

SITE INFORMATION

Report Type: Work Plan

General Site Information:

Site:	ESDU #6	
Company:	SM Energy Company	
Section, Township and Range	Section 24, T18S, R31E	Unit Letter - A
Lease Number:		
County:	Eddy County	
GPS:	32.73581° N, 103.81964° W	
Surface Owner:	Federal	
Mineral Owner:		
Directions:	From the intersection of Hwy 82 and Shugart Rd (Loco Hills), go south on Shugart Rd exactly 4 miles. Turn to the Southeast on a caliche road and travel southeast for another 4 miles until the road ends. Turn onto the road to the northeast and travel approximately 1.25 miles to the location.	
	RECEIVED	

Release Data:

Date Released:	8/12/2012
Type Release:	Produced Water
Source of Contamination:	Leak in a poly flowline at a failed butt weld.
Fluid Released:	20 bbls
Fluids Recovered:	15 bbls

RECEIVED

OCT 30 2012

NMOCD ARTESIA

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@tetrattech.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 11, 2012

Mr. Mike Bratcher
Environmental Engineer
Oil Conservation Division, District 2
811 S. First Street
Artesia, New Mexico 88210

**Re: Work Plan for SM Energy Company
ESDU #6 Tank Battery
Polyethylene Saltwater Flowline Release,
Unit A, Section 24, Township 18 South, Range 31 East
Eddy County, New Mexico**

Mr. Bratcher:

Tetra Tech, Inc. (Tetra Tech) was contacted by SM Energy Company (SM Energy) to assess a 3 inch polyethylene (poly) flowline release at the ESDU #6 located in Unit A, Section 24, Township 18 South, Range 31 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.73581°, W 103.81964°. 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 12, 2012. Approximately 20 barrels of produced water were released from a butt weld in a 3 inch poly flowline. Approximately 15 barrels of produced water were recovered. The Northeast portion of the well pad was scraped and the impacted soil was hauled to Controlled Recovery Inc. (CRI) for disposal. The poly flowline weld was cut out, re-dressed and welded back together. 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 2 miles of the site. The closest well (identified by the OSE as CP 00896) did not have any information available. The second closest well (identified by the OSE as CP 00672) had a total depth of 540 feet and a depth to water of 460 feet. The Geology and Ground-Water Resources of Eddy County, New Mexico (Report 3) showed the closest well to be in Section 34 of Township 17 South and Range 31 East. This well is over 4 miles from the site, is reported to be over 271 in depth with a pumping rate of approximately 3.5 gallons per minute. Depth to water for this well is not available. The New Mexico Oil Conservation Division (OCD) regional groundwater gradient map for Eddy County shows the depth to groundwater in this section at approximately 280 feet.

Tetra Tech

1910 North Big Spring, Midland, TX 79705

Tel 432.682.3946 Fax 432.682.3946 www.tetrattech.com



According to the Geology and Ground-Water Resources of Eddy County, New Mexico (Report 3), the Santa Rosa Sandstone (Dockum Group) is present in a belt 10 to 20 miles wide along the east border of Eddy County. The Santa Rosa Sandstone consists of fine to coarse grain sands with minor shale layers generally red in coloration.

On September 5, 2012, Tetra Tech advanced 6 Auger Holes (AH-1, AH-2, AH-3, AH-4, AH-5 and AH-6) to assess the current chloride concentrations at varying depths at the Site. During the soil assessment, groundwater was not encountered.

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 September 5, 2012, Tetra Tech personnel collected soils samples from up to 5.5 feet bgs utilizing a hand auger at six locations within the spill area. Tetra Tech advanced 6 Auger Holes (AH-1, AH-2, AH-3, AH-4, AH-5 and AH-6) to assess the current chloride concentrations at varying depths at the Site. During the soil assessment, groundwater was not encountered. The spill area was estimated to cover approximately 4,500 square feet. Soil samples were submitted for laboratory analysis of TPH by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by EPA method 300.0.

Referring to Table 1, all of the samples analyzed were below the RRAL for both BTEX and TPH. Analytical results indicate the maximum extent of chloride impact greater than 1,000 mg/kg extending to 1 foot at AH-1, AH-2 and AH-5 (within the well pad) and 4.5 feet at AH-6 (pasture area). All sample locations had chloride concentrations that decreased with depth. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix B. The results of the sampling are summarized in Table 1. The borehole locations are shown on Figure 3.

Work Plan

The spill was contained on the well pad and the pasture immediately south of the well pad. The proposed excavation plan is intended to minimize disruption to the facility while removing the greatest mass of chloride impacted soils.

The well pad area (AH-1, AH-2 and AH-5) had chloride concentrations in excess of 1,000 mg/kg contained to the surface soils no deeper than 1 foot bgs. This area will be excavated to a depth of approximately 1 foot bgs and backfilled with clean soil.



TETRA TECH

The pasture area (AH-6) had chloride concentrations in excess of 1,000 mg/kg contained to approximately 4.5 feet bgs. This area (AH-6) will be excavated to a depth of approximately 5 feet bgs. Based on the results, the impacted soil will be excavated to the appropriate depth and backfilled with clean soil. Soils excavated from all areas will be transported under manifest to a proper disposal facility. The excavation details are shown on Figure 4.

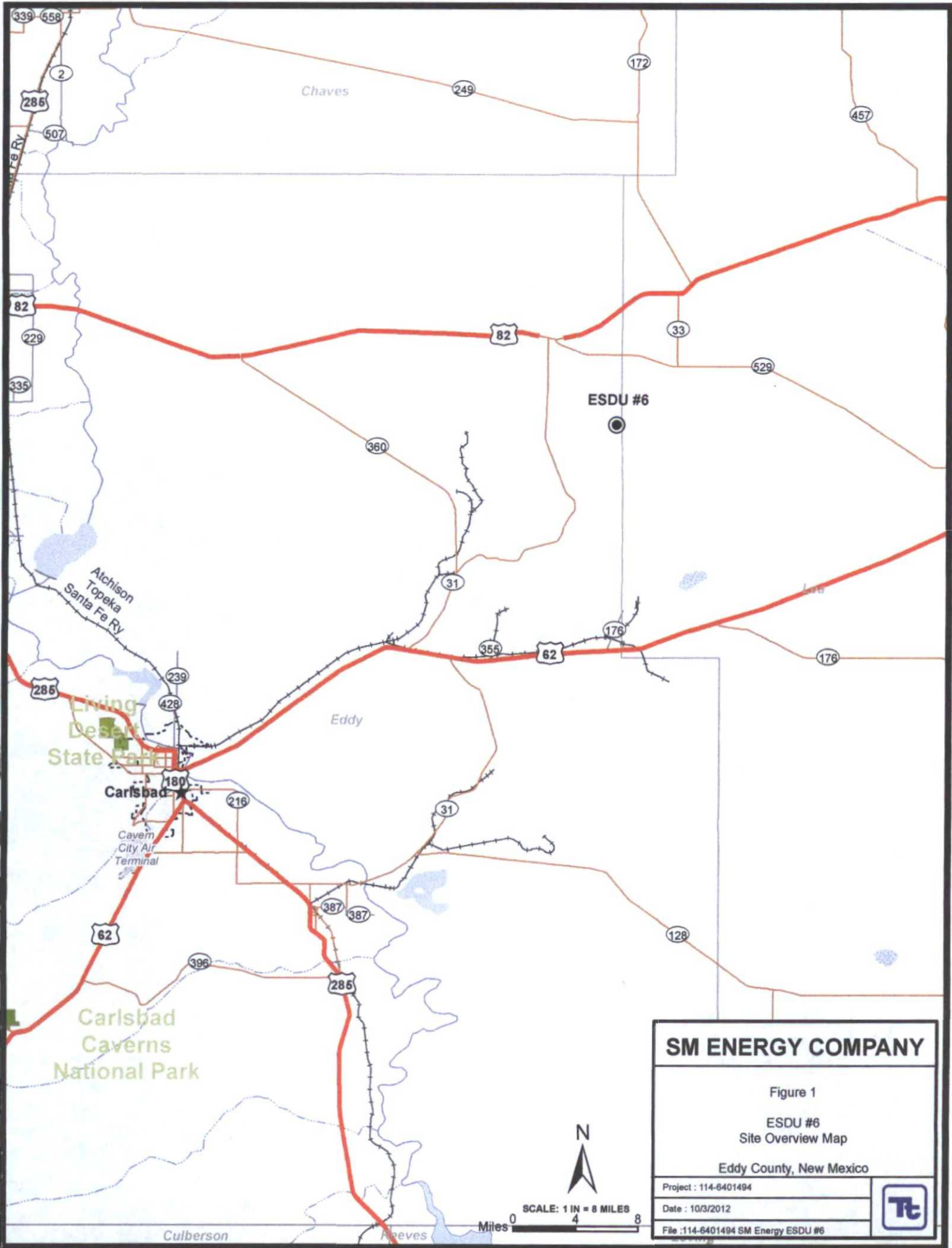
Once the remedial activities are performed a closure report will be submitted for the soils at the site. If you require any additional information or have any questions or comments concerning this work plan, please call at (432) 682-4559.

