

**APPROVED**

***By Olivia Yu at 4:16 pm, Apr 09, 2018***

NMOCD approves of the proposed  
additional delineation plan for  
1RP-4139.

**1RP-4139  
DELINEATION PLAN  
Cooper Jal Unit Well #512  
Produced Water Spill  
Lea County, New Mexico**

Latitude: N32° 12' 25.87"  
Longitude: W-103° 12' 39.19"

LAI Project No. 17-0175-17

February 23, 2018

Prepared for:  
Legacy Reserves Operating, LP  
303 West Wall Street, Suite 1300  
Midland, Texas 79701

Prepared by:  
Larson & Associates, Inc.  
507 North Marienfeld Street, Suite 205  
Midland, Texas 79701



Mark J. Larson, P.G.  
Certified Professional Geologist #10490



Sarah R. Johnson  
Staff Geologist

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## Table of Contents

1.0 INTRODUCTION.....	1
1.1 Background.....	1
1.2 Physical Setting.....	1
1.3 Remediation Action Levels.....	2
2.0 DELINEATION PLAN.....	2
3.0 REMEDIATION PLAN.....	2

## Figures

Figure 1	Topographic Map
Figure 2	Aerial Map Showing Proposed Sample Points

## Appendices

Appendix A	Initial C-141
Appendix B	ECA Analysis and Remediation Plan
Appendix C	Photographs

## 1.0 INTRODUCTION

Larson & Associates, Inc. (LAI) has prepared this delineation plan on behalf of Legacy Reserves Operating, LP (Legacy) for submittal to the New Mexico Oil Conservation Division (OCD) District I for a produced water spill at the Cooper Jal Well Unit #512 (Site) located in Unit A (NE/4, NE/4), Section 24, Township 24 South and Range 36 East in Lea County, New Mexico. The geodetic position is North 32° 12' 25.87" and West -103° 12' 39.19". Figure 1 presents a topographic map. Figure 2 presents an aerial map.

### 1.1 Background

The spill occurred on January 6, 2013, due to a leak in an injection line north of the well, allowing 20 barrels (bbl) of produced water to be released. Approximately 10 bbl were recovered. Resaca Operating Company (Resaca) was the operator when the release occurred. Resaca treated the affected area by mixing fertilizer with uncontaminated soil. Legacy assumed ownership on July 9, 2013. The initial C-141 was submitted on January 18, 2013 and assigned remediation permit number 1RP-4139. Appendix A presents the initial C-141.

Resaca retained Environmental Compliance Associates, Inc. (ECA) to address the release. On January 30, 2013, ECA collected soil samples at nineteen (19) locations (CJU #1 through CJU #19). The samples were collected at 0 – 1, 0 – 1.5, and 0 - 2 feet below ground surface (bgs). The samples were delivered to Xenco Laboratories (Xenco) in Odessa, Texas and analyzed for BTEX (sum of benzene, toluene, ethylbenzene and xylenes), total petroleum hydrocarbons (TPH) including gasoline range organics (GRO) and diesel range organics (DRO) and chloride by EPA SW-846 Methods 8021B, 8015M and 300, respectively. BTEX reported below the RRAL of 50 milligrams per kilogram (mg/Kg) in all samples. TPH reported below the RRAL (1,000 mg/Kg). The laboratory did not include the oil range organic fraction (ORO) of TPH extended to C35. Chloride reported above the recommended delineation limit (600 mg/Kg) in the following samples:

- CJU #1, 0 – 1 (772 mg/Kg)
- CJU #2, 0 – 1 (940 mg/Kg)
- CJU #5, 0 – 1 (977 mg/Kg)
- CJU #11A, 0 – 1 (668 mg/Kg)
- CJU #11B, 0 – 2 (693 mg/Kg)
- CJU #13A, 0 – 1 (825 mg/Kg)
- CJU #13B, 0 – 2 (692 mg/Kg)
- CJU #14, 0 – 1 (1,030 mg/Kg)
- CJU #15, 0 – 1 (711 mg/Kg)
- CJU #16, 0 – 1 (883 mg/Kg)

Legacy assumed ownership of the Site on July 9, 2013. Appendix B presents the ECA analysis and proposed remediation plan.

### 1.2 Physical Setting

The physical setting is as follows:

- The surface elevation is approximately 3,3015 feet above mean sea level (msl);
- The topography slopes gradually to the southwest;
- There is no surface water features within 1,000 feet of the Site;
- The soils are designated as "Tonuco loamy fine sand, 0 to 3 percent slopes", consisting of 0 to 12 inches of loamy fine sand underlain by 12 to 17 inches of loamy sand;



- Surface geology is of the Eolian and Piedmont deposits from the Holocene to middle Pleistocene, the deposits are interlayered eolian sands and piedmont-slope deposits;
- Groundwater occurs in the Ogallala formation;
- The nearest fresh water well is located in Unit F (SE/4, NW/4), Section 10, Township 24 South and Range 37 East about 4 miles northwest of the Site;
- Depth to ground water is reported at 83.32 feet bgs (1991).

### **1.3 Remediation Action Levels**

Remediation action levels (RRAL) were calculated for benzene, BTEX and TPH based on the following criteria established by OCD in *"Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993"*.

<b>Criteria</b>	<b>Result</b>	<b>Score</b>
Depth-to-Groundwater	50 - 99 Feet	10
Wellhead Protection Area	No	0
Distance to Surface Water Body	>1,000 Horizontal Feet	0

The following RRAL apply to the release for ranking score: 10

- Benzene 10 mg/Kg
- BTEX 50 mg/Kg
- TPH 1,000 mg/kg

Depth to groundwater between 50 and 100 feet bgs requires vertical delineation for chloride to 600 mg/Kg and maintained a minimum of 5 feet farther in depth.

## **2.0 DELINEATION PLAN**

LAI proposes to collect soil samples at four (4) locations within the contaminated area. The samples will be collected with direct push technology (DPT) at 1 foot intervals to approximately 4 feet bgs and 2 foot intervals to approximately 12 feet bgs, depending on subsurface conditions. Additional samples will be collected in each cardinal direction (north, south, east and west) of the spill area at the same depth intervals for horizontal delineation. The soil samples will be delivered under preservation and chain of custody to a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and analyzed for BTEX, TPH, including GRO, DRO and ORO and chloride by EPA SW-846 Methods 8021B, 8015M and 300 respectively. Pending laboratory results, further delineation will be performed to achieve the RRALs. Appendix C presents photographs.

## **3.0 DELINEATION**

Legacy will include a remediation plan in the delineation report submitted to the OCD upon receipt of the laboratory report.

