



October 6, 2015

Mr. Zackary Laird  
RKI Exploration & Production  
210 Park Ave, Suite 700  
Oklahoma City, OK 73102

**RE: OCD Workplan for Release at Brushy Draw Fed 35-6H and Interim C-141 Report  
Unit B, Sec. 35, T25S R29E Eddy County, New Mexico**

Dear Mr. Laird:

RKI Exploration & Production (RKI) retained Enviro Clean Services, LLC (ECS) to collect soil samples and remediate the release at the Brushy Draw Fed 35-6H site located in Section 35, Township 25S, Range 29E, in Eddy County, New Mexico (approximately 32.092512°N, 103.953869°W), following a drilling mud and fracking fluids release. **Figure 1** is a site map depicting the area of release and soil sample locations.

The New Mexico Oil Conservation Division's (OCD) Form C-141 was prepared by RKI for this site. This document indicates that in the early morning hours of September 17, 2015, well stimulation operations released 760 barrels (bbls) of drilling mud and fracking fluids, with 600 bbls recovered. The net loss is 160 bbls of drilling mud and fracking fluids.

On September 18, 2015, ECS field personnel collected soil samples from three locations within the impacted area, and three locations representing background locations. Sample depths were from the surface and at one foot below ground surface (bgs) within the impacted area. The samples were transported under chain-of-custody to Permian Basin Environmental Lab, LP in Midland, Texas, using industry standards for care and preservation. All samples were analyzed for Chlorides (EPA method 300.0) and Total Petroleum Hydrocarbons (TPH, EPA method 8015M).

### **General Site Characteristics**

The affected property is leased from the Bureau of Land Management (BLM). The *Geologic Map of New Mexico* (NMBGMR, 2003) indicates the site's surface geology is comprised primarily of Qep – Quaternary eolian and piedmont deposits (Holocene to middle Pleistocene). This usually is interlayered eolian sands and piedmont-slope deposits along the eastern flank of the Pecos River valley, primarily between Roswell and Carlsbad. The unit is typically capped by thin eolian deposits. The Natural Resource Conservation Service identifies the local soils as *PA—Pajarito loamy fine sand, 0 to 3 percent slopes*, eroded for most of the affected area originating at the source, while the far end enters soils of the *RE—Reagan-Upton association, 0 to 9 percent slopes*.

Although the Reagan soil's name indicated a steepening of the slope, the description of the soil indicates a 0 to 3 percent slope, which is consistent with the area. These soils are mixed alluvium and/or eolian sands, typically with a profile of loamy fine sand at the surface, with well drained gravelly loam to a depth of five feet or more. These descriptions are consistent with site observations.

The OCD Recommended Remediation Action Levels (RRALs) are a ranking system used to evaluate regulatory requirements. RRALs are based on depth to water, wellhead protection area distance, and the distance to surface water bodies. The nearest water well is almost three miles away, with a depth to water reported at 162 feet bgs, and a static head of 60 feet bgs. State Land Office Point of Diversion reports are attached for review. The nearest surface water is about three miles southwest of the site.

Using the site specific data, the RRALs for the site are 10 parts per million (ppm, or mg/Kg) benzene, 50 ppm BTEX, and 5,000 ppm TPH. All of the surface sample locations exhibited elevated levels of chlorides when compared to this standard, with decreasing concentrations at one foot bgs. **Table 1** summarizes the analytical results, and the laboratory analytical report and chain of custody documentation are attached for your records.

**Table 1 – Analytical Results Summary**

Sample ID	Depth (feet)	Date Collected	Total TPH	Benzene	BTEX	Chlorides*
RRALs			<b>5,000</b>	<b>10</b>	<b>50</b>	<b>1,000</b>
001	0	9/18/2015	<b>18.5</b>	---	---	<b>3,030</b>
001A	1	9/18/2015	<15.0	---	---	<b>375</b>
002	0	9/18/2015	<b>103</b>	---	---	<b>1,750</b>
002A	1	9/18/2015	<15.0	---	---	<b>185</b>
003	0	9/18/2015	<14.9	---	---	<b>3,350</b>
003A	1	9/18/2015	<15.0	---	---	<b>1,620</b>
004	0	9/18/2015	<15.0	---	---	<2.00
005	0	9/18/2015	<15.0	---	---	<2.00
006	0	9/18/2015	<15.0	---	---	<2.00

All values are in milligrams per kilogram (mg/Kg, ppm). Analyte detections are **bolded**.