Respectfully submitted,
TETRA TECH, INC.

Tom Elliott
Staff Scientist

cc: SM Energy Company – File Copy
BLM – Jim Amos

FIGURES



SM ENERGY COMPANY

Figure 1

ESDU #6
Site Overview Map

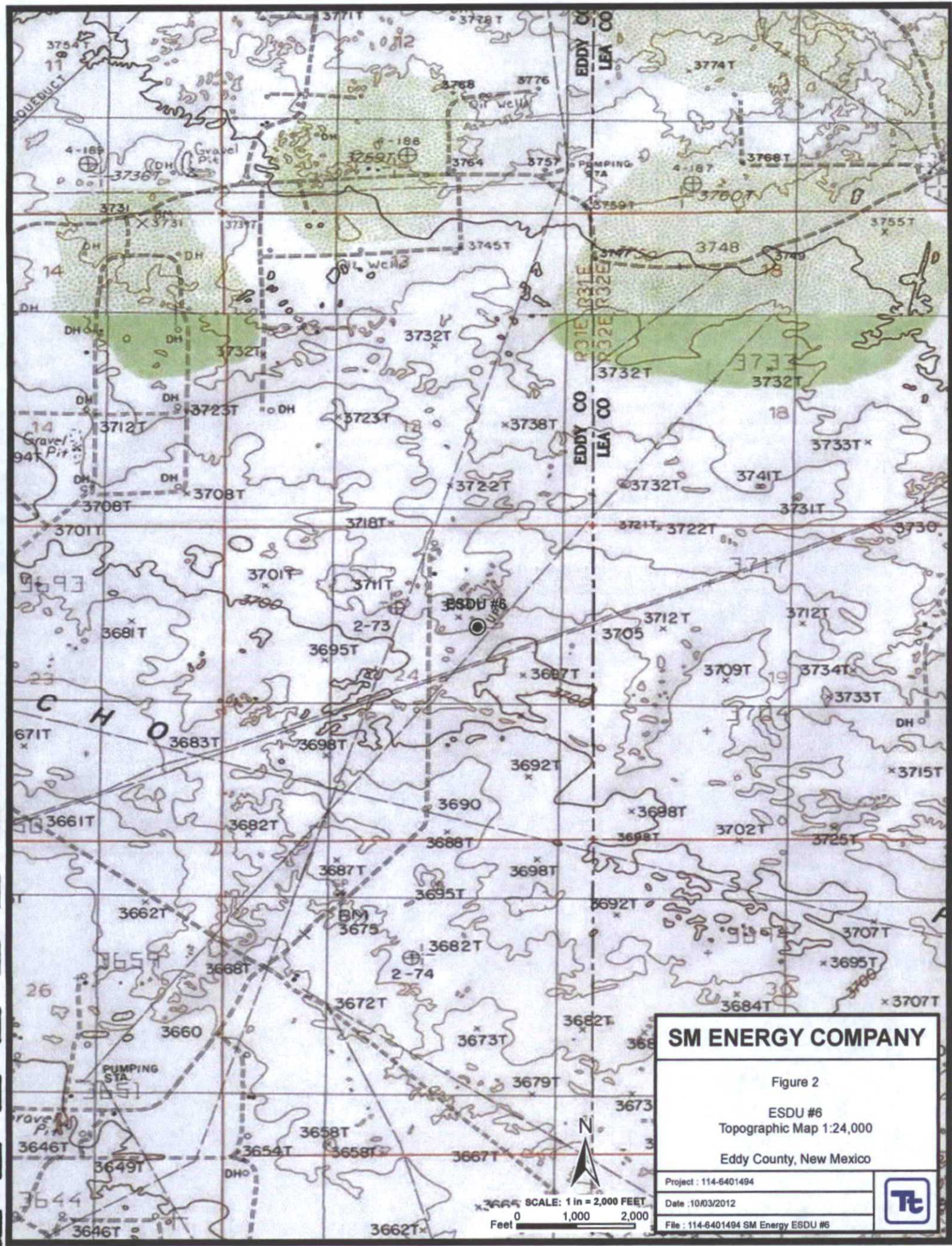
Eddy County, New Mexico

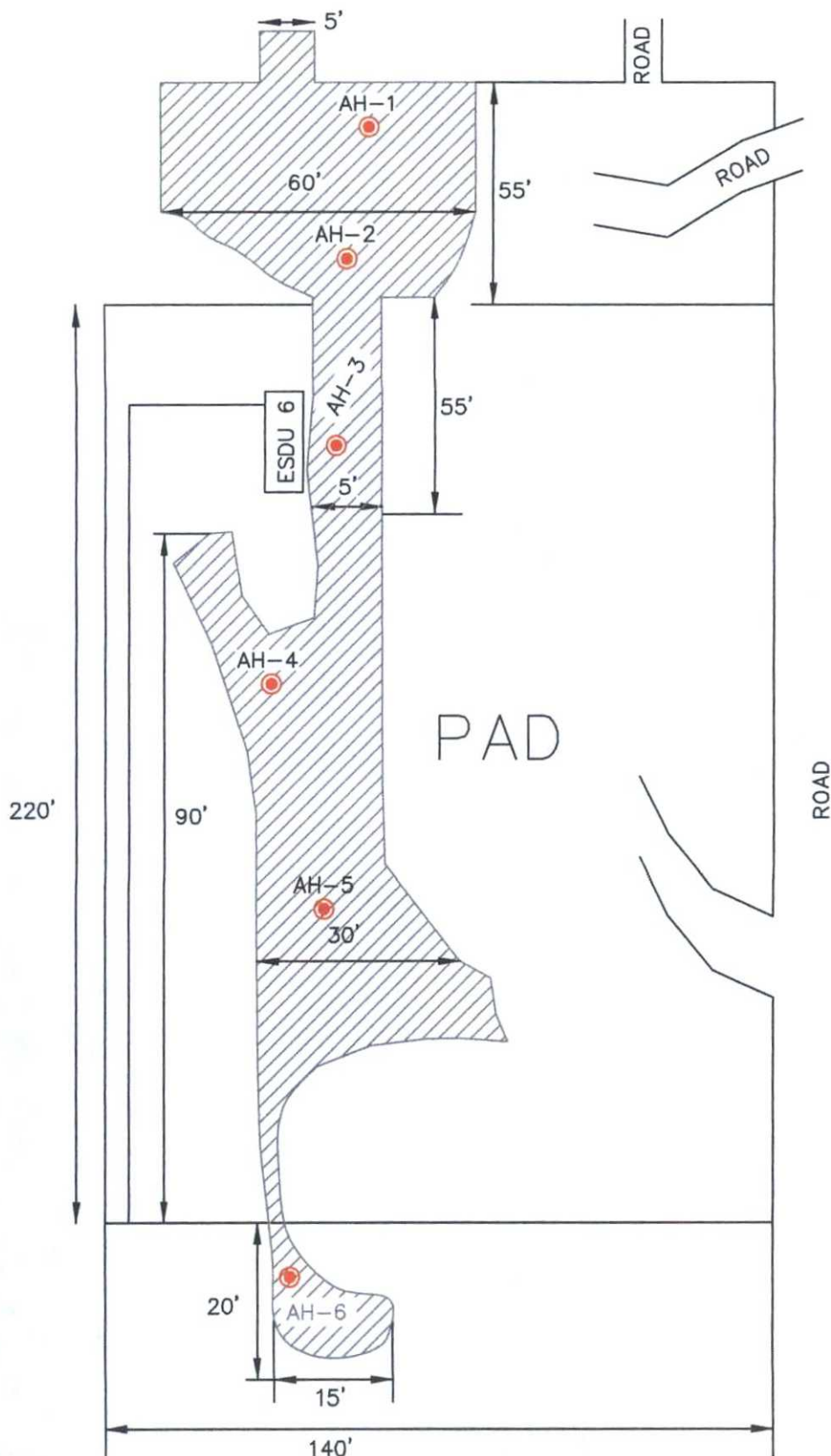
Project : 114-6401494

Date : 10/3/2012

File : 114-6401494 SM Energy ESDU #6







EXPLANATION

- AUGER HOLE SAMPLE LOCATIONS
- PROPOSED EXCAVATION AREAS



NOT TO SCALE

SM ENERGY COMPANY

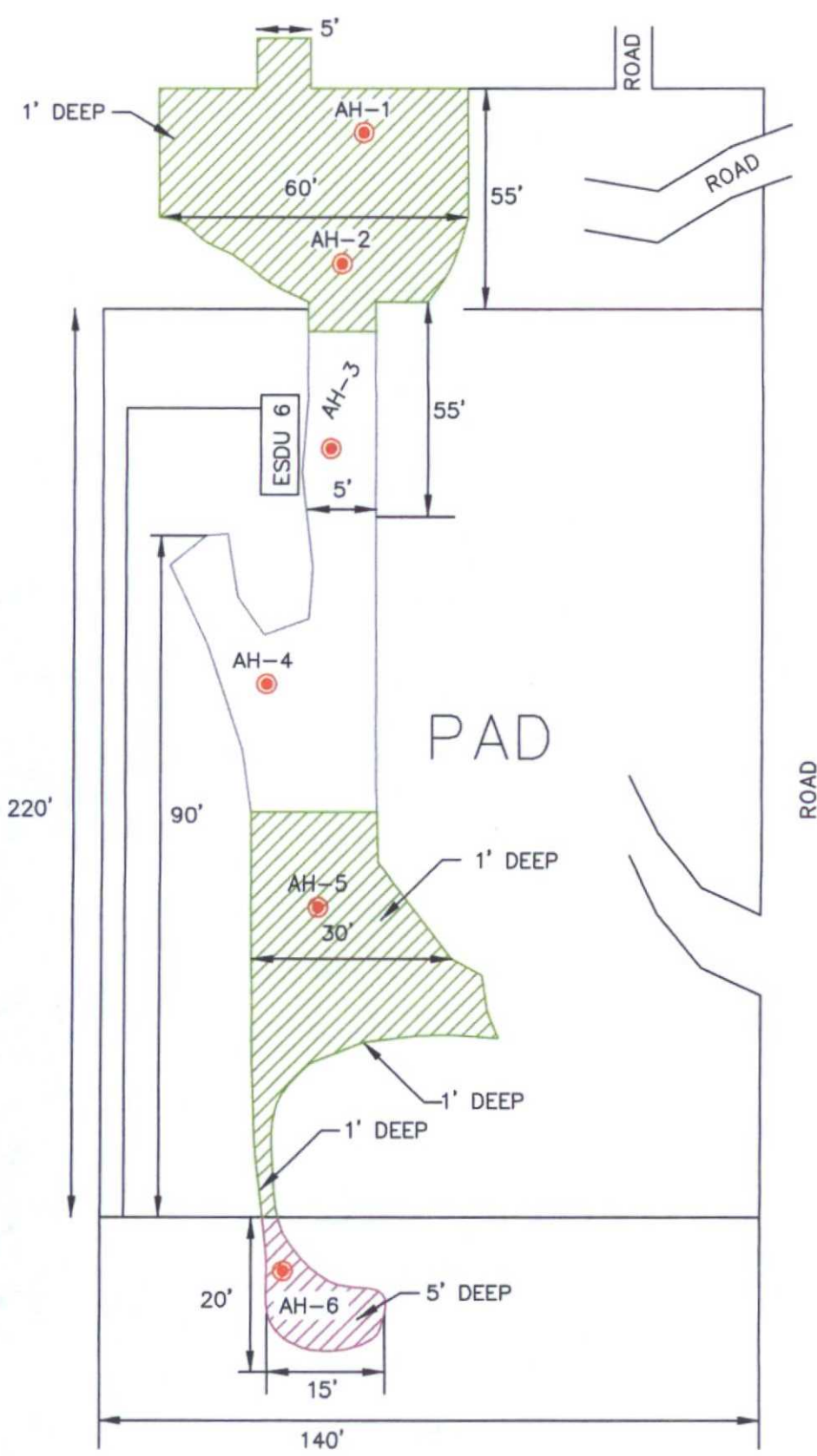
FIGURE 3
ESDU #6
SPILL ASSISMENT MAP
EDDY COUNTY, NEW MEXICO

PROJECT: 114-0401404

DATE: OCTOBER 04, 2012

SEE US: 114-0401404-1.0.001.001





EXPLANATION

- AUGER HOLE SAMPLE LOCATIONS
- ▨ PROPOSED EXCAVATION AREAS



NOT TO SCALE

SM ENERGY COMPANY	
FIGURE 4	
ESDU #6	
PROPOSED EXCAVATION AREAS & DEPTHS MAP	
EDDY COUNTY, NEW MEXICO	
PROJECT: 116-001004	
DATE: OCTOBER 04, 2012	
BY: D. WATKINS/SM ENERGY	

TABLES

Table 1
SM Energy
ESDU #6 Flowline
Eddy County, New Mexico

Sample ID	Sample Date	Sample Depth (ft)	Soil Status		TPH (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
			In-Situ	Removed	GRO	DRO	Total						
AH-5	9/5/2012	0-1	X		5.56	<50.0	5.56	<0.0200	0.219	0.0388	0.193	0.451	7,290
	"	1-1.5	X		-	-	-	-	-	-	-	-	755
	"	2-2.5	X		-	-	-	-	-	-	-	-	312
	"	3-3.5	X		-	-	-	-	-	-	-	-	<20.0
AH-6	9/5/2012	0-1	X		5.31	<50.0	5.31	0.0201	0.218	0.0380	0.204	0.480	1,230
	"	1-1.5	X		-	-	-	-	-	-	-	-	1,110
	"	2-2.5	X		-	-	-	-	-	-	-	-	10,800
	"	3-3.5	X		-	-	-	-	-	-	-	-	5,170
	"	4-4.5	X		-	-	-	-	-	-	-	-	5,570
	"	5-5.5	X		-	-	-	-	-	-	-	-	360

(-) Not Analyzed

PHOTOGRAPHS

SM Energy Company
EDSU #6 Well
Eddy County, New Mexico



TETRA TECH