## Figures

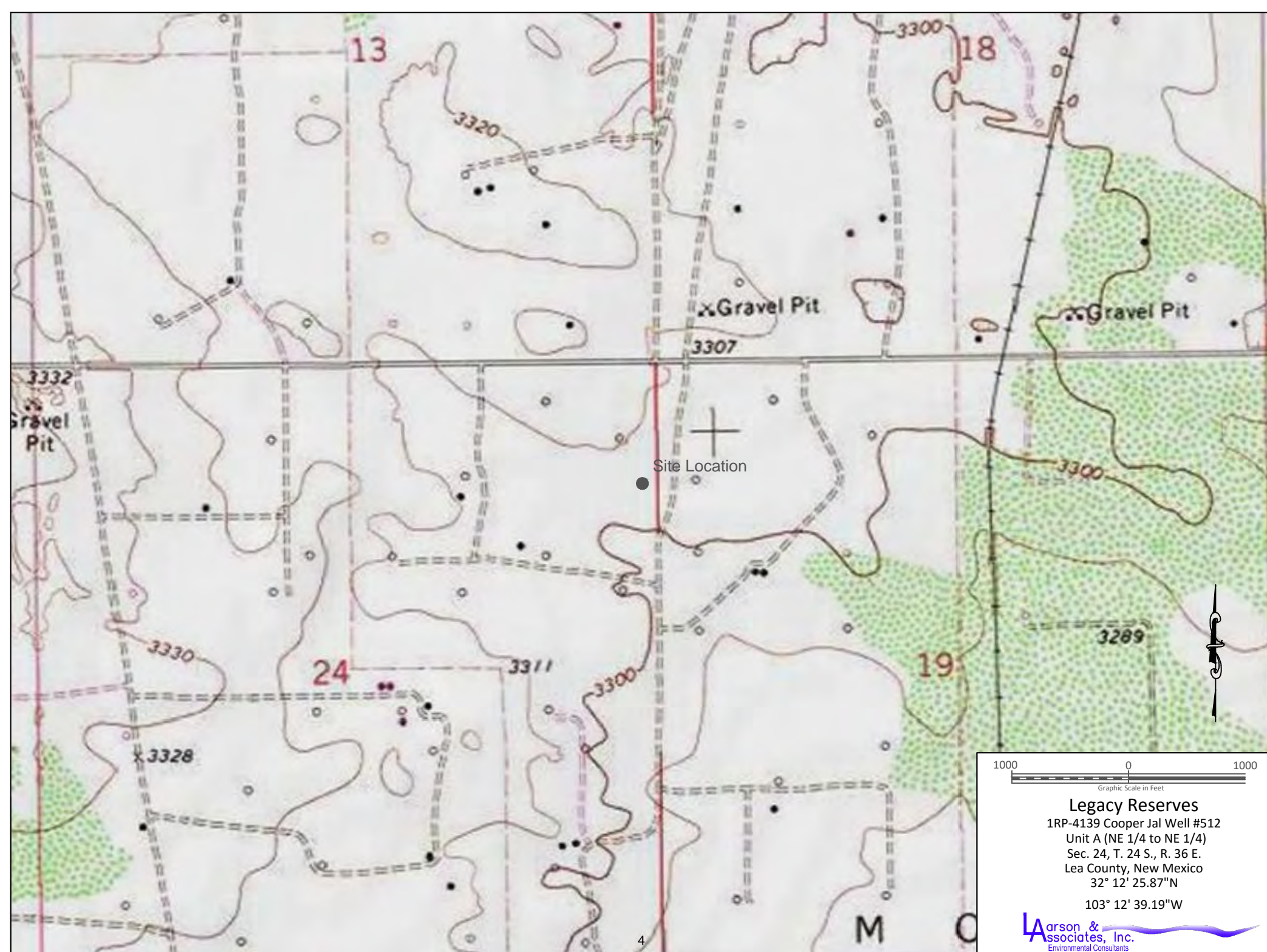


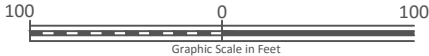
Figure 1 - Topographic Map





Legend

- Spill Area
- Proposed Sample Location



**Legacy Reserves**

1RP-4139 Cooper Jal Well #512  
Unit A (NE 1/4 to NE 1/4)  
Sec. 24, T. 24 S., R. 36 E.  
Lea County, New Mexico  
32° 12' 25.87"N  
103° 12' 39.19"W



Figure 3 - Site Map Showing Proposed Sample Location

**Appendix A**  
**Initial C-141**



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	Resaca Operating Company	Contact	Marc Neatherlin
Address	2509 Maurice Road, Odessa, TX 79763	Telephone No.	(432) 557-9430
Facility Name	Cooper Jal Unit Well #512	Facility Type	Oil Production Facility
Surface Owner	Kelly Meyers	Mineral Owner	
		API No.	30-025-39103

#### LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
J	24	24S	36E					Lea

Latitude 32° 12' 20.642" Longitude 103° 12' 40.511"

#### NATURE OF RELEASE

Type of Release	Production Water	Volume of Release	20 Barrels	Volume Recovered	10 Barrels
Source of Release	Injection Line	Date and Hour of Occurrence	1/6/13	Date and Hour of Discovery	1/6/13
Was Immediate Notice Given?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required	If YES, To Whom?			
By Whom?	Date and Hour				
Was a Watercourse Reached?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.			

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

Describe Cause of Problem and Remedial Action Taken.\*

The injection line developed a leak and releases 20 barrels of produces water on the ground. The injection line was repaired and 10 barrels of produced water were recovered with a vacuum truck. There was an initial remediation using fertilizer and mixing with new, uncontaminated soil.

Describe Area Affected and Cleanup Action Taken.\*

The leak of the injection line occurred north of the Cooper Jal Unit Well #512. A vacuum truck was used to recover 10 barrels of the release and the soil was remediated using fertilizer and mixing with new, uncontaminated soil.

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 liability should they fail to comply with federal, state, or local laws and/or regulations.

Signature:

Printed Name: Aaron Edrington

Title: Environmental Consultant

E-mail Address: aedrington@eca-mail.com

Date: 1/18/13 Phone: (713) 978-6700

# APPROVED

Approval Date: 2/3/14 | Expiration Date:

Conditions of Approval:

Attached ☐

\* Attach Additional Sheets If Necessary

REP 439

**Appendix B**  
**ECA Analysis & Proposed Remediation Plan**



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	Resaca Operating Company	Contact	Marc Neatherlin
Address	2509 Maurice Road, Odessa, TX 79763	Telephone No.	(432) 557-9430
Facility Name	Cooper Jal Unit Well #512	Facility Type	Oil Production Facility
Surface Owner	Kelly Meyers	Mineral Owner	
		API No.	30-025-39103

**LOCATION OF RELEASE**

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
J	24	24S	36E					Lea

Latitude 32° 12' 20.642" Longitude 103° 12' 40.511"

**NATURE OF RELEASE**

Type of Release	Production Water	Volume of Release	20 Barrels	Volume Recovered	10 Barrels
Source of Release	Injection Line	Date and Hour of Occurrence	1/6/13	Date and Hour of Discovery	1/6/13
Was Immediate Notice Given?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required	If YES, To Whom?			
By Whom?		Date and Hour			
Was a Watercourse Reached?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.			
If a Watercourse was Impacted, Describe Fully.* N/A					

**Describe Cause of Problem and Remedial Action Taken.\***

The injection line developed a leak and releases 20 barrels of produces water on the ground. The injection line was repaired and 10 barrels of produced water were recovered with a vacuum truck. There was an initial remediation using fertilizer and mixing with new, uncontaminated soil.

**Describe Area Affected and Cleanup Action Taken.\***

The leak of the injection line occurred north of the Cooper Jal Unit Well #512. A vacuum truck was used to recover 10 barrels of the release and the soil was remediated using fertilizer and mixing with new, uncontaminated soil.

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 liability should they fail to comply with federal, state, or local laws and/or regulations.

Signature:

Printed Name: Aaron Edrington

Title: Environmental Consultant

E-mail Address: aedrington@eca-mail.com

Date: 1/18/13 Phone: (713) 978-6700

**APPROVED**

Approval Date: 2/3/14 | Expiration Date:

Conditions of Approval:

Attached ☐

\* Attach Additional Sheets If Necessary

REP 439





Resaca Exploitation, Inc.  
Cooper Jal Unit Well #512  
Corrective Action Plan

HOBBS OCD

FEB 19 2013

RECEIVED

Subject Lease:  
Cooper Jal Unit  
J- Sec. 24 -T24S-R36E  
Lea County, New Mexico

125'

Prepared For:  
New Mexico Oil Conservation Division  
Hobbs District Office  
And  
Resaca Exploitation, Inc.  
Mr. Marc Neatherlin

February 12, 2013

*Reviewed w/ comments*  
*Jeffrey Yekim*  
Environmental Specialist  
NMOC - DIST 1  
3/1/13

Prepared by:  
Environmental Compliance Associates, Inc  
10590 Westoffice Drive, Suite 150  
Houston, Texas 77042

## **TABLE OF CONTENTS**

- 1.0 PURPOSE**
- 2.0 DESCRIPTION OF INCIDENT**
- 3.0 GENERAL SITE CHARACTERISTICS**
- 4.0 CORRECTIVE ACTIONS**
- 5.0 CONCLUSION OF REMEDIATION**

### **APPENDICES:**

<b>APPENDIX A</b>	<b>NMOCD Form C-141 (Initial)</b>
<b>APPENDIX B</b>	<b>General Site Diagram</b>
<b>APPENDIX C</b>	<b>Site Ranking Information</b>
<b>APPENDIX D</b>	<b>Photographic Documentation</b>
<b>APPENDIX E</b>	<b>Material Safety Data Sheets</b>
<b>APPENDIX F</b>	<b>Sample Results</b>

## **1.0 PURPOSE**

The purpose of this document is to summarize and define corrective action measures that will take place to mitigate any possible environmental impairment as a result of an accidental release that occurred on January 6<sup>th</sup>, 2013 from a ruptured injection line north of the Cooper Jal Unit Well #512 located in Section 24, T24S, R36E, Lea County, New Mexico.

This corrective action plan is being submitted to supplement the initial C-141 submitted to the New Mexico Oil Conservation Division (NMOCD) on January 18<sup>th</sup>, 2013.

## **2.0 DESCRIPTION OF INCIDENT**

On January 6<sup>th</sup>, 2013, an injection line ruptured, resulting in the release of approximately twenty (20) barrels of produced water. When the release was discovered, Resaca Operating Company repaired the injection line, recovered approximately ten (10) barrels of produced water and performed an initial remediation using fertilizer and uncontaminated soil. The initial Form C-141 was submitted to the NMOCD on January 18<sup>th</sup>, 2013 by Mr. Aaron Edrington of Environmental Compliance Associates, Inc. (ECA). The area of this release of produced water is located just north of the Cooper Jal Unit #512.

A copy of the initial NMOCD Form C-141 is reproduced as Appendix A. A general site diagram is attached as Appendix B. Site Ranking Information is included as Appendix C. Photographic documentation is presented as Appendix D. Material Safety Data Sheets are provided as Appendix E. The analytical laboratory results of the samples taken are attached as Appendix F.



### **3.0 GENERAL SITE CHARACTERISTICS**

The Cooper Jal Unit # 512 well is described as a producing oil and gas well. This location sits on Tonuco series soils. The Tonuco series is shallow to very shallow, excessively drained and is formed from coarse textured alluvium derived from mixed sources. It is on broad plains and alluvial fans with slopes of zero to five percent (0-5%). Average annual precipitation is approximately twelve inches (12") and the average annual air temperature is approximately sixty-three degrees Fahrenheit (63°F). The affected area consists of native plants and grasses.

