORATORY: Trace

ADDRESS:

CITY: Midland STATE: TX ZIP:

CONTACT: PHONE:

RECEIVED BY: (Signature)

DATE: TIME:

TETRA TECH CONTACT PERSON: Aaron Hale

Results by:

RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED: 3.4°c intact

REMARKS: If total TPH exceeds 1,000 mg/kg run dropor samples / If total BTEX exceeds 50 mg/kg or Benzene exceeds 10 mg/kg run dropor samples

Please fill out all copies - Laboratory retains Yellow copy - Return Orginal copy to Tetra Tech - Project Manager retains Pink copy - Accounting receives Gold copy.