Photo 1. View looking at spill area on well pad.



Photo 2. View looking south from well pad to spill area on pasture.

APPENDIX A

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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

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

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in
accordance with 19.15.29 NMAC.

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 ESDU 6 30-015-25385	Facility Type WELL
Surface Owner BUREAU OF LAND MANAGEMENT Mineral Owner BUREAU OF LAND MANAGEMENT MPI No. NMNM101361X	

LOCATION OF RELEASE

Unit Letter A	Section 24	Township 18S	Range 31E	Feet from the 890	North/South Line NORTH	Feet from the 990	East/West Line EAST	County EDDY
-------------------------	----------------------	------------------------	---------------------	-----------------------------	----------------------------------	-----------------------------	-------------------------------	-----------------------

Latitude _____ Longitude _____

NATURE OF RELEASE

Type of Release PRODUCED WATER	Volume of Release 20 BBLS	Volume Recovered 15 BBLS
Source of Release 3" POLYETHYLENE FLOWLINE	Date and Hour of Occurrence 8/12/12 6:00 AM	Hour of Discovery SAME
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? JIM AMOS WITH BLM	
By Whom? BILL HEARNE	Date and Hour 8/12/12 2:53 PM	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

N/A

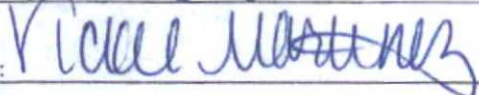
Describe Cause of Problem and Remedial Action Taken.*

3" POLYETHYLENE FLOWLINE LEAK IN BUTT WELD. CUT OFF BAD SECTION OF LINE, RE-DRESSED ENDS AND WELDED PIPE BACK TOGETHER. SM ENERGY WILL BE TURNING THIS OVER TO TETRA TECH FOR FURTHER EVALUATION.