### **4.0 CORRECTIVE ACTIONS**

The process we propose to chemically remediate the affected area is as follows:

- 1) Collect minimum five point composite sample of the soil profile to a minimum depth of twelve inches (12") below ground surface and analyze for presence and concentrations of BTEX, total petroleum hydrocarbons (TPH) and total chlorides.
- 2) Disc the affected area to a minimum depth of six to twelve inches (6"-12") below ground surface.
- 3) Apply SoilSaver and I A Petro to affected areas (MSDS for each product is located in Appendix E).
- 4) Disc the affected area to a minimum depth of six to twelve inches (6"-12") below ground surface.
- 5) Water the affected area provided the absence of rain.
- 6) Collect minimum five point composite sample of the soil profile to a minimum depth of twelve inches (12") below ground surface and analyze for presence and concentrations of BTEX, total petroleum hydrocarbons (TPH) and total chlorides.
- 7) Contour to minimize erosion.
- 8) Seed with varietal mixture acceptable to landowner.

## **5.0 CONCLUSION OF REMEDIATION**

The remediation process will be complete once the affected areas have been tilled, remediated and confirmation samples, gathered from zero to twenty-four (0"-24") inches below the surface, show that chloride levels are below two hundred fifty (250) ppm and TPH levels are below five thousand (5,000) ppm.

Upon completion of this project, the third party environmental consulting firm will draft notes of sample results during the remediation process, provide photographic documentation of activities and submit a final version of form C-141 to the NMOCD for successful closure of this Corrective Action Plan.

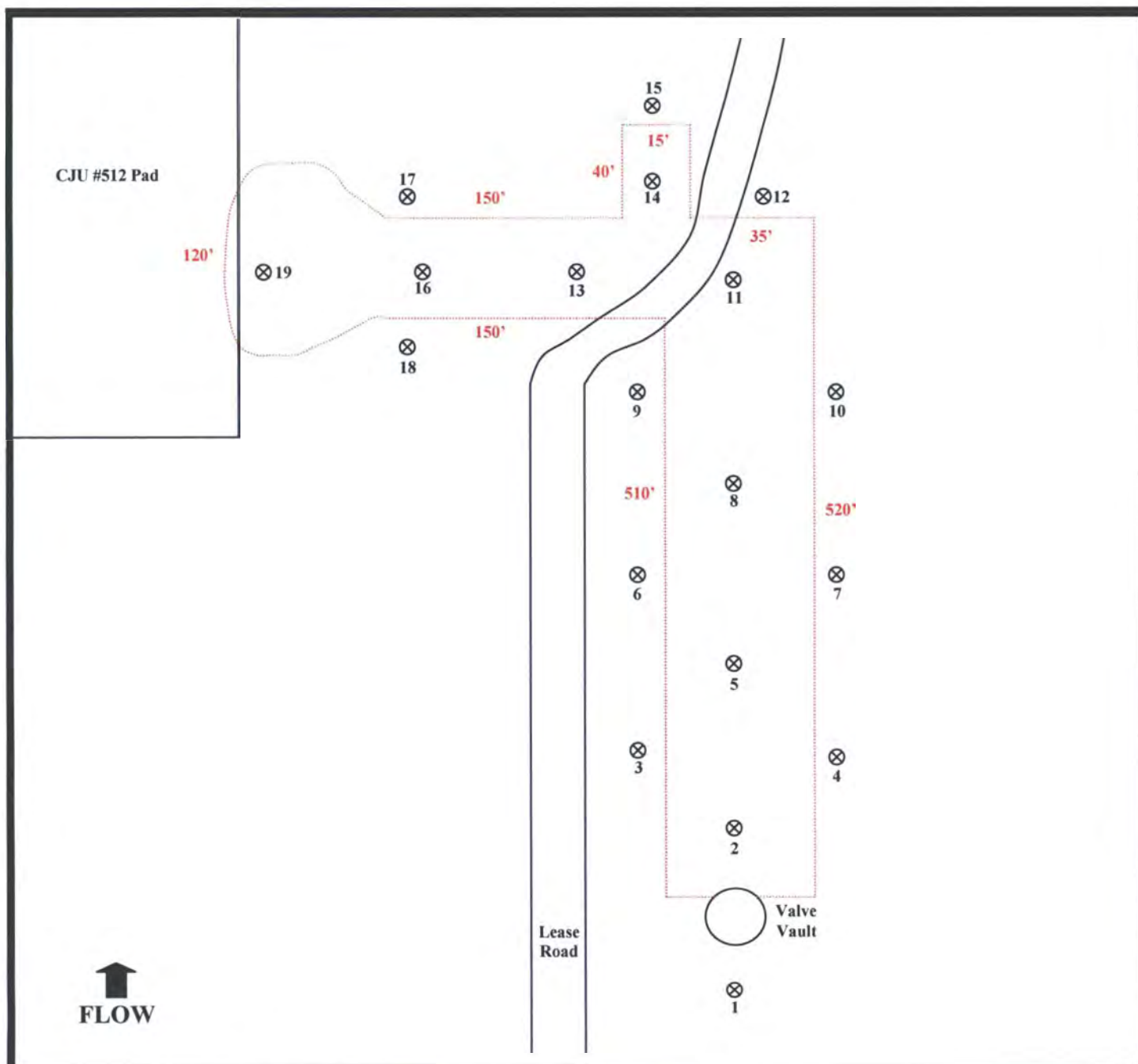
It is our opinion that the implementation of this corrective action plan will assist to ensure protection of fresh waters and public health and the environment.

Sincerely,



---

Marc Neatherlin - District Manager  
Resaca Exploitation



- |           |                     |                                       |
|-----------|---------------------|---------------------------------------|
| 1. CJU #1 | 8. CJU #8           | 15. CJU #15                           |
| 2. CJU #2 | 9. CJU #9           | 16. CJU #16                           |
| 3. CJU #3 | 10. CJU #10         | 17. CJU #17                           |
| 4. CJU #4 | 11. CJU #11A & #11B | 18. CJU #18                           |
| 5. CJU #5 | 12. CJU #12         | 19. CJU #19                           |
| 6. CJU #6 | 13. CJU #13A & #13B | ** Valve Vault is source of release** |
| 7. CJU #7 | 14. CJU #14         |                                       |

**ECA**  
 ENVIRONMENTAL COMPLIANCE  
 ASSOCIATES  
 10590 WESTOFFICE, SUITE 150  
 HOUSTON, TEXAS 77042  
 (713) 978-6700



TITLE: **Cooper Jal Unit #512**

CLIENT: **Resaca Exploitation, Inc.**

DATE: **January 2013**

LOCATION: **Lea County, New Mexico**

PREPARED BY: **ATE**

PROJECT NO.: **0113-12**

SCALE: **NONE**

LATITUDE: **32° 12' 25.7"**

LONGITUDE: **103° 12' 39.1"**

VIEW: **TOP**



**GUIDELINES**

**FOR**

**REMEDIATION**

**OF**

**LEAKS, SPILLS AND RELEASES**

(AUGUST 13, 1993)

New Mexico Oil Conservation Division  
1220 S. ST. FRANCIS DR.  
Santa Fe, New Mexico 87505

## TABLE OF CONTENTS

### INTRODUCTION

- I. NOTICE OF LEAK, SPILL OR RELEASE
  - A. RESPONSIBLE PARTY AND LOCAL CONTACT
  - B. FACILITY
  - C. TIME OF INCIDENT
  - D. DISCHARGE EVENT
  - E. TYPE OF DISCHARGE
  - F. QUANTITY
  - G. SITE CHARACTERISTICS
  - H. IMMEDIATE CORRECTIVE ACTIONS
- II. INITIAL RESPONSE ACTIONS
  - A. SOURCE ELIMINATION AND SITE SECURITY
  - B. CONTAINMENT
  - C. SITE STABILIZATION
- III. SITE ASSESSMENT
  - A. GENERAL SITE CHARACTERISTICS
    - 1. Depth To Ground Water
    - 2. Wellhead Protection Area
    - 3. Distance To Nearest Surface Water Body
  - B. SOIL/WASTE CHARACTERISTICS
    - 1. Highly Contaminated/Saturated Soils
    - 2. Unsaturated Contaminated Soils
  - C. GROUND WATER QUALITY
- IV. SOIL AND WATER REMEDIATION ACTION LEVELS
  - A. SOILS
    - 1. Highly Contaminated/Saturated Soils
    - 2. Unsaturated Contaminated Soils
      - a. Ranking Criteria
      - b. Recommended Remediation Level
  - B. GROUND WATER



V.

SOIL AND WATER SAMPLING PROCEDURES

A. HIGHLY CONTAMINATED OR SATURATED SOILS

1. Physical Observations

B. UNSATURATED CONTAMINATED SOILS

1. Soil Sampling Procedures for Headspace Analysis
2. Soil Sampling Procedures For Laboratory Analysis
  - a. Sampling Procedures
  - b. Analytical methods

C. GROUND WATER SAMPLING

1. Monitor Well Installation/Location
2. Monitor Well Construction
3. Monitor Well Development
4. Sampling Procedures
5. Ground Water laboratory Analysis
  - a. Analytical Methods

VI.