Values that exceed the Recommended Remediation Action Levels are shaded.

\*Chloride values are site specific; 1,000 is a regionally accepted target value.

## Oil Conservation Division Work Plan

Additional subsurface chloride vertical delineation is required for this site based on OCD guidance requirements.

For vertical delineation ECS recommends field screening with laboratory confirmation that chlorides are below 1,000 ppm chloride, and approaching the 250 ppm New Mexico Water Quality Control Commission (WQCC) standard. Soil samples will be field screened using an electrical conductivity meter and one-to-one soil-water solution, with laboratory chloride confirmation.

The flow path is narrow and long, approximate 3,000 feet in length. Screening samples will be selected at approximately 100 foot linear intervals, with laboratory samples selected at approximately 500 foot intervals. The results of both field screening and the laboratory analyses will be tabulated in a final report.

For remediation, ECS recommends excavation in the vicinity of sample 003 until laboratory confirmation is below 1,000 ppm chlorides, or to 4-feet bgs, whichever occurs first. A BTEX sample will be collected near 003 for RRAL confirmation. In other areas the impacted soil is much shallower, and will be excavated, as determined with field screening and laboratory confirmation. Excavated areas will be backfilled with similar soil from a BLM-approved, weed-free source.

All excavated impacted soil will be transported to an approved NMOCD facility for disposal. With RKI's concurrence, ECS will prepare a cost estimate to return to the site for remediation and the collection of vertical delineation confirmation samples.

ECS appreciates the opportunity to be of service to RKI. If you have any questions about the information presented in this report, please contact me at [bill.green@eccgrp.com](mailto:bill.green@eccgrp.com) or at 432.301.0209.

Sincerely,

**Enviro Clean Services, LLC**




William D. Green, PG  
Geologist, Texas No. 136

Attachments: Figure 1: Area of Release and Soil Sample Locations  
Initial C-141  
State Land Office Point of Diversion Reports  
Laboratory Analytical Report and Chain of Custody Documentation  
Photographic Documentation





Area of Release and Soil Sample Locations  
 RKI Exploration & Production  
 Brushy Draw 35-6H  
 Unit B, Sec. 35, Township 25S, Range 29E  
 Eddy County, New Mexico

Scale:		Drawn By:
Not to Scale		ECS
Date:		Project Mgr.:
10/2/2015		ECS
2405 East County Road 123, Midland, Texas 79706		
Project No.:	RKIRTX0005	Figure:
		1

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	RKI E&P, LLC	Contact	Zack Laird
Address	210 Park Ave. - Ste. 700, OKC, OK 73102	Telephone No.	405-987-2213
Facility Name:	North Brushy Draw Fed 35-6H	Facility Type:	Oil and Gas Well

Surface Owner: Federal	Mineral Owner: Federal	API No. 30-015-42293
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#### LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
A	35	25S	29E	175	FNL	2290	FEL	Eddy

Latitude: 32.0929574 Longitude: -103.95337

#### NATURE OF RELEASE

Type of Release. Drilling Mud/Frac Fluid	Volume of Release: 760 Bbls	Volume Recovered: 600 Bbls
Source of Release 5.5" x 9.675" annulus	Date and Hour of Occurrence 09/17/15 - 0200hrs MT	Date and Hour of Discovery 09/17/15 - 0200hrs MT
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Heather Patterson/Shelly Tucker (BLM)	
By Whom? Zack Laird	Date and Hour: 09/17/15 - 1000hrs and 1715hrs	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse. N/A	

If a Watercourse was Impacted, Describe Fully.\* N/A

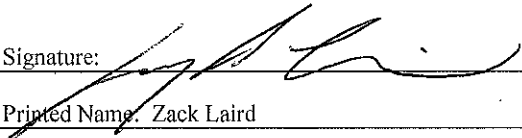
Describe Cause of Problem and Remedial Action Taken.\*

During stage 8 stimulation operations an unknown downhole failure (i.e. casing part) caused communication between 5.5" and 9.625" casing, pressure relief valve plumbed to "B" section of wellhead parted under pressure and allowed well flow on surface for approximately 1.5hrs.