Describe Area Affected and Cleanup Action Taken.*

SPILL AREA: 40'X30' = 1200 SQ FT

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: 	OIL CONSERVATION DIVISION		
Printed Name: VICKIE MARTINEZ	Approved by Environmental Specialist:		
Title: ENGINEER TECH II	Approval Date:	Expiration Date:	
E-mail Address: VMARTINEZ@SM-ENERGY.COM	Conditions of Approval:		Attached ☐
Date: 08/15/2012	Phone: (432)688-1709		

* Attach Additional Sheets If Necessary

APPENDIX B

Summary Report

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

Report Date: September 25, 2012

Work Order: 12091216

Project Location: NM
Project Name: SME/ESDU #6 Flowline
Project Number: 114-6401494

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
309050	AH-1 0-1'	soil	2012-09-05	00:00	2012-09-11
309051	AH-1 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309052	AH-1 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309053	AH-2 0-1'	soil	2012-09-05	00:00	2012-09-11
309054	AH-2 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309055	AH-2 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309056	AH-2 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309057	AH-2 4-4.5'	soil	2012-09-05	00:00	2012-09-11
309058	AH-3 0-1'	soil	2012-09-05	00:00	2012-09-11
309059	AH-3 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309060	AH-3 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309061	AH-3 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309062	AH-4 0-1'	soil	2012-09-05	00:00	2012-09-11
309063	AH-4 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309064	AH-4 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309065	AH-4 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309066	AH-5 0-1'	soil	2012-09-05	00:00	2012-09-11
309067	AH-5 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309068	AH-5 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309069	AH-5 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309070	AH-6 0-1'	soil	2012-09-05	00:00	2012-09-11
309071	AH-6 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309072	AH-6 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309073	AH-6 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309074	AH-6 4-4.5'	soil	2012-09-05	00:00	2012-09-11
309075	AH-6 5-5.5'	soil	2012-09-05	00:00	2012-09-11

Sample - Field Code	BTEX				TPH DRO - NEW DRO (mg/Kg)	TPH GRO GRO (mg/Kg)
	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Xylene (mg/Kg)		
309050 - AH-1 0-1'	<1.00	<1.00	<1.00	<1.00	285	869 Q ^u
309053 - AH-2 0-1'	<1.00	<1.00	<1.00	<1.00	534	477 Q ^u
309058 - AH-3 0-1'	<0.0200	0.234	0.0394	0.192	<50.0	6.51 Q ^u
309062 - AH-4 0-1'	<0.0200	0.207	0.0333	0.165	<50.0	5.10 Q ^u
309066 - AH-5 0-1'	<0.0200	0.219	0.0388	0.193	<50.0	5.56 Q ^u
309070 - AH-6 0-1'	0.0201	0.218	0.0380	0.204	<50.0	5.31 Q ^u

Sample: 309050 - AH-1 0-1'

Param	Flag	Result	Units	RL
Chloride		6930	mg/Kg	4

Sample: 309051 - AH-1 1-1.5'

Param	Flag	Result	Units	RL
Chloride		107	mg/Kg	4

Sample: 309052 - AH-1 2-2.5'

Param	Flag	Result	Units	RL
Chloride		224	mg/Kg	4

Sample: 309053 - AH-2 0-1'

Param	Flag	Result	Units	RL
Chloride		10400	mg/Kg	4

Sample: 309054 - AH-2 1-1.5'

Param	Flag	Result	Units	RL
Chloride		151	mg/Kg	4

Sample: 309055 - AH-2 2-2.5'

Param	Flag	Result	Units	RL
Chloride		176	mg/Kg	4

Sample: 309056 - AH-2 3-3.5'

Param	Flag	Result	Units	RL
Chloride		33.9	mg/Kg	4

Sample: 309057 - AH-2 4-4.5'

Param	Flag	Result	Units	RL
Chloride		48.5	mg/Kg	4

Sample: 309058 - AH-3 0-1'

Param	Flag	Result	Units	RL
Chloride		848	mg/Kg	4

Sample: 309059 - AH-3 1-1.5'

Param	Flag	Result	Units	RL
Chloride		48.5	mg/Kg	4

Sample: 309060 - AH-3 2-2.5'

Param	Flag	Result	Units	RL
Chloride		<20.0	mg/Kg	4

Sample: 309061 - AH-3 3-3.5'

Param	Flag	Result	Units	RL
Chloride		<20.0	mg/Kg	4

Sample: 309062 - AH-4 0-1'

Param	Flag	Result	Units	RL
Chloride		402	mg/Kg	4

Sample: 309063 - AH-4 1-1.5'

Param	Flag	Result	Units	RL
Chloride		102	mg/Kg	4

Sample: 309064 - AH-4 2-2.5'

Param	Flag	Result	Units	RL
Chloride		102	mg/Kg	4

Sample: 309065 - AH-4 3-3.5'

Param	Flag	Result	Units	RL
Chloride		189	mg/Kg	4

Sample: 309066 - AH-5 0-1'

Param	Flag	Result	Units	RL
Chloride		7290	mg/Kg	4

Sample: 309067 - AH-5 1-1.5'

Param	Flag	Result	Units	RL
Chloride		755	mg/Kg	4

Sample: 309068 - AH-5 2-2.5'

Param	Flag	Result	Units	RL
Chloride		312	mg/Kg	4

Sample: 309069 - AH-5 3-3.5'

Param	Flag	Result	Units	RL
Chloride		<20.0	mg/Kg	4

Sample: 309070 - AH-6 0-1'

Param	Flag	Result	Units	RL
Chloride		1230	mg/Kg	4

Sample: 309071 - AH-6 1-1.5'

Param	Flag	Result	Units	RL
Chloride		1110	mg/Kg	4

Report Date: September 25, 2012

Work Order: 12091216

Page Number: 5 of 5

Sample: 309072 - AH-6 2-2.5'

Param	Flag	Result	Units	RL
Chloride		10800	mg/Kg	4

Sample: 309073 - AH-6 3-3.5'

Param	Flag	Result	Units	RL
Chloride		5170	mg/Kg	4

Sample: 309074 - AH-6 4-4.5'

Param	Flag	Result	Units	RL
Chloride		5570	mg/Kg	4

Sample: 309075 - AH-6 5-5.5'

Param	Flag	Result	Units	RL
Chloride		360	mg/Kg	4



6701 Aberdeen Avenue, Suite 9
200 East Sunset Road, Suite E
5002 Basin Street, Suite A1
(BioAquatic) 2501 Mayes Rd., Suite 100

Lubbock, Texas 79424
El Paso, Texas 79922
Midland, Texas 79703
Carrollton, Texas 75006

800-378-1296

806-794-1296

FAX 806-794-1298

915-585-3443

FAX 915-585-4944

432-689-6301

FAX 432-689-6313

972-242-7750

E-Mail: lab@traceanalysis.com WEB: www.traceanalysis.com

Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report (Corrected Report)

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

Report Date: September 25, 2012

Work Order: 12091216

Project Location: NM
Project Name: SME/ESDU #6 Flowline
Project Number: 114-6401494

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
309050	AH-1 0-1'	soil	2012-09-05	00:00	2012-09-11
309051	AH-1 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309052	AH-1 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309053	AH-2 0-1'	soil	2012-09-05	00:00	2012-09-11
309054	AH-2 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309055	AH-2 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309056	AH-2 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309057	AH-2 4-4.5'	soil	2012-09-05	00:00	2012-09-11
309058	AH-3 0-1'	soil	2012-09-05	00:00	2012-09-11
309059	AH-3 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309060	AH-3 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309061	AH-3 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309062	AH-4 0-1'	soil	2012-09-05	00:00	2012-09-11
309063	AH-4 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309064	AH-4 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309065	AH-4 3-3.5'	soil	2012-09-05	00:00	2012-09-11

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
309066	AH-5 0-1'	soil	2012-09-05	00:00	2012-09-11
309067	AH-5 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309068	AH-5 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309069	AH-5 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309070	AH-6 0-1'	soil	2012-09-05	00:00	2012-09-11
309071	AH-6 1-1.5'	soil	2012-09-05	00:00	2012-09-11
309072	AH-6 2-2.5'	soil	2012-09-05	00:00	2012-09-11
309073	AH-6 3-3.5'	soil	2012-09-05	00:00	2012-09-11
309074	AH-6 4-4.5'	soil	2012-09-05	00:00	2012-09-11
309075	AH-6 5-5.5'	soil	2012-09-05	00:00	2012-09-11

Report Corrections (Work Order 12091216)

- Corrected BTEX QC batch date. 9-25-12

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 33 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	5
Analytical Report	6
Sample 309050 (AH-1 0-1')	6
Sample 309051 (AH-1 1-1.5')	7
Sample 309052 (AH-1 2-2.5')	7
Sample 309053 (AH-2 0-1')	8
Sample 309054 (AH-2 1-1.5')	9
Sample 309055 (AH-2 2-2.5')	9
Sample 309056 (AH-2 3-3.5')	10
Sample 309057 (AH-2 4-4.5')	10
Sample 309058 (AH-3 0-1')	10
Sample 309059 (AH-3 1-1.5')	12
Sample 309060 (AH-3 2-2.5')	12
Sample 309061 (AH-3 3-3.5')	12
Sample 309062 (AH-4 0-1')	13
Sample 309063 (AH-4 1-1.5')	14
Sample 309064 (AH-4 2-2.5')	14
Sample 309065 (AH-4 3-3.5')	15
Sample 309066 (AH-5 0-1')	15
Sample 309067 (AH-5 1-1.5')	16
Sample 309068 (AH-5 2-2.5')	17
Sample 309069 (AH-5 3-3.5')	17
Sample 309070 (AH-6 0-1')	17
Sample 309071 (AH-6 1-1.5')	19
Sample 309072 (AH-6 2-2.5')	19
Sample 309073 (AH-6 3-3.5')	19
Sample 309074 (AH-6 4-4.5')	20
Sample 309075 (AH-6 5-5.5')	20
Method Blanks	21
QC Batch 94898 - Method Blank (1)	21
QC Batch 95020 - Method Blank (1)	21
QC Batch 95025 - Method Blank (1)	21
QC Batch 95026 - Method Blank (1)	22
QC Batch 95027 - Method Blank (1)	22
QC Batch 95031 - Method Blank (1)	22
Laboratory Control Spikes	23
QC Batch 94898 - LCS (1)	23
QC Batch 95020 - LCS (1)	23
QC Batch 95025 - LCS (1)	24
QC Batch 95026 - LCS (1)	24
QC Batch 95027 - LCS (1)	24
QC Batch 95031 - LCS (1)	25
QC Batch 94898 - MS (1)	25