REMEDIATION

A. SOIL REMEDIATION

1. Contaminated Soils
2. Soil Management Options
  - a. Disposal
  - b. Soil Treatment and Remediation Techniques
    - i. Landfarming
    - ii. Insitu Soil Treatment
    - iii. Alternate Methods

B. GROUND WATER REMEDIATION

1. Remediation Requirements

- a. Free Phase Contamination
- b. Dissolved Phase Contamination
- c. Alternate Methods

VII. TERMINATION OF REMEDIAL ACTION

A. SOIL

B. GROUND WATER

VIII. FINAL CLOSURE

IX. FINAL REPORT

## INTRODUCTION

The following document is to be used as a **guide** on all federal, state and fee lands when remediating contaminants resulting from leaks, spills and releases of oilfield wastes or products. The New Mexico Oil Conservation Division (OCD) requires that corrective actions be taken for leaks, spills or releases of any material which has a reasonable probability to injure or be detrimental to public health, fresh waters, animal or plant life, or property or unreasonably interfere with the public welfare or use of the property. These guidelines are intended to provide direction for remediation of soils and fresh waters contaminated as a result of leaks, spills or releases of oilfield wastes and products in a manner that assures protection of fresh waters, public health and the environment.

Fresh waters (to be protected) includes the water in lakes, playas, surface waters of all streams regardless of the quality of the water within any given reach, and all underground waters containing 10,000 milligrams per liter (mg/l) or less of total dissolved solids (TDS) except for which, after notice and hearing, it is found that there is no present or reasonably foreseeable beneficial use which would be impaired by contamination of such waters. The water in lakes and playas shall be protected from contamination even though it may contain more than 10,000 mg/l of TDS unless it can be shown that hydrologically connected fresh ground water will not be adversely affected.

Procedures may deviate from the following guidelines if it can be shown that the proposed procedure will either remediate, remove, isolate or control contaminants in such a manner that fresh waters, public health and the environment will not be impacted. Specific constituents and/or requirements for soil and ground water analysis and/or remediation may vary depending on site specific conditions. Deviations from approved plans will require OCD notification and approval.

\*\*\*\* Note: Notification to OCD of leaks, spills and releases does not relieve an operator of responsibility for compliance with any other federal, state or local law and/or regulation regarding the incident. Other agencies (ie. BLM, Indian Tribes, etc) may also have guidelines or requirements for remediation of leaks spills and releases.



**I. NOTIFICATION OF LEAK, SPILL OR RELEASE**

Leaks, spills and releases of any wastes or products from oilfield operations are required to be reported to the OCD pursuant to OCD Rule 116 (Appendix A) or New Mexico Water Quality Control Commission (WQCC) Regulation 1-203 (Appendix B). Appendix C contains the phone numbers and addresses for reporting incidents to the OCD district and Santa Fe offices. Notification will include all information required under the respective rule or regulation.

Below is a description of some of the information required:

**A. RESPONSIBLE PARTY AND LOCAL CONTACT**

The name, address and telephone number of the person/persons in charge of the facility/operation as well as the owner and/or operator of the facility/operation and a local contact.

**B. FACILITY**

The name and address of the facility or operation where the incident took place and the legal location listed by quarter-quarter, section, township and range, and by distance and direction from the nearest town or prominent landmark so that the exact site location can be readily located on the ground.

**C. TIME OF INCIDENT**

The date, time and duration of the incident.

**D. DISCHARGE EVENT**

A description of the source and cause of the incident.

**E. TYPE OF DISCHARGE**

A description of the nature or type of discharge. If the material leaked, spilled or released is anything other than crude oil, condensate or produced water include its chemical composition and physical characteristics.

**F. QUANTITY**

The known or estimated volume of the discharge.

**G. SITE CHARACTERISTICS**

The relevant general conditions prevailing at the site including precipitation, wind conditions, temperature, soil type, distance to nearest residence and population centers and proximity of fresh water wells or watercourse (ie. any river, lake, stream, playa, arroyo, draw, wash, gully or natural or man-made channel through which water flows or has flowed).



#### **H. IMMEDIATE CORRECTIVE ACTIONS**

Any initial response actions taken to mitigate immediate threats to fresh waters, public health and the environment.

#### **II. INITIAL RESPONSE ACTIONS**

Upon learning of a leak, spill or release of any material which has a reasonable probability to injure or be detrimental to public health, fresh waters, animal or plant life, or property or unreasonably interfere with the public welfare or use of the property, the responsible party (RP) should take the following immediate actions unless the actions could create a safety hazard which would result in a threat to personal or public injury:

##### **A. SOURCE ELIMINATION AND SITE SECURITY**

The RP should take the appropriate measures to stop the source of the leak, spill or release and limit access to the site as necessary to reduce the possibility of public exposure.

##### **B. CONTAINMENT**

Once the site is secure, the RP should take steps to contain the materials leaked, spilled or released by construction of berms or dikes, the use of absorbent pads or other containment actions to limit the area impacted by the event and prevent potential fresh water contaminants from migrating to watercourses or areas which could pose a threat to public health and safety.

##### **C. SITE STABILIZATION**

After containment, the RP should recover any products or wastes which can be physically removed from the surface within the containment area. The disposition of all wastes or products removed from the site must be approved by the OCD.

#### **III. SITE ASSESSMENT**

Prior to final closure (Section VIII), soils into which nonrecoverable products or wastes have infiltrated and which have a reasonable probability to injure or be detrimental to public health, fresh waters, animal or plant life, or property or unreasonably interfere with the public welfare or use of the property should be assessed for their potential environmental impacts and remediated according to the procedures contained in the following sections. Assessment results form the basis of any required remediation. Sites will be assessed for severity of contamination and potential environmental and public health threats using a risk based ranking system.

The following characteristics should be determined in order to evaluate a sites potential risks, the need for remedial action and, if necessary, the level of cleanup required at the site:



**A. GENERAL SITE CHARACTERISTICS**

**1. Depth To Ground Water**

The operator should determine the depth to ground water at each site. The depth to ground water is defined as the vertical distance from the lowermost contaminants to the seasonal high water elevation of the ground water.

If the exact depth to ground water is unknown, the ground water depth can be estimated using either local water well information, published regional ground water information, data on file with the New Mexico State Engineer Office or the vertical distance from adjacent ground water or surface water.

**2. Wellhead Protection Area**

The operator should determine the horizontal distance from all water sources including private and domestic water sources. Water sources are defined as wells, springs or other sources of fresh water extraction. Private and domestic water sources are those water sources used by less than five households for domestic or stock purposes.

**3. Distance To Nearest Surface Water Body**

The operator should determine the horizontal distance to all downgradient surface water bodies. Surface water bodies are defined as perennial rivers, streams, creeks, irrigation canals and ditches, lakes, ponds and playas.

**B. SOIL/WASTE CHARACTERISTICS**

Soils/wastes within and beneath the area of the leak, spill or release should be evaluated to determine the type and extent of contamination at the site. In order to assess the level of contamination, observations should be made of the soils at the surface and samples of the impacted soils should be taken in the leak, spill or release area. Observations should note whether previous leaks, spills or releases have occurred at the site. Additional samples may be required to completely define the lateral and vertical extent of contamination. Soil samples should be obtained according to the sampling procedures in Sections V.A. and V.B. This may be accomplished using a backhoe, drill rig, hand auger, shovel or other means.

Initial assessment of soil contaminant levels is not required if an operator proposes to determine the final soil contaminant concentrations after a soil removal or remediation pursuant to section VI.A.

Varying degrees of contamination described below may co-exist at an individual site. The following sections describe the degrees of contamination that should be documented during the



assessment of the level of soil contamination:

**1. Highly Contaminated/Saturated Soils**

Highly contaminated/saturated soils are defined as those soils which contain a free liquid phase or exhibit gross staining.

**2. Unsaturated Contaminated Soils**

Unsaturated contaminated soils are defined as soils which are not highly contaminated/saturated, as described above, but contain benzene, toluene, ethylbenzene and xylenes (BTEX) and total petroleum hydrocarbons (TPH) or other potential fresh water contaminants unique to the leak, spill or release. Action levels and sampling and analytical methods for determining contaminant concentrations are described in detail in Sections IV. and V.

\*\*\*\*

(NOTE: Soils contaminated as a result of spills, leaks or releases of non-exempt wastes must be evaluated for all RCRA Subtitle C hazardous waste characteristics. The above definitions apply only to oilfield contaminated soils which are exempt from federal RCRA Subtitle C hazardous waste provisions and nonexempt oilfield contaminated soils which are characteristically nonhazardous according to RCRA Subtitle C regulations. Any nonexempt contaminated soils which are determined to be characteristically hazardous cannot be remediated using this guidance document and will be referred to the New Mexico Environment Department Hazardous Waste Program.)