Describe Area Affected and Cleanup Action Taken.\*

Fluid accumulated on well pad and ran off location to the South for approximately .5 miles

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: 		<b>OIL CONSERVATION DIVISION</b>	
Printed Name: Zack Laird		Approved by Environmental Specialist:	
Title: Sr. EHS Manager		Approval Date:	Expiration Date:
E-mail Address: Zlaird@rkixp.com		Conditions of Approval:	Attached <input type="checkbox"/>
Date: 09/17/15 Phone: 405-987-2213			




\* Attach Additional Sheets If Necessary



# New Mexico Office of the State Engineer

## Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)										(R=POD has been replaced and no longer serves this file, (quarters are 1=NW 2=NE 3=SW 4=SE) C=the file is closed) (quarters are smallest to largest) (NAD83 UTM in meters)										
WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q	q	q	6416	4	Sec	Tws	Rng	X	Y	Distance
<a href="#">C 03617</a>	C	STK		0 BUREAU OF LAND MANAGEMENT UNITED STATES DEPT OF INTERIOR	ED	<a href="#">C 03617 POD1</a>				3	4	3	14	25S	29E		598207	3554566		3536
<a href="#">C 02371</a>	C	STK		3 TRAN KING & WESTERN COMM. BANK	ED	<a href="#">C 02371</a>		Shallow		2	3	15	25S	29E			596741	3555106*		4526
<a href="#">C 02680</a>	C	STK		3 TRAN KING AND WESTERN COMMERCE BANK	ED	<a href="#">C 02680</a>				2	3	15	25S	29E			596741	3555106*		4526

Record Count: 3

### UTMNAD83 Radius Search (in meters):

**Easting (X):** 598814

**Northing (Y):** 3551082

**Radius:** 5000

**Sorted by:** Distance

\*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



# New Mexico Office of the State Engineer

## Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

**POD Number**


**Q64 Q16 Q4 Sec Tws Rng**

**X**

**Y**

C 02371

2 3 15 25S 29E

596741 3555106\* 

**Driller License:** 1259

**Driller Name:** CAMPBELL, MICHAEL R.

**Drill Start Date:** 01/12/1995

**Drill Finish Date:** 01/24/1995

**Plug Date:**

**Log File Date:** 02/01/1995

**PCW Rcv Date:**

**Source:** Shallow

**Pump Type:**

**Pipe Discharge Size:**

**Estimated Yield:** 20 GPM

**Casing Size:** 7.00

**Depth Well:** 200 feet

**Depth Water:** 60 feet

**Water Bearing Stratifications:**

**Top Bottom Description**

162 200 Sandstone/Gravel/Conglomerate

**Casing Perforations:**

**Top Bottom**

140 200

\*UTM location was derived from PLSS - see Help

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# New Mexico Office of the State Engineer

## Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

**POD Number**


**Q64 Q16 Q4 Sec Tws Rng**

**X**

**Y**

C 02680

2 3 15 25S 29E

596741 3555106\* 

**Driller License:**

**Driller Name:**

**Drill Start Date:**

**Drill Finish Date:** 04/30/1964

**Plug Date:**

**Log File Date:**

**PCW Rcv Date:**

**Source:**

**Pump Type:**

**Pipe Discharge Size:**

**Estimated Yield:**

**Casing Size:** 6.00

**Depth Well:** 200 feet

**Depth Water:**

\*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



# **Analytical Report 515940**

**for  
Enviroclean- Midland**

**Project Manager: BILL GREEN**

**RKI Brushy Draw**

**28-SEP-15**

Collected By: Client



**12600 West I-20 East Odessa, Texas 79765**

Xenco-Houston (EPA Lab code: TX00122):

Texas (T104704215-15-19), Arizona (AZ0765), Florida (E871002), Louisiana (03054)  
Oklahoma (9218)

Xenco-Atlanta (EPA Lab Code: GA00046):

Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD ( L10-135)  
Texas (T104704477), Louisiana (04176), USDA (P330-07-00105)

Xenco-Lakeland: Florida (E84098)

Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)

Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)

Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)

Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)

Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)



28-SEP-15

Project Manager: **BILL GREEN**  
**Enviroclean- Midland**  
2405 ECR 123  
Midland, TX 79706

Reference: XENCO Report No(s): **515940**  
**RKI Brushy Draw**  
Project Address: NM

**BILL GREEN:**

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 515940. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 515940 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

---

**Kelsey Brooks**

Project Manager

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## Sample Cross Reference 515940



### Enviroclean- Midland, Midland, TX

RKI Brushy Draw

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
001	S	09-18-15 12:40		515940-001
001-A	S	09-18-15 12:45	- 1 ft	515940-002
002	S	09-18-15 12:50		515940-003
002-A	S	09-18-15 12:55	- 1 ft	515940-004
003	S	09-18-15 13:05		515940-005
003-A	S	09-18-15 13:10	- 1 ft	515940-006
004	S	09-18-15 13:20		515940-007
005	S	09-18-15 13:25		515940-008
006	S	09-18-15 13:35		515940-009



## CASE NARRATIVE



*Client Name: Enviroclean- Midland*

*Project Name: RKI Brushy Draw*

Project ID:

Work Order Number(s): 515940

Report Date: 28-SEP-15

Date Received: 09/21/2015

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### **Sample receipt non conformances and comments:**

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### **Sample receipt non conformances and comments per sample:**

None

### **Analytical non conformances and comments:**

Batch: LBA-977731 TPH By SW8015B Mod

Surrogate 1-Chlorooctane, Surrogate o-Terphenyl recovered above QC limits. Matrix interferences is suspected; data confirmed by re-analysis.

Samples affected are: 515940-004.

# Certificate of Analysis Summary 515940

Enviroclean- Midland, Midland, TX

Project Name: RKI Brushy Draw



Project Id:

Contact: BILL GREEN

Project Location: NM

Date Received in Lab: Mon Sep-21-15 01:55 pm

Report Date: 28-SEP-15

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	515940-001	515940-002	515940-003	515940-004	515940-005	515940-006
	<i>Field Id:</i>	001	001-A	002	002-A	003	003-A
	<i>Depth:</i>		1 ft		1 ft		1 ft
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Sep-18-15 12:40	Sep-18-15 12:45	Sep-18-15 12:50	Sep-18-15 12:55	Sep-18-15 13:05	Sep-18-15 13:10
<b>Inorganic Anions by EPA 300/300.1</b>	<i>Extracted:</i>	Sep-26-15 10:00	Sep-26-15 10:00	Sep-26-15 10:00	Sep-26-15 10:00	Sep-26-15 10:00	Sep-26-15 10:00
	<i>Analyzed:</i>	Sep-26-15 14:42	Sep-26-15 15:27	Sep-26-15 15:50	Sep-26-15 16:12	Sep-26-15 16:35	Sep-26-15 16:58
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		3030 200	375 40.0	1750 100	185 10.0	3350 200	1620 100
<b>TPH By SW8015B Mod</b>	<i>Extracted:</i>	Sep-25-15 15:00	Sep-25-15 15:00	Sep-25-15 15:00	Sep-25-15 15:00	Sep-25-15 15:00	Sep-25-15 15:00
	<i>Analyzed:</i>	Sep-25-15 20:50	Sep-25-15 21:14	Sep-25-15 21:38	Sep-25-15 22:02	Sep-25-15 22:26	Sep-25-15 23:14
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
C6-C10 Gasoline Range Hydrocarbons		18.5 14.9	ND 15.0	24.6 15.0	ND 15.0	ND 14.9	ND 15.0
C10-C28 Diesel Range Hydrocarbons		ND 14.9	ND 15.0	78.4 15.0	ND 15.0	ND 14.9	ND 15.0
C28-C35 Oil Range Hydrocarbons		ND 14.9	ND 15.0	ND 15.0	ND 15.0	ND 14.9	ND 15.0
Total TPH		18.5 14.9	ND 15.0	103 15.0	ND 15.0	ND 14.9	ND 15.0