QC Batch 95020 - MS (1)	26
QC Batch 95025 - MS (1)	26
QC Batch 95026 - MS (1)	27
QC Batch 95027 - MS (1)	27
QC Batch 95031 - MS (1)	27
Calibration Standards	29
QC Batch 94898 - CCV (1)	29
QC Batch 94898 - CCV (2)	29
QC Batch 94898 - CCV (3)	29
QC Batch 95020 - CCV (1)	29
QC Batch 95020 - CCV (2)	30
QC Batch 95020 - CCV (3)	30
QC Batch 95025 - CCV (1)	30
QC Batch 95025 - CCV (2)	30
QC Batch 95026 - CCV (1)	31
QC Batch 95026 - CCV (2)	31
QC Batch 95027 - CCV (1)	31
QC Batch 95027 - CCV (2)	31
QC Batch 95031 - CCV (1)	32
QC Batch 95031 - CCV (2)	32
QC Batch 95031 - CCV (3)	32
Appendix	33
Report Definitions	33
Laboratory Certifications	33
Standard Flags	33
Attachments	33

Case Narrative

Samples for project SME/ESDU #6 Flowline were received by TraceAnalysis, Inc. on 2012-09-11 and assigned to work order 12091216. Samples for work order 12091216 were received intact at a temperature of 2.1 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	80514	2012-09-18 at 09:00	95020	2012-09-18 at 15:38
Chloride (Titration)	SM 4500-Cl B	80454	2012-09-18 at 13:01	95025	2012-09-19 at 15:48
Chloride (Titration)	SM 4500-Cl B	80454	2012-09-18 at 13:01	95026	2012-09-19 at 15:49
Chloride (Titration)	SM 4500-Cl B	80454	2012-09-18 at 13:01	95027	2012-09-19 at 15:50
TPH DRO - NEW	S 8015 D	80415	2012-09-17 at 08:00	94898	2012-09-18 at 08:30
TPH GRO	S 8015 D	80524	2012-09-18 at 09:00	95031	2012-09-18 at 09:00

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 12091216 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.

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 6 of 33
NM

Analytical Report

Sample: 309050 - AH-1 0-1'

Laboratory: Midland
Analysis: BTEX
QC Batch: 95020
Prep Batch: 80514

Analytical Method: S 8021B
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-18

Prep Method: S 5035
Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	u	1	<1.00	mg/Kg	50	0.0200
Toluene	u	1	<1.00	mg/Kg	50	0.0200
Ethylbenzene	u	1	<1.00	mg/Kg	50	0.0200
Xylene	u	1	<1.00	mg/Kg	50	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.102	mg/Kg	50	0.100	102	70 - 130
4-Bromofluorobenzene (4-BFB)			0.105	mg/Kg	50	0.100	105	70 - 130

Sample: 309050 - AH-1 0-1'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95025
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			6930	mg/Kg	10	4.00

Sample: 309050 - AH-1 0-1'

Laboratory: Midland
Analysis: TPH DRO - NEW
QC Batch: 94898
Prep Batch: 80415

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-17

Prep Method: N/A
Analyzed By: CW
Prepared By: CW

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
DRO		1	285	mg/Kg	1	50.0

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 7 of 33
NM

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			119	mg/Kg	1	100	119	70 - 130

Sample: 309050 - AH-1 0-1'

Laboratory: Midland
Analysis: TPH GRO
QC Batch: 95031
Prep Batch: 80524

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-18

Prep Method: S 5035
Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	Q*	1	869	mg/Kg	50	4.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.100	mg/Kg	50	0.100	100	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0800	mg/Kg	50	0.100	80	70 - 130

Sample: 309051 - AH-1 1-1.5'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95025
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			107	mg/Kg	5	4.00

Sample: 309052 - AH-1 2-2.5'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95025
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

continued ...

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 8 of 33
NM

sample 309052 continued ...

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			224	mg/Kg	5	4.00

Sample: 309053 - AH-2 0-1'

Laboratory: Midland
Analysis: BTEX
QC Batch: 95020
Prep Batch: 80514

Analytical Method: S 8021B
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-18

Prep Method: S 5035
Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<1.00	mg/Kg	50	0.0200
Toluene	u	1	<1.00	mg/Kg	50	0.0200
Ethylbenzene	u	1	<1.00	mg/Kg	50	0.0200
Xylene	u	1	<1.00	mg/Kg	50	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.100	mg/Kg	50	0.100	100	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0945	mg/Kg	50	0.100	94	70 - 130

Sample: 309053 - AH-2 0-1'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95025
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			10400	mg/Kg	10	4.00

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 9 of 33
NM

Sample: 309053 - AH-2 0-1'

Laboratory: Midland
Analysis: TPH DRO - NEW
QC Batch: 94898
Prep Batch: 80415

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-17

Prep Method: N/A
Analyzed By: CW
Prepared By: CW

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
DRO		1	534	mg/Kg	1	50.0

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane	Q _{sr}	Q _{sr}	160	mg/Kg	1	100	160	70 - 130

Sample: 309053 - AH-2 0-1'

Laboratory: Midland
Analysis: TPH GRO
QC Batch: 95031
Prep Batch: 80524

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-18

Prep Method: S 5035
Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	Q _s	1	477	mg/Kg	50	4.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0972	mg/Kg	50	0.100	97	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0980	mg/Kg	50	0.100	98	70 - 130

Sample: 309054 - AH-2 1-1.5'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95025
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			151	mg/Kg	5	4.00

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 10 of 33
NM

Sample: 309055 - AH-2 2-2.5'

Laboratory:	Midland	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
Analysis:	Chloride (Titration)	Date Analyzed:	2012-09-19	Analyzed By:	AR
QC Batch:	95025	Sample Preparation:	2012-09-18	Prepared By:	AR
Prep Batch:	80454				

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			176	mg/Kg	5	4.00

Sample: 309056 - AH-2 3-3.5'

Laboratory:	Midland	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
Analysis:	Chloride (Titration)	Date Analyzed:	2012-09-19	Analyzed By:	AR
QC Batch:	95026	Sample Preparation:	2012-09-18	Prepared By:	AR
Prep Batch:	80454				

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			33.9	mg/Kg	5	4.00

Sample: 309057 - AH-2 4-4.5'

Laboratory:	Midland	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
Analysis:	Chloride (Titration)	Date Analyzed:	2012-09-19	Analyzed By:	AR
QC Batch:	95026	Sample Preparation:	2012-09-18	Prepared By:	AR
Prep Batch:	80454				

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			48.5	mg/Kg	5	4.00

Sample: 309058 - AH-3 0-1'

Laboratory:	Midland	Analytical Method:	S 8021B	Prep Method:	S 5035
Analysis:	BTEX	Date Analyzed:	2012-09-18	Analyzed By:	YG
QC Batch:	95020	Sample Preparation:	2012-09-18	Prepared By:	YG
Prep Batch:	80514				

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 11 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.0200	mg/Kg	1	0.0200
Toluene		1	0.234	mg/Kg	1	0.0200
Ethylbenzene		1	0.0394	mg/Kg	1	0.0200
Xylene		1	0.192	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.102	mg/Kg	1	0.100	102	70 - 130
4-Bromofluorobenzene (4-BFB)			0.107	mg/Kg	1	0.100	107	70 - 130

Sample: 309058 - AH-3 0-1'

Laboratory: Midland	Analytical Method: SM 4500-Cl B	Prep Method: N/A
Analysis: Chloride (Titration)	Date Analyzed: 2012-09-19	Analyzed By: AR
QC Batch: 95026	Sample Preparation: 2012-09-18	Prepared By: AR
Prep Batch: 80454		