**C. GROUND WATER QUALITY**

If ground water is encountered during the soil/waste characterization of the impacted soils, a sample should be obtained to assess the incidents potential impact on ground water quality. Ground water samples should be obtained using the sampling procedures in Section V.C. Monitor wells may be required to assess potential impacts on ground water and the extent of ground water contamination, if there is a reasonable probability of ground water contamination based upon the extent and magnitude of soil contamination defined during remedial activities.

**IV. SOIL AND WATER REMEDIATION ACTION LEVELS**

**A. SOILS**

The sections below describe the OCD's recommended remediation action levels for soils contaminated with petroleum hydrocarbons. Soils contaminated with substances other than petroleum hydrocarbons may be required to be remediated based

upon the nature of the contaminant and it's potential to impact fresh waters, public health and the environment.

**1. Highly Contaminated/Saturated Soils**

All highly contaminated/saturated soils should be remediated insitu or excavated to the maximum extent practicable. These soils should be remediated using techniques described in Section VI.A to the contaminant specific level listed in Section IV.A.2.b.

**2. Unsaturated Contaminated Soils**

The general site characteristics obtained during the site assessment (Section III.A.) will be used to determine the appropriate soil remediation action levels using a risk based approach. Soils which are contaminated by petroleum constituents will be scored according to the ranking criteria below to determine their relative threat to public health, fresh waters and the environment.

**a. Ranking Criteria**

<u>Depth To Ground Water</u>	<u>Ranking Score</u>
<50 feet	20
50 - 99	10
>100	0



### Wellhead Protection Area

<1000 feet from a water source, or;	
<200 feet from private domestic water source	
Yes	20
No	0

### Distance To Surface Water Body

<200 horizontal feet	20
200 - 1000 horizontal feet	10
>1000 horizontal feet	0

#### b. Recommended Remediation Action Level

The total ranking score determines the degree of remediation that may be required at any given site. The total ranking score is the sum of all four individual ranking criteria listed in Section IV.A.2.a. The table below lists the remediation action level that may be required for the appropriate total ranking score.

(NOTE: The OCD retains the right to require remediation to more stringent levels than those proposed below if warranted by site specific conditions (ie. native soil type, location relative to population centers and future use of the site or other appropriate site specific conditions.)

	<u>Total Ranking Score</u>		
	<u>&gt;19</u>	<u>10 - 19</u>	<u>0 - 9</u>
<u>Benzene (ppm) *</u>	10	10	10
<u>BTEX (ppm) *</u>	50	50	50
<u>TPH (ppm) **</u>	100	1000	5000

\* A field soil vapor headspace measurement (Section V.B.1) of 100 ppm may be substituted for a laboratory analysis of the Benzene and BTEX concentration limits.

\*\* The contaminant concentration for TPH is the concentration above background levels.

**B. GROUND WATER**

Contaminated ground water is defined as ground water of a present or foreseeable beneficial use which contains free phase products, dissolved phase volatile organic constituents or other dissolved constituents in excess of the natural background water quality. Ground water contaminated in excess of the WQCC ground water standards or natural background water quality will require remediation.

**V. SOIL AND WATER SAMPLING PROCEDURES**

Below are the sampling procedures for soil and ground water contaminant investigations of leaks, spills or releases of RCRA Subtitle C exempt oil field petroleum hydrocarbon wastes. Leaks, spills or releases of non-exempt RCRA wastes must be tested to demonstrate that the wastes are not characteristically hazardous according to RCRA regulations. Sampling for additional constituents may be required based upon the nature of the contaminant which was leaked, spilled or released.

**A. HIGHLY CONTAMINATED OR SATURATED SOILS**

The following method is used to determine if soils are highly contaminated or saturated:

**1. Physical Observations**

Study a representative sample of the soil for observable free petroleum hydrocarbons or immiscible phases and gross staining. The immiscible phase may range from a free hydrocarbon to a sheen on any associated aqueous phase. A soil exhibiting any of these characteristics is considered highly contaminated or saturated.

**B. UNSATURATED CONTAMINATED SOILS**

The following methods may be used for determining the magnitude of contamination in unsaturated soils:

**1. Soil Sampling Procedures for Headspace Analysis**

A headspace analysis may be used to determine the total volatile organic vapor concentrations in soils (ie. in lieu of a laboratory analysis for benzene and BTEX but not in lieu of a TPH analysis). Headspace analysis procedures should be conducted according to OCD approved industry standards or other OCD-approved procedures. Accepted OCD procedures are as follows:

- a) Fill a 0.5 liter or larger jar half full of sample and seal the top tightly with aluminum foil or fill



a one quart zip-lock bag one-half full of sample and seal the top of the bag leaving the remainder of the bag filled with air.

- b) Ensure that the sample temperature is between 15 to 25 degrees Celsius (59-77 degrees Fahrenheit).
- c) Allow aromatic hydrocarbon vapors to develop within the headspace of the sample jar or bag for 5 to 10 minutes. During this period, the sample jar should be shaken vigorously for 1 minute or the contents of the bag should be gently massaged to break up soil clods.
- d) If using a jar, pierce the aluminum foil seal with the probe of either a PID or FID organic vapor meter (OVM), and then record the highest (peak) measurement. If using a bag, carefully open one end of the bag and insert the probe of the OVM into the bag and re-seal the bag around the probe as much as possible to prevent vapors from escaping. Record the peak measurement. The OVM must be calibrated to assume a benzene response factor.

## 2. Soil Sampling Procedures For Laboratory Analysis

### a. Sampling Procedures

Soil sampling for laboratory analysis should be conducted according to OCD approved industry standards or other OCD-approved procedures. Accepted OCD soil sampling procedures and laboratory analytical methods are as follows:

- i) Collect samples in clean, air-tight glass jars supplied by the laboratory which will conduct the analysis or from a reliable laboratory equipment supplier.
- ii) Label the samples with a unique code for each sample.
- iii) Cool and store samples with cold packs or on ice.
- iv) Promptly ship sample to the lab for analysis following chain of custody procedures.
- v) All samples must be analyzed within the holding times for the laboratory analytical method specified by EPA.

### b. Analytical Methods

All soil samples must be analyzed using EPA methods, or by other OCD approved methods and must

be analyzed within the holding time specified by the method. Below are laboratory analytical methods commonly accepted by OCD for analysis of soil samples analyzed for petroleum related constituents. Additional analyses may be required if the substance leaked, spilled or released has been anything other than petroleum based fluids or wastes.

i) Benzene, toluene, ethylbenzene and xylene

- EPA Method 602/8020

ii) Total Petroleum Hydrocarbons

- EPA Method 418.1, or;

- EPA Method Modified 8015

### **C. GROUND WATER SAMPLING**

If an investigation of ground water quality is deemed necessary, it should be conducted according to OCD approved industry standards or other OCD-approved procedures. The following methods are standard OCD accepted methods which should be used to sample and analyze ground water at RCRA Subtitle C exempt sites (Note: The installation of monitor wells may not be required if the OCD approves of an alternate ground water investigation or sampling technique):

#### **1. Monitor Well Installation/Location**

One monitor well should be installed adjacent to and hydrologically down-gradient from the area of the leak, spill or release to determine if protectable fresh water has been impacted by the disposal activities. Additional monitor wells, located up-gradient and down-gradient of the leak, spill or release, may be required to delineate the full extent of ground water contamination if ground water underlying the leak, spill or release has been found to be contaminated.

#### **2. Monitor Well Construction**

a) Monitor well construction materials should be:

i) selected according to industry standards;

ii) chemically resistant to the contaminants to be monitored; and

iii) installed without the use of glues/adhesives.

b) Monitor wells should be constructed according to OCD approved industry standards to prevent migration of contaminants along the well casing. Monitor wells should be constructed with a minimum of fifteen



(15) feet of well screen. At least five (5) feet of the well screen should be above the water table to accommodate seasonal fluctuations in the static water table.

### **3. Monitor Well Development**

When ground water is collected for analysis from monitoring wells, the wells should be developed prior to sampling. The objective of monitor well development is to repair damage done to the formation by the drilling operation so that the natural hydraulic properties of the formation are restored and to remove any fluids introduced into the formation that could compromise the integrity of the sample. Monitoring well development is accomplished by purging fluid from the well until the pH and specific conductivity have stabilized and turbidity has been reduced to the greatest extent possible.

### **4. Sampling Procedures**

Ground water should be sampled according to OCD accepted standards or other OCD approved methods. Samples should be collected in clean containers supplied by the laboratory which will conduct the analysis or from a reliable laboratory equipment supplier. Samples for different analyses require specific types of containers.

The laboratory can provide information on the types of containers and preservatives required for sample collection. The following procedures are accepted by OCD as standard sampling procedures:

- a) Monitor wells should be purged of a minimum of three well volumes of ground water using a clean bailer prior to sampling to ensure that the sample represents the quality of the ground water in the formation and not stagnant water in the well bore.
- b) Collect samples in appropriate sample containers containing the appropriate preservative for the analysis required. No bubbles or headspace should remain in the sample container.
- c) Label the sample containers with a unique code for each sample.
- d) Cool and store samples with cold packs or on ice.
- e) Promptly ship sample to the lab for analysis following chain of custody procedures.
- f) All samples must be analyzed within the holding times for the laboratory analytical method specified by EPA.