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi



Kelsey Brooks  
Project Manager



# Certificate of Analysis Summary 515940

Enviroclean- Midland, Midland, TX

Project Name: RKI Brushy Draw



Project Id:

Contact: BILL GREEN

Project Location: NM

Date Received in Lab: Mon Sep-21-15 01:55 pm

Report Date: 28-SEP-15

Project Manager: Kelsey Brooks

<b>Analysis Requested</b>	<b>Lab Id:</b>	515940-007	515940-008	515940-009			
	<b>Field Id:</b>	004	005	006			
	<b>Depth:</b>						
	<b>Matrix:</b>	SOIL	SOIL	SOIL			
	<b>Sampled:</b>	Sep-18-15 13:20	Sep-18-15 13:25	Sep-18-15 13:35			
<b>Inorganic Anions by EPA 300/300.1</b>	<b>Extracted:</b>	Sep-26-15 10:00	Sep-26-15 10:00	Sep-26-15 10:00			
	<b>Analyzed:</b>	Sep-26-15 18:06	Sep-26-15 18:28	Sep-26-15 18:51			
	<b>Units/RL:</b>	mg/kg RL	mg/kg RL	mg/kg RL			
Chloride		ND 2.00	ND 2.00	ND 2.00			
<b>TPH By SW8015B Mod</b>	<b>Extracted:</b>	Sep-25-15 15:00	Sep-25-15 15:00	Sep-25-15 15:00			
	<b>Analyzed:</b>	Sep-25-15 23:38	Sep-26-15 00:02	Sep-26-15 00:25			
	<b>Units/RL:</b>	mg/kg RL	mg/kg RL	mg/kg RL			
C6-C10 Gasoline Range Hydrocarbons		ND 15.0	ND 15.0	ND 15.0			
C10-C28 Diesel Range Hydrocarbons		ND 15.0	ND 15.0	ND 15.0			
C28-C35 Oil Range Hydrocarbons		ND 15.0	ND 15.0	ND 15.0			
Total TPH		ND 15.0	ND 15.0	ND 15.0			

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Kelsey Brooks  
Project Manager



- X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F** RPD exceeded lab control limits.
- J** The target analyte was positively identified below the quantitation limit and above the detection limit.
- U** Analyte was not detected.
- L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- K** Sample analyzed outside of recommended hold time.
- JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

\*\* Surrogate recovered outside laboratory control limit.

**BRL** Below Reporting Limit.

**RL** Reporting Limit

**MDL** Method Detection Limit      **SDL** Sample Detection Limit      **LOD** Limit of Detection

**PQL** Practical Quantitation Limit      **SQL** Sample Quantitation Limit      **LOQ** Limit of Quantitation

**DL** Method Detection Limit

**NC** Non-Calculable

+ NELAC certification not offered for this compound.

\* (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

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4143 Greenbriar Dr, Stafford, TX 77477  
 9701 Harry Hines Blvd, Dallas, TX 75220  
 5332 Blackberry Drive, San Antonio TX 78238  
 2505 North Falkenburg Rd, Tampa, FL 33619  
 12600 West I-20 East, Odessa, TX 79765  
 6017 Financial Drive, Norcross, GA 30071  
 3725 E. Atlanta Ave, Phoenix, AZ 85040

Phone	Fax
(281) 240-4200	(281) 240-4280
(214) 902 0300	(214) 351-9139
(210) 509-3334	(210) 509-3335
(813) 620-2000	(813) 620-2033
(432) 563-1800	(432) 563-1713
(770) 449-8800	(770) 449-5477
(602) 437-0330	



## Form 2 - Surrogate Recoveries

Project Name: RKI Brushy Draw

Work Orders : 515940,

Lab Batch #: 977731

Sample: 515940-001 / SMP

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 20:50

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	117	99.6	117	70-135	
o-Terphenyl	58.6	49.8	118	70-135	

Lab Batch #: 977731

Sample: 515940-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 21:14

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	73.1	99.7	73	70-135	
o-Terphenyl	35.9	49.9	72	70-135	

Lab Batch #: 977731

Sample: 515940-003 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 21:38

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	99.9	106	70-135	
o-Terphenyl	53.1	50.0	106	70-135	