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			848	mg/Kg	5	4.00

Sample: 309058 - AH-3 0-1'

Laboratory: Midland	Analytical Method: S 8015 D	Prep Method: N/A
Analysis: TPH DRO - NEW	Date Analyzed: 2012-09-18	Analyzed By: CW
QC Batch: 94898	Sample Preparation: 2012-09-17	Prepared By: CW
Prep Batch: 80415		

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

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			109	mg/Kg	1	100	109	70 - 130

Sample: 309058 - AH-3 0-1'

Laboratory: Midland	Analytical Method: S 8015 D	Prep Method: S 5035
Analysis: TPH GRO	Date Analyzed: 2012-09-18	Analyzed By: YG
QC Batch: 95031	Sample Preparation: 2012-09-18	Prepared By: YG
Prep Batch: 80524		

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 12 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	Q*	1	6.51	mg/Kg	1	4.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.100	mg/Kg	1	0.100	100	70 - 130
4-Bromofluorobenzene (4-BFB)			0.100	mg/Kg	1	0.100	100	70 - 130

Sample: 309059 - AH-3 1-1.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	95026	Date Analyzed:	2012-09-19	Analyzed By:	AR
Prep Batch:	80454	Sample Preparation:	2012-09-18	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			48.5	mg/Kg	5	4.00

Sample: 309060 - AH-3 2-2.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	95026	Date Analyzed:	2012-09-19	Analyzed By:	AR
Prep Batch:	80454	Sample Preparation:	2012-09-18	Prepared By:	AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	u		<20.0	mg/Kg	5	4.00

Sample: 309061 - AH-3 3-3.5'

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	95026	Date Analyzed:	2012-09-19	Analyzed By:	AR
Prep Batch:	80454	Sample Preparation:	2012-09-18	Prepared By:	AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 13 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	u		<20.0	mg/Kg	5	4.00

Sample: 309062 - AH-4 0-1'

Laboratory: Midland
Analysis: BTEX
QC Batch: 95020
Prep Batch: 80514

Analytical Method: S 8021B
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-18

Prep Method: S 5035
Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene	u	1	<0.0200	mg/Kg	1	0.0200
Toluene		1	0.207	mg/Kg	1	0.0200
Ethylbenzene		1	0.0333	mg/Kg	1	0.0200
Xylene		1	0.165	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.104	mg/Kg	1	0.100	104	70 - 130
4-Bromofluorobenzene (4-BFB)			0.108	mg/Kg	1	0.100	108	70 - 130

Sample: 309062 - AH-4 0-1'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95026
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			402	mg/Kg	5	4.00

Sample: 309062 - AH-4 0-1'

Laboratory: Midland
Analysis: TPH DRO - NEW
QC Batch: 94898
Prep Batch: 80415

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-17

Prep Method: N/A
Analyzed By: CW
Prepared By: CW

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 14 of 33
NM

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			113	mg/Kg	1	100	113	70 - 130

Sample: 309062 - AH-4 0-1'

Laboratory: Midland
Analysis: TPH GRO
QC Batch: 95031
Prep Batch: 80524

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-18

Prep Method: S 5035
Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	Q*	1	5.10	mg/Kg	1	4.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0988	mg/Kg	1	0.100	99	70 - 130
4-Bromofluorobenzene (4-BFB)			0.100	mg/Kg	1	0.100	100	70 - 130

Sample: 309063 - AH-4 1-1.5'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95026
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			102	mg/Kg	5	4.00

Sample: 309064 - AH-4 2-2.5'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95026
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 15 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			102	mg/Kg	5	4.00

Sample: 309065 - AH-4 3-3.5'

Laboratory: Midland
Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A
QC Batch: 95026 Date Analyzed: 2012-09-19 Analyzed By: AR
Prep Batch: 80454 Sample Preparation: 2012-09-18 Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			189	mg/Kg	5	4.00

Sample: 309066 - AH-5 0-1'

Laboratory: Midland
Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 95020 Date Analyzed: 2012-09-18 Analyzed By: YG
Prep Batch: 80514 Sample Preparation: 2012-09-18 Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	<0.0200	mg/Kg	1	0.0200
Toluene		1	0.219	mg/Kg	1	0.0200
Ethylbenzene		1	0.0388	mg/Kg	1	0.0200
Xylene		1	0.193	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0985	mg/Kg	1	0.100	98	70 - 130
4-Bromofluorobenzene (4-BFB)			0.103	mg/Kg	1	0.100	103	70 - 130

Sample: 309066 - AH-5 0-1'

Laboratory: Midland
Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A
QC Batch: 95027 Date Analyzed: 2012-09-19 Analyzed By: AR
Prep Batch: 80454 Sample Preparation: 2012-09-18 Prepared By: AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 16 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			7290	mg/Kg	10	4.00

Sample: 309066 - AH-5 0-1'

Laboratory: Midland
Analysis: TPH DRO - NEW
QC Batch: 94898
Prep Batch: 80415

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-17

Prep Method: N/A
Analyzed By: CW
Prepared By: CW

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			112	mg/Kg	1	100	112	70 - 130

Sample: 309066 - AH-5 0-1'

Laboratory: Midland
Analysis: TPH GRO
QC Batch: 95031
Prep Batch: 80524

Analytical Method: S 8015 D
Date Analyzed: 2012-09-18
Sample Preparation: 2012-09-18

Prep Method: S 5035
Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	Q*	1	5.56	mg/Kg	1	4.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.100	mg/Kg	1	0.100	100	70 - 130
4-Bromofluorobenzene (4-BFB)			0.100	mg/Kg	1	0.100	100	70 - 130

Sample: 309067 - AH-5 1-1.5'

Laboratory: Midland
Analysis: Chloride (Titration)
QC Batch: 95027
Prep Batch: 80454

Analytical Method: SM 4500-Cl B
Date Analyzed: 2012-09-19
Sample Preparation: 2012-09-18

Prep Method: N/A
Analyzed By: AR
Prepared By: AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 17 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			755	mg/Kg	5	4.00

Sample: 309068 - AH-5 2-2.5'

Laboratory: Midland
Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A
QC Batch: 95027 Date Analyzed: 2012-09-19 Analyzed By: AR
Prep Batch: 80454 Sample Preparation: 2012-09-18 Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			312	mg/Kg	5	4.00

Sample: 309069 - AH-5 3-3.5'

Laboratory: Midland
Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A
QC Batch: 95027 Date Analyzed: 2012-09-19 Analyzed By: AR
Prep Batch: 80454 Sample Preparation: 2012-09-18 Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride	u		<20.0	mg/Kg	5	4.00

Sample: 309070 - AH-6 0-1'

Laboratory: Midland
Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 95020 Date Analyzed: 2012-09-18 Analyzed By: YG
Prep Batch: 80514 Sample Preparation: 2012-09-18 Prepared By: YG

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Benzene		1	0.0201	mg/Kg	1	0.0200
Toluene		1	0.218	mg/Kg	1	0.0200
Ethylbenzene		1	0.0380	mg/Kg	1	0.0200

continued ...

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 18 of 33
NM

sample 309070 continued ...

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Xylene		1	0.204	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0982	mg/Kg	1	0.100	98	70 - 130
4-Bromofluorobenzene (4-BFB)			0.103	mg/Kg	1	0.100	103	70 - 130

Sample: 309070 - AH-6 0-1'

Laboratory: Midland
Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A
QC Batch: 95027 Date Analyzed: 2012-09-19 Analyzed By: AR
Prep Batch: 80454 Sample Preparation: 2012-09-18 Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			1230	mg/Kg	5	4.00

Sample: 309070 - AH-6 0-1'

Laboratory: Midland
Analysis: TPH DRO - NEW Analytical Method: S 8015 D Prep Method: N/A
QC Batch: 94898 Date Analyzed: 2012-09-18 Analyzed By: CW
Prep Batch: 80415 Sample Preparation: 2012-09-17 Prepared By: CW

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		114		mg/Kg	1	100	114	70 - 130

Sample: 309070 - AH-6 0-1'

Laboratory: Midland
Analysis: TPH GRO Analytical Method: S 8015 D Prep Method: S 5035
QC Batch: 95031 Date Analyzed: 2012-09-18 Analyzed By: YG
Prep Batch: 80524 Sample Preparation: 2012-09-18 Prepared By: YG

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 19 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
GRO	Qs	1	5.31	mg/Kg	1	4.00

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0994	mg/Kg	1	0.100	99	70 - 130
4-Bromofluorobenzene (4-BFB)			0.102	mg/Kg	1	0.100	102	70 - 130

Sample: 309071 - AH-6 1-1.5'