### **5. Ground Water Laboratory Analysis**

Samples should be analyzed for potential ground water contaminants contained in the waste stream, as defined by the WQCC Regulations. All ground water samples must be analyzed using EPA methods, or by other OCD approved methods and must be analyzed within the holding time specified by the method. Below are OCD accepted laboratory analytical methods for analysis of ground water samples analyzed for petroleum related constituents. Additional analyses may be required if the substance leaked, spilled or release has been anything other than a petroleum based fluid or waste.

a. Analytical Methods

i.) Benzene, Toluene, Ethylbenzene and Xylene

- EPA Method 602/8020

ii.) Major Cations and Anions

- Various EPA or standard methods

iii.) Heavy Metals

- EPA Method 6010, or;
- Various EPA 7000 series methods

iv.) Polynuclear Aromatic Hydrocarbons

- EPA Method 8100



## **VI. REMEDATION**

The following discussion summarizes recommended techniques for remediation of contaminated soil and ground water as defined in Section IV.A. and IV.B. OCD approval for remediation of an individual leak, spill or release site is not required if the company is operating under an OCD approved spill containment plan.

All procedures which deviate from the companies spill containment plan must be approved by OCD.

### **A. SOIL REMEDIATION**

When RCRA Subtitle C exempt or RCRA nonhazardous petroleum contaminated soil requires remediation, it should be remediated and managed according to the criteria described below or by other OCD approved procedures which will remove, treat, or isolate contaminants in order to protect fresh waters, public health and the environment.

In lieu of remediation, OCD may accept an assessment of risk which demonstrates that the remaining contaminants will not pose a threat to present or foreseeable beneficial use of fresh waters, public health and the environment.

#### **1. Contaminated Soils**

Highly contaminated/saturated soils and unsaturated contaminated soils exceeding the standards described in Section IV.A. should be either:

- a) Excavated from the ground until a representative sample from the walls and bottom of the excavation is below the contaminant specific remediation level listed in Section IV.A.2.b or an alternate approved remediation level, or;
- b) Excavated to the maximum depth and horizontal extent practicable. Upon reaching this limit a sample should be taken from the walls and bottom of the excavation to determine the remaining levels of soil contaminants, or;
- c) Treated in place, as described in Section VI.A.2.b.ii. - Treatment of Soil in Place, until a representative sample is below the contaminant specific remediation level listed in Section IV.A.2.b, or an alternate approved remediation level, or;
- d) Managed according to an approved alternate method.

#### **2. Soil Management Options**

All soil management options must be approved by OCD. The following is a list of options for either on-site

treatment or off-site treatment and/or disposal of contaminated soils:

a. Disposal

Excavated soils may be disposed of at an off-site OCD approved or permitted facility.

b. Soil Treatment and Remediation Techniques

i. Landfarming

Onetime applications of contaminated soils may be landfarmed on location by spreading the soil in an approximately six inch lift within a bermed area. Only soils which do not contain free liquids can be landfarmed. The soils should be disced regularly to enhance biodegradation of the contaminants. If necessary, upon approval by OCD, moisture and nutrients may be added to the soil to enhance aerobic biodegradation.

In some high risk areas an impermeable liner may be required to prevent leaching of contaminants into the underlying soil.

Landfarming sites that will receive soils from more than one location are considered centralized sites and must be approved separately by the OCD prior to operation.

ii. Insitu Soil Treatment

Insitu treatment may be accomplished using vapor venting, bioremediation or other approved treatment systems.

iii. Alternate Methods

The OCD encourages alternate methods of soil remediation including, but not limited to, active soil aeration, composting, bioremediation, solidification, and thermal treatment.

B. GROUND WATER REMEDIATION

1. Remediation Requirements

Ground water remediation activities will be reviewed and approved by OCD on a case by case basis prior to commencement of remedial activities. When contaminated ground water exceeds WQCC ground water standards, it



should be remediated according to the criteria described below.

a. Free Phase Contamination

Free phase floating product should be removed from ground water through the use of skimming devices, total-fluid type pumps, or other OCD-approved methods.

b. Dissolved Phase Contamination

Ground water contaminated with dissolved phase constituents in excess of WQCC ground water standards can be remediated by either removing and treating the ground water, or treating the ground water in place. If treated waters are to be disposed of onto or below the ground surface, a discharge plan must be submitted and approved by OCD.

c. Alternate Methods

The OCD encourages other methods of ground water remediation including, but not limited to, air sparging and bioremediation. Use of alternate methods must be approved by OCD prior to implementation.

## VII. TERMINATION OF REMEDIAL ACTION

Remedial action may be terminated when the criteria described below have been met:

A. **SOIL**

Contaminated soils requiring remediation should be remediated so that residual contaminant concentrations are below the recommended soil remediation action level for a particular site as specified in Section IV.A.2.b.

If soil action levels cannot practicably be attained, an evaluation of risk may be performed and provided to OCD for approval showing that the remaining contaminants will not pose a threat to present or foreseeable beneficial use of fresh water, public health and the environment.

B. **GROUND WATER**

A ground water remedial action may be terminated if all recoverable free phase product has been removed, and the concentration of the remaining dissolved phase contaminants in the ground water does not exceed New Mexico WQCC water quality standards or background levels. Termination of remedial action will be approved by OCD upon a demonstration of completion of remediation as described in above.

#### VIII. FINAL CLOSURE

Upon termination of any required remedial actions (Section VII.) the area of a leak, spill or release may be closed by backfilling any excavated areas, contouring to provide drainage away from the site, revegetating the area or other OCD approved methods.

#### IX. FINAL REPORT

Upon completion of remedial activities a final report summarizing all actions taken to mitigate environmental damage related to the leak, spill or release will be provided to OCD for approval.





PHOTO NO. 1 – COOPER JAL UNIT #512 SPILL AREA



PHOTO NO. 2 – CHLORIDE CONTAMINATION AREA



PHOTO NO. 3 – HYDROCARBON CONTAMINATION AREA



PHOTO NO. 4 – HYDROCARBON CONTAMINATION AREA

**APPENDIX E**  
**MATERIAL SAFETY DATA SHEETS**



**NUGREEN SPECIALTY, INC.  
MATERIAL SAFETY DATA SHEET**

**NUGREEN SPECIALTY - SB-1**

**SECTION 1 :=====IDENTIFICATION=====**

Effective Date: 1/03/04

Revised: 01/03/04

Name and Address:

Phone: (248)-330-9029

Emergency Phone: CHEMTREC (800)-424-9300

NUGREEN SPECIALTY, INC.  
990 HIGHWAY 287 N, STE. 106  
MANSFIELD, TX. 76063

Chemical Name: NOT APPLICABLE  
Synonyms: NONE  
D.O.T. Hazard Class: PRODUCT IS NOT DOT REGULATED  
D.O.T. Shipping Name: PRODUCT IS NOT DOT REGULATED  
Formula: SEE SECTION II  
Chemical Family: N.A.  
ID No.: NONE  
NFPA Profile: Health 1; Flammability 0; Reactivity 0

**SECTION 2 :=====INGREDIENTS=====**

**A. Hazardous Ingredients**

	%	TLV
NONE KNOWN	N.A.	N.A.

**B. Other Ingredients**

%*	TLV
----	-----

INGREDIENTS NOT PRECISELY IDENTIFIED ARE  
NON-HAZARDOUS & PROPRIETARY.

INGREDIENTS OF <1% HAVE BEEN ADDED TO A  
NON-HAZARDOUS LIQUID ORGANIC SUBSTRATE

ACTIVE COMPONENTS: PROPRIETARY	>15%	NONE ESTAB.
ENZYME MIXTURE	<5%	NONE ESTAB.
WATER, CAS#7732-18-5	<85%	NONE ESTAB.

**SECTION 3 :=====PHYSICAL PROPERTIES=====**

Boiling Point: ~212°F	Specific Gravity: ~1.0
Percent Volatile (volume): N.A.	pH (undiluted): 7.5-9.5
Vapor Pressure (mm Hg): N.A.	Solubility in Water: 99%
Vapor Density (air=1): N.A.	Evaporation Rate (water=1): <1.0
Freezing Point ~0°F	Viscosity: Similar to Water

Appearance and Odor: DARK BROWN/BLACK LIQUID, MILD EARTHY ODOR.

**NUGREEN SPECIALTY, INC.  
MATERIAL SAFETY DATA SHEET**

**NUGREEN SPECIATLY - SB-1**

**SECTION 4:=====FIRE AND EXPLOSION HAZARD DATA=====**

Flash Point (method used): NOT APPLICABLE

Flammable Limits in Air (lower): N.A.

(upper): N.A.

Extinguishing Media: SOLUTION IS NOT FLAMMABLE. IF INVOLVED IN A FIRE, USE WATER.

Special Fire Fighting Procedures: NONE. PRODUCT WILL NOT BURN.

Unusual Fire or Explosion Hazards: NONE. PRODUCT WILL NOT BURN.