Lab Batch #: 977731

Sample: 515940-004 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 22:02

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	137	100	137	70-135	**
o-Terphenyl	68.9	50.0	138	70-135	**

Lab Batch #: 977731

Sample: 515940-005 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 22:26

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	80.1	99.0	81	70-135	
o-Terphenyl	40.2	49.5	81	70-135	

\* Surrogate outside of Laboratory QC limits

\*\* Surrogates outside limits; data and surrogates confirmed by reanalysis

\*\*\* Poor recoveries due to dilution

Surrogate Recovery [D] =  $100 * A / B$

All results are based on MDL and validated for QC purposes.



## Form 2 - Surrogate Recoveries

Project Name: RKI Brushy Draw

Work Orders : 515940,

Lab Batch #: 977731

Sample: 515940-006 / SMP

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 23:14

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	83.5	100	84	70-135	
o-Terphenyl	41.4	50.0	83	70-135	

Lab Batch #: 977731

Sample: 515940-007 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 23:38

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	128	99.9	128	70-135	
o-Terphenyl	63.4	50.0	127	70-135	

Lab Batch #: 977731

Sample: 515940-008 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/26/15 00:02

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	99.7	106	70-135	
o-Terphenyl	53.5	49.9	107	70-135	

Lab Batch #: 977731

Sample: 515940-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/26/15 00:25

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	125	100	125	70-135	
o-Terphenyl	63.7	50.0	127	70-135	

Lab Batch #: 977731

Sample: 698641-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 09/25/15 15:43

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	78.0	100	78	70-135	
o-Terphenyl	39.6	50.0	79	70-135	

\* Surrogate outside of Laboratory QC limits

\*\* Surrogates outside limits; data and surrogates confirmed by reanalysis

\*\*\* Poor recoveries due to dilution

Surrogate Recovery [D] =  $100 * A / B$

All results are based on MDL and validated for QC purposes.



## Form 2 - Surrogate Recoveries

Project Name: RKI Brushy Draw

Work Orders : 515940,

Lab Batch #: 977731

Sample: 698641-1-BKS / BKS

Project ID:

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 09/25/15 16:07

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	87.3	100	87	70-135	
o-Terphenyl	39.9	50.0	80	70-135	

Lab Batch #: 977731

Sample: 698641-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 09/25/15 16:55

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	108	100	108	70-135	
o-Terphenyl	49.0	50.0	98	70-135	

Lab Batch #: 977731

Sample: 516203-001 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 19:26

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	103	100	103	70-135	
o-Terphenyl	42.4	50.0	85	70-135	

Lab Batch #: 977731

Sample: 516203-001 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 09/25/15 19:51

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	97.2	99.6	98	70-135	
o-Terphenyl	42.5	49.8	85	70-135	

\* Surrogate outside of Laboratory QC limits

\*\* Surrogates outside limits; data and surrogates confirmed by reanalysis

\*\*\* Poor recoveries due to dilution

Surrogate Recovery [D] =  $100 * A / B$

All results are based on MDL and validated for QC purposes.



# BS / BSD Recoveries



Project Name: RKI Brushy Draw

Work Order #: 515940

Project ID:

Analyst: JUM

Date Prepared: 09/26/2015

Date Analyzed: 09/26/2015

Lab Batch ID: 977774

Sample: 698661-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

## BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Chloride	<2.00	50.0	49.6	99	50.0	48.4	97	2	90-110	20	

Analyst: PJB

Date Prepared: 09/25/2015

Date Analyzed: 09/25/2015

Lab Batch ID: 977731

Sample: 698641-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

## BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TPH By SW8015B Mod	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
C6-C10 Gasoline Range Hydrocarbons	<15.0	1000	708	71	1000	855	86	19	70-135	35	
C10-C28 Diesel Range Hydrocarbons	<15.0	1000	752	75	1000	842	84	11	70-135	35	