Laboratory: Midland	Analytical Method: SM 4500-Cl B	Prep Method: N/A
Analysis: Chloride (Titration)	Date Analyzed: 2012-09-19	Analyzed By: AR
QC Batch: 95027	Sample Preparation: 2012-09-18	Prepared By: AR
Prep Batch: 80454		

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			1110	mg/Kg	5	4.00

Sample: 309072 - AH-6 2-2.5'

Laboratory: Midland	Analytical Method: SM 4500-Cl B	Prep Method: N/A
Analysis: Chloride (Titration)	Date Analyzed: 2012-09-19	Analyzed By: AR
QC Batch: 95027	Sample Preparation: 2012-09-18	Prepared By: AR
Prep Batch: 80454		

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			10800	mg/Kg	10	4.00

Sample: 309073 - AH-6 3-3.5'

Laboratory: Midland	Analytical Method: SM 4500-Cl B	Prep Method: N/A
Analysis: Chloride (Titration)	Date Analyzed: 2012-09-19	Analyzed By: AR
QC Batch: 95027	Sample Preparation: 2012-09-18	Prepared By: AR
Prep Batch: 80454		

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 20 of 33
NM

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			5170	mg/Kg	10	4.00

Sample: 309074 - AH-6 4-4.5'

Laboratory:	Midland			
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method: N/A
QC Batch:	95027	Date Analyzed:	2012-09-19	Analyzed By: AR
Prep Batch:	80454	Sample Preparation:	2012-09-18	Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			5570	mg/Kg	10	4.00

Sample: 309075 - AH-6 5-5.5'

Laboratory:	Midland			
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method: N/A
QC Batch:	95027	Date Analyzed:	2012-09-19	Analyzed By: AR
Prep Batch:	80454	Sample Preparation:	2012-09-18	Prepared By: AR

Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Chloride			360	mg/Kg	5	4.00

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 21 of 33
NM

Method Blanks

Method Blank (1) QC Batch: 94898

QC Batch: 94898
Prep Batch: 80415

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-17

Analyzed By: CW
Prepared By: CW

Parameter	Flag	Cert	MDL Result	Units	RL
DRO		1	<9.09	mg/Kg	50

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			111	mg/Kg	1	100	111	70 - 130

Method Blank (1) QC Batch: 95020

QC Batch: 95020
Prep Batch: 80514

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-18

Analyzed By: YG
Prepared By: YG

Parameter	Flag	Cert	MDL Result	Units	RL
Benzene		1	<0.00470	mg/Kg	0.02
Toluene		1	<0.00980	mg/Kg	0.02
Ethylbenzene		1	<0.00500	mg/Kg	0.02
Xylene		1	<0.0170	mg/Kg	0.02

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.104	mg/Kg	1	0.100	104	70 - 130
4-Bromofluorobenzene (4-BFB)			0.108	mg/Kg	1	0.100	108	70 - 130

Method Blank (1) QC Batch: 95025

QC Batch: 95025
Prep Batch: 80454

Date Analyzed: 2012-09-19
QC Preparation: 2012-09-18

Analyzed By: AR
Prepared By: AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 22 of 33
NM

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

Method Blank (1) QC Batch: 95026

QC Batch: 95026 Date Analyzed: 2012-09-19 Analyzed By: AR
Prep Batch: 80454 QC Preparation: 2012-09-18 Prepared By: AR

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

Method Blank (1) QC Batch: 95027

QC Batch: 95027 Date Analyzed: 2012-09-19 Analyzed By: AR
Prep Batch: 80454 QC Preparation: 2012-09-18 Prepared By: AR

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

Method Blank (1) QC Batch: 95031

QC Batch: 95031 Date Analyzed: 2012-09-18 Analyzed By: YG
Prep Batch: 80524 QC Preparation: 2012-09-18 Prepared By: YG

Parameter	Flag	Cert	MDL Result	Units	RL
GRO		1	<1.22	mg/Kg	4

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0980	mg/Kg	1	0.100	98	70 - 130
4-Bromofluorobenzene (4-BFB)			0.100	mg/Kg	1	0.100	100	70 - 130

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 23 of 33
NM

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 94898
Prep Batch: 80415

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-17

Analyzed By: CW
Prepared By: CW

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
DRO		1	293	mg/Kg	1	250	<9.09	117	70 - 130

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	289	mg/Kg	1	250	<9.09	116	70 - 130	1	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	110	103	mg/Kg	1	100	110	103	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch: 95020
Prep Batch: 80514

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-18

Analyzed By: YG
Prepared By: YG

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.0990	mg/Kg	1	0.100	<0.00470	99	70 - 130
Toluene		1	0.102	mg/Kg	1	0.100	<0.00980	102	70 - 130
Ethylbenzene		1	0.0974	mg/Kg	1	0.100	<0.00500	97	70 - 130
Xylene		1	0.297	mg/Kg	1	0.300	<0.0170	99	70 - 130

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	0.0992	mg/Kg	1	0.100	<0.00470	99	70 - 130	0	20
Toluene		1	0.102	mg/Kg	1	0.100	<0.00980	102	70 - 130	0	20
Ethylbenzene		1	0.0980	mg/Kg	1	0.100	<0.00500	98	70 - 130	1	20
Xylene		1	0.298	mg/Kg	1	0.300	<0.0170	99	70 - 130	0	20

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

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 24 of 33
NM

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.102	0.102	mg/Kg	1	0.100	102	102	70 - 130
4-Bromofluorobenzene (4-BFB)	0.112	0.111	mg/Kg	1	0.100	112	111	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch: 95025
Prep Batch: 80454

Date Analyzed: 2012-09-19
QC Preparation: 2012-09-18

Analyzed By: AR
Prepared By: AR

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			2600	mg/Kg	1	2500	<3.85	104	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			2730	mg/Kg	1	2500	<3.85	109	85 - 115	5	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: 95026
Prep Batch: 80454

Date Analyzed: 2012-09-19
QC Preparation: 2012-09-18

Analyzed By: AR
Prepared By: AR

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			2590	mg/Kg	1	2500	<3.85	104	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			2660	mg/Kg	1	2500	<3.85	106	85 - 115	3	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: 95027
Prep Batch: 80454

Date Analyzed: 2012-09-19
QC Preparation: 2012-09-18

Analyzed By: AR
Prepared By: AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 25 of 33
NM

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			2510	mg/Kg	1	2500	<3.85	100	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			2610	mg/Kg	1	2500	<3.85	104	85 - 115	4	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: 95031
Prep Batch: 80524

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-18

Analyzed By: YG
Prepared By: YG

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
GRO		1	21.2	mg/Kg	1	20.0	<1.22	106	70 - 130

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
GRO		1	21.1	mg/Kg	1	20.0	<1.22	106	70 - 130	0	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)	0.0998	0.0990	mg/Kg	1	0.100	100	99	70 - 130
4-Bromofluorobenzene (4-BFB)	0.107	0.100	mg/Kg	1	0.100	107	100	70 - 130

Matrix Spike (MS-1) Spiked Sample: 309041

QC Batch: 94898
Prep Batch: 80415

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-17

Analyzed By: CW
Prepared By: CW

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
DRO		1	263	mg/Kg	1	250	<9.09	105	70 - 130

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

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 26 of 33
NM

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
DRO		1	268	mg/Kg	1	250	<9.09	107	70 - 130	2	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	114	120	mg/Kg	1	100	114	120	70 - 130

Matrix Spike (MS-1) Spiked Sample: 308963

QC Batch: 95020
Prep Batch: 80514

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-18

Analyzed By: YG
Prepared By: YG

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	0.107	mg/Kg	1	0.100	<0.00470	107	70 - 130
Toluene		1	0.118	mg/Kg	1	0.100	<0.00980	118	70 - 130
Ethylbenzene		1	0.108	mg/Kg	1	0.100	<0.00500	108	70 - 130
Xylene		1	0.330	mg/Kg	1	0.300	<0.0170	110	70 - 130

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	0.107	mg/Kg	1	0.100	<0.00470	107	70 - 130	0	20
Toluene		1	0.118	mg/Kg	1	0.100	<0.00980	118	70 - 130	0	20
Ethylbenzene		1	0.108	mg/Kg	1	0.100	<0.00500	108	70 - 130	0	20
Xylene		1	0.331	mg/Kg	1	0.300	<0.0170	110	70 - 130	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
Trifluorotoluene (TFT)	0.105	0.106	mg/Kg	1	0.1	105	106	70 - 130
4-Bromofluorobenzene (4-BFB)	0.113	0.115	mg/Kg	1	0.1	113	115	70 - 130

Matrix Spike (MS-1) Spiked Sample: 309055

QC Batch: 95025
Prep Batch: 80454

Date Analyzed: 2012-09-19
QC Preparation: 2012-09-18

Analyzed By: AR
Prepared By: AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 27 of 33
NM