**SECTION 5:=====HEALTH HAZARD DATA=====**

A. TLV and source: N.A.

B. Effects of a Single Overexposure by

1. Ingestion: MAY CAUSE SICKNESS IF INGESTED IN LARGE QUANTITIES.
2. Inhalation: LOW ORDER OF TOXICITY. MAY CAUSE MILD DISCOMFORT.
3. Skin Contact: SLIGHT REDNESS ON HANDS AND FORARMS IF INDIVIDUAL HAS HISTORY OF DERMAL ALLERGIC REACTIONS.
4. Eye Contact: MAY CAUSE MILD TRANSIENT IRRITATION.

C. Cancer Statement: THIS PRODUCT (OR ANY COMPONENT AT A CONCENTRATION OF 0.1% OR GREATER) IS NOT LISTED BY THE NTP, LARC, OSHA OR EPA AS A CARCINOGEN. IT ALSO CONTAINS NO KNOWN TERATOGENS, REPRODUCTIVE TOXINS OR SENSITIZERS.

D. Emergency and First Aid Procedure for

1. Ingestion: GIVE TWO GLASSES OF WATER. DO NOT INDUCE VOMITING GET PROMPT MEDICAL ATTENTION.
2. Inhalation: IMMEDIATELY REMOVE VICTIM FROM EXPOSURE. ADMINISTER ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED. KEEP AT REST. CALL FOR PROMPT MEDICAL ATTENTION.
3. Skin Contact: WASH WITH LARGE AMOUNTS OF WATER; USE SOAP IF AVAILABLE. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION.
4. Eye Contact: IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF WATER UNTIL IRRITATION SUBSIDES. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION.



**NUGREEN SPECIALTY, INC.**  
**MATERIAL SAFETY DATA SHEET**

**NUGREEN SPECIALTY - SB-1**

**SECTION 6:=====PERSONNEL PROTECTION DATA=====**

Respiratory Protection: NOT NORMALLY REQUIRED. IF MISTED BY HEAT AGITATION OR SPRAY, USE A MIST RESPIRATOR APPROVED BY NIOSH. DO NOT USE SINGLE-USE TYPE.

Ventilation: VENTILATION SHOULD BE PROVIDED TO CONTROL WORKER EXPOSURES AND PREVENT HEALTH RISK;

Protective Gloves: CHEMICAL RESISTANT GLOVES.

Eye Protection: GOGGLES OR SAFETY GLASSES WITH SIDE SHIELDS.

Other Protective Equipment: EYEWASH STATION IN AREA OF USE.

**SECTION 7:=====REACTIVITY DATA=====**

Product Stability: STABLE

Conditions to Avoid: STRONG ACIDS OR ALKALI COMPOUNDS MAY INACTIVATE BIO CULTURES.

Incompatibility: STRONG ACIDS OR ALKALI COMPOUNDS

Hazard Combustion or Decomposition Products: N.A.

Hazardous Polymerization: WILL NOT OCCUR.

**SECTION 8:=====ACCIDENTAL RELEASE MEASURES=====**

- A. Water Spill: PREVENT ADDITIONAL DISCHARGE OF MATERIAL, IF POSSIBLE TO DO SO WITHOUT HAZARD. SINCE N-P-K IS A FERTILIZER, IT MAY PROMOTE EUTROPHICATION IN WATERWAYS. CONSULT AN EXPERT ON DISPOSAL OF RECOVERED MATERIAL, AND ENSURE CONFORMITY TO ALL FEDERAL, STATE, AND LOCAL DISPOSAL REGULATIONS.
- B. Land Spill: PREVENT ADDITIONAL DISCHARGE OF MATERIAL, IF POSSIBLE TO DO SO WITHOUT HAZARD. FOR SMALL SPILLS, IMPLEMENT CLEANUP PROCEDURES; FOR LARGE SPILLS, IMPLEMENT CLEANUP PROCEDURES AND, IF IN PUBLIC AREA, ADVISE AUTHORITIES.  
PREVENT LIQUID FROM ENTERING SEWERS, WATERCOURSES, OR LOW AREAS. CONTAIN SPILLED LIQUID WITH SAND OR EARTH.  
RECOVER BY PUMPING OR WITH A SUITABLE ABSORBENT. CONSULT AN EXPERT ON DISPOSAL OF RECOVERED MATERIAL AND ENSURE CONFORMITY TO ALL FEDERAL, STATE, AND LOCAL DISPOSAL REGULATIONS.



**NUGREEN SPECIALTY, INC.  
MATERIAL SAFETY DATA SHEET**

**NUGREEN SPECIALTY - SB-1**

**SECTION 9:=====SPECIAL PRECAUTIONS=====**

A. Handling and

Storage: KEEP CONTAINER CLOSED. BOTH OPEN AND HANDLE  
CONTAINERS WITH CARE. STORE IN A COOL, WELL  
VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS.

STORAGE TEMPERATURE: 0°F MIN TO 180°F MAX.

LOADING TEMPERATURE: 0°F MIN TO 180°F MAX.

STORAGE PRESSURE: ATMOSPHERIC

B. Other Precautions: NONE

**SECTION 10:=====TOXICOLOGICAL INFORMATION=====**

PLEASE CALL THE NON-EMERGENCY TELEPHONE NUMBER ON PAGE ONE IF THIS  
INFORMATION IS REQUIRED.

**SECTION 11:=====ECOLOGICAL INFORMATION=====**

PLEASE CALL THE NON-EMERGENCY TELEPHONE NUMBER ON PAGE ONE IF THIS  
INFORMATION IS REQUIRED.

The data contained in this Material Safety Data Sheet has been prepared based upon an evaluation of the ingredients contained in the product, their concentration in the product and potential interactions. The information is offered in good faith and is believed to be accurate. It is furnished to the customer who is urged to study it carefully to become aware of hazards, if any, in the storage, handling, use and disposal of the product; and to insure their employees are properly informed and advised of all safety precautions required. The information is furnished for compliance with the "Occupational Safety and Health Act" of 1970, the "Hazards Communication Act" of 1983 as well as various other Federal, State and Local regulations. Use or dissemination of all or part of this information for any other purpose is illegal.

**Analytical Report 456729**  
**for**  
**Environmental Compliance Associates**

**Project Manager: Aaron Edrington**

**Cooper Jal Unit #512**

**0113-12**

**06-FEB-13**

Collected By: Client



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

Xenco-Houston (EPA Lab code: TX00122):

Texas (T104704215-10-6-TX), Arizona (AZ0765), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)  
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)  
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)  
Rhode Island (LAO00312), USDA (S-44102), DoD (L11-54)

Xenco-Atlanta (EPA Lab Code: GA00046):

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

Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)

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)





06-FEB-13

Project Manager: **Aaron Edrington**  
**Environmental Compliance Associates**  
P.O.Box 770005  
Houston, TX 77215

Reference: XENCO Report No(s): **456729**  
**Cooper Jal Unit #512**  
Project Address: Jal.NM

**Aaron Edrington:**

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) 456729. 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. 456729 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,

---

**Nicholas Straccione**  
Project Manager

*Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.  
Certified and approved by numerous States and Agencies.  
A Small Business and Minority Status Company that delivers SERVICE and QUALITY*

Houston - Dallas - Odessa - San Antonio - Tampa - Lakeland - Atlanta - Phoenix - Oklahoma - Latin America



**Environmental Compliance Associates, Houston, TX**

Cooper Jal Unit #512

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
CJU #1	S	01-30-13 12:20	0 - 1 ft	456729-001
CJU #2	S	01-30-13 12:33	0 - 1 ft	456729-002
CJU #3	S	01-30-13 12:40	0 - 1 ft	456729-003
CJU #4	S	01-30-13 12:45	0 - 1.5 ft	456729-004
CJU #5	S	01-30-13 12:50	0 - 1 ft	456729-005
CJU #6	S	01-30-13 12:58	0 - 1 ft	456729-006
CJU #7	S	01-30-13 13:03	0 - 1 ft	456729-007
CJU #8	S	01-30-13 13:09	0 - 1 ft	456729-008
CJU #9	S	01-30-13 13:16	0 - 1 ft	456729-009
CJU #10	S	01-30-13 13:21	0 - 1.5 ft	456729-010
CJU #11A	S	01-30-13 13:28	0 - 1 ft	456729-011
CJU #11B	S	01-30-13 13:33	0 - 2 ft	456729-012
CJU #12	S	01-30-13 13:40	0 - 1 ft	456729-013
CJU #13A	S	01-30-13 13:46	0 - 1 ft	456729-014
CJU #13B	S	01-30-13 13:50	0 - 2 ft	456729-015
CJU #14	S	01-30-13 13:58	0 - 1 ft	456729-016
CJU #15	S	01-30-13 14:05	0 - 1 ft	456729-017
CJU #16	S	01-30-13 14:10	0 - 1 ft	456729-018
CJU #17	S	01-30-13 14:15	0 - 1 ft	456729-019
CJU #18	S	01-30-13 14:21	0 - 1 ft	456729-020
CJU #19	S	01-30-13 14:27	0 - 1 ft	456729-021



## CASE NARRATIVE

*Client Name: Environmental Compliance Associates*

*Project Name: Cooper Jal Unit #512*



Project ID: 0113-12  
Work Order Number(s): 456729

Report Date: 06-FEB-13  
Date Received: 01/31/2013

### Sample receipt non conformances and comments:

None

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

None

#### Analytical non conformances and comments:

Batch: LBA-905963 BTEX by EPA 8021B  
SW8021BM

Batch 905963, m\_p-Xylenes recovered below QC limits in the Matrix Spike.