Relative Percent Difference RPD =  $200 * |(C-F)/(C+F)|$

Blank Spike Recovery [D] =  $100 * (C)/[B]$

Blank Spike Duplicate Recovery [G] =  $100 * (F)/[E]$

All results are based on MDL and Validated for QC Purposes



# Form 3 - MS Recoveries

Project Name: RKI Brushy Draw



Work Order #: 515940

Lab Batch #: 977774

Date Analyzed: 09/26/2015

QC- Sample ID: 515940-001 S

Reporting Units: mg/kg

Project ID:

Date Prepared: 09/26/2015

Batch #: 1

Analyst: JUM

Matrix: Soil

MATRIX / MATRIX SPIKE RECOVERY STUDY						
Inorganic Anions by EPA 300	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Analytes						
Chloride	3030	5000	8610	112	80-120	

Lab Batch #: 977774

Date Analyzed: 09/26/2015

QC- Sample ID: 516319-002 S

Reporting Units: mg/kg

Date Prepared: 09/26/2015

Batch #: 1

Analyst: JUM

Matrix: Soil

MATRIX / MATRIX SPIKE RECOVERY STUDY						
Inorganic Anions by EPA 300	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Analytes						
Chloride	423	500	949	105	80-120	

Matrix Spike Percent Recovery [D] =  $100 \times (C-A)/B$   
Relative Percent Difference [E] =  $200 \times (C-A)/(C+B)$   
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit





# Form 3 - MS / MSD Recoveries



Project Name: RKI Brushy Draw

Work Order # : 515940

Project ID:

Lab Batch ID: 977731

QC- Sample ID: 516203-001 S

Batch #: 1 Matrix: Soil

Date Analyzed: 09/25/2015

Date Prepared: 09/25/2015

Analyst: PJB

Reporting Units: mg/kg

## MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
C6-C10 Gasoline Range Hydrocarbons	30.9	1000	911	88	996	880	85	3	70-135	35	
C10-C28 Diesel Range Hydrocarbons	<15.0	1000	747	75	996	739	74	1	70-135	35	

Matrix Spike Percent Recovery  $[D] = 100 * (C - A) / B$   
Relative Percent Difference  $RPD = 200 * |(C - F) / (C + F)|$

Matrix Spike Duplicate Percent Recovery  $[G] = 100 * (F - A) / E$

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable  
N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.

Final 1.000



# XENCO Laboratories

## Prelogin/Nonconformance Report- Sample Log-In



**Client:** Enviroclean- Midland

**Date/ Time Received:** 09/21/2015 01:55:00 PM

**Work Order #:** 515940

**Acceptable Temperature Range:** 0 - 6 degC

**Air and Metal samples Acceptable Range:** Ambient

**Temperature Measuring device used :**

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Sample instructions complete on Chain of Custody?	Yes
#9 Any missing/extra samples?	No
#10 Chain of Custody signed when relinquished/ received?	Yes
#11 Chain of Custody agrees with sample label(s)?	Yes
#12 Container label(s) legible and intact?	Yes
#13 Sample matrix/ properties agree with Chain of Custody?	Yes
#14 Samples in proper container/ bottle?	Yes
#15 Samples properly preserved?	Yes
#16 Sample container(s) intact?	Yes
#17 Sufficient sample amount for indicated test(s)?	Yes
#18 All samples received within hold time?	Yes
#19 Subcontract of sample(s)?	No
#20 VOC samples have zero headspace (less than 1/4 inch bubble)?	N/A
#21 <2 for all samples preserved with HNO3,HCL, H2SO4? Except for samples for the analysis of HEM or HEM-SGT which are verified by the analysts.	N/A
#22 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH?	N/A

**\* Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst:

PH Device/Lot#:

**Checklist completed by:**

Kelsey Brooks  
Kelsey Brooks

Date: 09/21/2015

**Checklist reviewed by:**

Kelsey Brooks  
Kelsey Brooks

Date: 09/22/2015





Viewing West. The flowpath leads west, off of the pad site.



Viewing West. The release consisted of produced water, which left a notable soil discoloration.





Viewing Southwest. This is a typical flow path, which aids in horizontal delineation. This is near Sample 002. Chloride concentrations were within WQCC standards at 1-foot below ground surface.



Viewing Southwest. Beyond Sample 003 location, the flowpath enters heavier desert vegetation. None appears to have been affected by the release.