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			2790	mg/Kg	5	2500	176	104	78.9 - 121

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			2870	mg/Kg	5	2500	176	108	78.9 - 121	3	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: 309065

QC Batch: 95026
Prep Batch: 80454

Date Analyzed: 2012-09-19
QC Preparation: 2012-09-18

Analyzed By: AR
Prepared By: AR

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			2660	mg/Kg	5	2500	189	99	78.9 - 121

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			2770	mg/Kg	5	2500	189	103	78.9 - 121	4	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: 309075

QC Batch: 95027
Prep Batch: 80454

Date Analyzed: 2012-09-19
QC Preparation: 2012-09-18

Analyzed By: AR
Prepared By: AR

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			2880	mg/Kg	5	2500	360	101	78.9 - 121

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			2970	mg/Kg	5	2500	360	104	78.9 - 121	3	20

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

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 28 of 33
NM

Matrix Spike (MS-1) Spiked Sample: 308963

QC Batch: 95031
Prep Batch: 80524

Date Analyzed: 2012-09-18
QC Preparation: 2012-09-18

Analyzed By: YG
Prepared By: YG

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	
GRO	Q*	Q*	1	26.2	mg/Kg	1	20.0	<1.22	131	70 - 130

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	24.4	mg/Kg	1	20.0	<1.22	122	70 - 130	7	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)	0.103	0.100	mg/Kg	1	0.1	103	100	70 - 130
4-Bromofluorobenzene (4-BFB)	0.113	0.110	mg/Kg	1	0.1	113	110	70 - 130

Calibration Standards

Standard (CCV-1)

QC Batch: 94898

Date Analyzed: 2012-09-18

Analyzed By: CW

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		1	mg/Kg	250	278	111	80 - 120	2012-09-18

Standard (CCV-2)

QC Batch: 94898

Date Analyzed: 2012-09-18

Analyzed By: CW

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		1	mg/Kg	250	288	115	80 - 120	2012-09-18

Standard (CCV-3)

QC Batch: 94898

Date Analyzed: 2012-09-18

Analyzed By: CW

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		1	mg/Kg	250	256	102	80 - 120	2012-09-18

Standard (CCV-1)

QC Batch: 95020

Date Analyzed: 2012-09-18

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/kg	0.100	0.104	104	80 - 120	2012-09-18
Toluene		1	mg/kg	0.100	0.107	107	80 - 120	2012-09-18

continued ...

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 30 of 33
NM

standard continued ...

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Ethylbenzene		1	mg/kg	0.100	0.0938	94	80 - 120	2012-09-18
Xylene		1	mg/kg	0.300	0.288	96	80 - 120	2012-09-18

Standard (CCV-2)

QC Batch: 95020

Date Analyzed: 2012-09-18

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/kg	0.100	0.103	103	80 - 120	2012-09-18
Toluene		1	mg/kg	0.100	0.110	110	80 - 120	2012-09-18
Ethylbenzene		1	mg/kg	0.100	0.0940	94	80 - 120	2012-09-18
Xylene		1	mg/kg	0.300	0.287	96	80 - 120	2012-09-18

Standard (CCV-3)

QC Batch: 95020

Date Analyzed: 2012-09-18

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/kg	0.100	0.103	103	80 - 120	2012-09-18
Toluene		1	mg/kg	0.100	0.110	110	80 - 120	2012-09-18
Ethylbenzene		1	mg/kg	0.100	0.0938	94	80 - 120	2012-09-18
Xylene		1	mg/kg	0.300	0.287	96	80 - 120	2012-09-18

Standard (CCV-1)

QC Batch: 95025

Date Analyzed: 2012-09-19

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	99.7	100	85 - 115	2012-09-19

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 31 of 33
NM

Standard (CCV-2)

QC Batch: 95025

Date Analyzed: 2012-09-19

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	100	100	85 - 115	2012-09-19

Standard (CCV-1)

QC Batch: 95026

Date Analyzed: 2012-09-19

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	101	101	85 - 115	2012-09-19

Standard (CCV-2)

QC Batch: 95026

Date Analyzed: 2012-09-19

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	99.5	100	85 - 115	2012-09-19

Standard (CCV-1)

QC Batch: 95027

Date Analyzed: 2012-09-19

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	100	100	85 - 115	2012-09-19

Standard (CCV-2)

QC Batch: 95027

Date Analyzed: 2012-09-19

Analyzed By: AR

Report Date: September 25, 2012
114-6401494

Work Order: 12091216
SME/ESDU #6 Flowline

Page Number: 32 of 33
NM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	100	100	85 - 115	2012-09-19

Standard (CCV-1)

QC Batch: 95031

Date Analyzed: 2012-09-18

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		1	mg/Kg	1.00	0.986	99	80 - 120	2012-09-18

Standard (CCV-2)

QC Batch: 95031

Date Analyzed: 2012-09-18

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		1	mg/Kg	1.00	1.05	105	80 - 120	2012-09-18

Standard (CCV-3)

QC Batch: 95031

Date Analyzed: 2012-09-18

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		1	mg/Kg	1.00	1.05	105	80 - 120	2012-09-18

Appendix

Report Definitions

Name	Definition
MDL	Method Detection Limit
MQL	Minimum Quantitation Limit
SDL	Sample Detection Limit

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	T104704392-12-4	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 than 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

ANALYSIS REQUEST
(Circle or Specify Method No.)

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 NAME: ESDU #6 Flowline		
PROJECT NO.: 114-6401494								
LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP	GRAB	SAMPLE IDENTIFICATION		
00780	9-5-12		S		1	AH1	O-1	
051			S		1	AH1	1-1.5	
052			S		1	AH1	2-2.5	
053			S		1	AH2	O-1	
054			S		1	AH2	1-1.5	
055			S		1	AH2	2-2.5	
056			S		1	AH2	3-3.5	
057			S		1	AH2	4-4.5	
058			S		1	AH3	O-1	
059			S		1	AH3	1-1.5	

RELINQUISHED BY: (Signature) _____ Date: 9-11-12 Time: 16:45
 RECEIVED BY: (Signature) [Signature] Date: 9-11-12 Time: 16:45

RELINQUISHED BY: (Signature) _____ Date: _____ Time: _____
 RECEIVED BY: (Signature) _____ Date: _____ Time: _____

RELINQUISHED BY: (Signature) _____ Date: _____ Time: _____
 RECEIVED BY: (Signature) _____ Date: _____ Time: _____

RECEIVING LABORATORY: Trace ADDRESS: _____ STATE: _____ ZIP: _____ PHONE: _____ DATE: _____ TIME: _____

CONTACT: _____ SAMPLE CONDITION WHEN RECEIVED: 2.1

PRELIMINARY RESULTS:

TEST	RESULT
PAH 8270	X
RCRA Metals Ag As Ba Cd	
TCLP Metals Ag As Ba Cd	
TCLP Volatiles	
TCLP Semi Volatiles	
RCl	
GC/MS Vol. 8240/8260/624	
GC/MS Semi. Vol. 8270/625	
PCB's 8080/608	
Pest. 808/608	
Chloride	X
Gamma Spec.	
Alpha Beta (Air)	
PLM (Asbestos)	
Major Anions/Cations, pH, T	

Results by: Aaron Hale

RUSH Charges Authorized: Yes No

Analysis Request of Chain of Custody Record

ANALYSIS REQUEST

(Circle or Specify Method No.)



TETRA TECH

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

SITE MANAGER: Aaron Hale

PROJECT NO.: PROJECT NAME:

NAME: ESOL #6 flowline

SAMPLE IDENTIFICATION

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB
--------------------	------	------	--------	-------	------

070	9/5-	S	X	Alt-6	0-1
071	↓	↓	↓	Alt-6	1-1.5
072				Alt-6	2-2.5
073				Alt-6	3-3.5
074				Alt-6	4-4.5
075		↓	↓	Alt-6	5-5.5

PRESERVATIVE METHOD	HCL
	HNO3
	ICE
	NONE

[illegible]

RECEIVED BY: (Signature) *H. H. H. H.*

Date: 9/11/12
Time: 16:45
Date: _____

SAMPLED BY: (Print & Initial)
Mona K. Smith/Ry
DATE: _____
TIME: _____
AIRBILL #: _____
SAMPLE SHIPPED BY: (Circle)

RECEIVED BY: (Signature)

Date: _____
Time: _____

OTHER: _____	_____
HAND DELIVERED	UPS
TETRA TECH CONTACT PERSON:	
Result	

DATE: _____

TIME: _____

Avon Hale	RUS Authentic	Y
-----------	------------------	---

281

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