Samples affected are: 456729-004, -002, -005, -001, -003.

The Laboratory Control Sample for m\_p-Xylenes is within laboratory Control Limits

Batch: LBA-906129 Inorganic Anions by EPA 300/300.1  
E300

Batch 906129, Chloride recovered below QC limits in the Matrix Spike and Matrix Spike Duplicate.

Samples affected are: 456729-004, -002, -006, -005, -001, -003, -007.

The Laboratory Control Sample for Chloride is within laboratory Control Limits

Batch: LBA-906268 Inorganic Anions by SW 9056  
E300

Batch 906268, Chloride recovered below QC limits in the Matrix Spike and Matrix Spike Duplicate.

Samples affected are: 456729-016, -013, -012, -014, -018, -011, -015, -017.

The Laboratory Control Sample for Chloride is within laboratory Control Limits





Project Id: 0113-12

Contact: Aaron Edrington

Project Location: Jal.NM

Project Name: Cooper Jal Unit #512

Date Received in Lab: Thu Jan-31-13 08:00 am

Report Date: 06-FEB-13

Project Manager: Nicholas Straccione

Analysis Requested		Lab Id:	456729-001	456729-002	456729-003	456729-004	456729-005	456729-006
		Field Id:	CJU #1	CJU #2	CJU #3	CJU #4	CJU #5	CJU #6
		Depth:	0-1 ft	0-1 ft	0-1 ft	0-1.5 ft	0-1 ft	0-1 ft
		Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled:	Jan-30-13 12:20	Jan-30-13 12:33	Jan-30-13 12:40	Jan-30-13 12:45	Jan-30-13 12:50	Jan-30-13 12:58
<b>BTEX by EPA 8021B</b>		Extracted:	Jan-31-13 09:00	Jan-31-13 09:00	Jan-31-13 09:00	Jan-31-13 09:00	Jan-31-13 09:00	Feb-01-13 08:40
		Analyzed:	Jan-31-13 14:36	Jan-31-13 14:52	Jan-31-13 15:42	Jan-31-13 15:58	Jan-31-13 16:15	Feb-01-13 11:01
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene			ND 0.00106	ND 0.00114	ND 0.00103	ND 0.00105	ND 0.00110	ND 0.00103
Toluene			ND 0.00213	ND 0.00228	ND 0.00205	ND 0.00210	ND 0.00221	ND 0.00207
Ethylbenzene			ND 0.00106	ND 0.00114	ND 0.00103	ND 0.00105	ND 0.00110	ND 0.00103
m_p-Xylenes			ND 0.00213	ND 0.00228	ND 0.00205	ND 0.00210	ND 0.00221	ND 0.00207
o-Xylene			ND 0.00106	ND 0.00114	ND 0.00103	ND 0.00105	0.00485 0.00110	ND 0.00103
Total Xylenes			ND 0.00106	ND 0.00114	ND 0.00103	ND 0.00105	0.00485 0.00110	ND 0.00103
Total BTEX			ND 0.00106	ND 0.00114	ND 0.00103	ND 0.00105	0.00485 0.00110	ND 0.00103
<b>Inorganic Anions by EPA 300/300.1</b>		Extracted:	Feb-04-13 17:45	Feb-04-13 18:37	Feb-04-13 18:55	Feb-04-13 19:12	Feb-04-13 19:29	Feb-04-13 19:47
<b>SUB: E871002</b>		Analyzed:	Feb-04-13 17:45	Feb-04-13 18:37	Feb-04-13 18:55	Feb-04-13 19:12	Feb-04-13 19:29	Feb-04-13 19:47
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride			772 1.06	940 1.14	30.5 1.02	49.9 1.04	977 1.09	24.6 1.03
<b>Percent Moisture</b>		Extracted:						
		Analyzed:	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30
		Units/RL:	% RL	% RL	% RL	% RL	% RL	% RL
Percent Moisture			6.62 1.00	12.9 1.00	2.92 1.00	4.64 1.00	8.76 1.00	3.55 1.00
<b>TPH By SW8015B Mod</b>		Extracted:	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-04-13 14:50
		Analyzed:	Feb-02-13 00:09	Feb-02-13 00:34	Feb-02-13 01:00	Feb-02-13 01:26	Feb-02-13 01:51	Feb-05-13 02:31
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
C6-C10 Gasoline Range Hydrocarbons			ND 16.1	ND 17.3	ND 15.4	ND 15.7	ND 16.4	ND 15.6
C10-C28 Diesel Range Hydrocarbons			41.1 16.1	149 17.3	91.2 15.4	ND 15.7	22.9 16.4	ND 15.6
Total TPH			41.1 16.1	149 17.3	91.2 15.4	ND 15.7	22.9 16.4	ND 15.6

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Nicholas Straccione  
Project Manager





Project Id: 0113-12

Contact: Aaron Edrington

Project Location: Jal.NM

Date Received in Lab: Thu Jan-31-13 08:00 am

Report Date: 06-FEB-13

Project Manager: Nicholas Straccione

Analysis Requested		Lab Id:	456729-007	456729-008	456729-009	456729-010	456729-011	456729-012
		Field Id:	CJU #7	CJU #8	CJU #9	CJU #10	CJU #11A	CJU #11B
		Depth:	0-1 ft	0-1 ft	0-1 ft	0-1.5 ft	0-1 ft	0-2 ft
		Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled:	Jan-30-13 13:03	Jan-30-13 13:09	Jan-30-13 13:16	Jan-30-13 13:21	Jan-30-13 13:28	Jan-30-13 13:33
<b>BTEX by EPA 8021B</b>		Extracted:	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40
		Analyzed:	Feb-01-13 15:29	Feb-01-13 11:33	Feb-01-13 11:52	Feb-01-13 12:09	Feb-01-13 12:25	Feb-01-13 12:41
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene			ND 0.00106	ND 0.00109	ND 0.00103	ND 0.00104	ND 0.00107	ND 0.00107
Toluene			ND 0.00212	ND 0.00218	ND 0.00206	ND 0.00207	ND 0.00213	ND 0.00214
Ethylbenzene			ND 0.00106	ND 0.00109	ND 0.00103	ND 0.00104	ND 0.00107	ND 0.00107
m,p-Xylenes			ND 0.00212	ND 0.00218	ND 0.00206	ND 0.00207	ND 0.00213	ND 0.00214
o-Xylene			ND 0.00106	ND 0.00109	ND 0.00103	ND 0.00104	ND 0.00107	ND 0.00107
Total Xylenes			ND 0.00106	ND 0.00109	ND 0.00103	ND 0.00104	ND 0.00107	ND 0.00107
Total BTEX			ND 0.00106	ND 0.00109	ND 0.00103	ND 0.00104	ND 0.00107	ND 0.00107
<b>Inorganic Anions by EPA 300/300.1</b>		Extracted:	Feb-04-13 20:39	Feb-05-13 07:06	Feb-05-13 07:23	Feb-05-13 07:40	Feb-04-13 21:31	Feb-04-13 22:23
<b>SUB: E871002</b>		Analyzed:	Feb-04-13 20:39	Feb-05-13 07:06	Feb-05-13 07:23	Feb-05-13 07:40	Feb-04-13 21:31	Feb-04-13 22:23
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride			64.5 1.04	466 1.09	54.3 1.03	ND 1.04	668 1.07	693 1.07
<b>Percent Moisture</b>		Extracted:						
		Analyzed:	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30
		Units/RL:	% RL	% RL	% RL	% RL	% RL	% RL
Percent Moisture			5.50 1.00	8.25 1.00	4.03 1.00	3.83 1.00	6.39 1.00	7.40 1.00
<b>TPH By SW8015B Mod</b>		Extracted:	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45
		Analyzed:	Feb-02-13 02:43	Feb-02-13 03:08	Feb-02-13 03:34	Feb-02-13 03:59	Feb-02-13 04:50	Feb-02-13 05:16
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
C6-C10 Gasoline Range Hydrocarbons			ND 15.8	ND 16.3	ND 15.6	ND 15.6	ND 16.0	ND 16.2
C10-C28 Diesel Range Hydrocarbons			ND 15.8	ND 16.3	ND 15.6	ND 15.6	71.4 16.0	18.7 16.2
Total TPH			ND 15.8	ND 16.3	ND 15.6	ND 15.6	71.4 16.0	18.7 16.2

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Nicholas Straccione  
Project Manager





Project Id: 0113-12  
Contact: Aaron Edrington  
Project Location: Jal.NM

Date Received in Lab: Thu Jan-31-13 08:00 am  
Report Date: 06-FEB-13

Project Manager: Nicholas Straccione

Analysis Requested		Lab Id:	456729-013	456729-014	456729-015	456729-016	456729-017	456729-018
		Field Id:	CJU #12	CJU #13A	CJU #13B	CJU #14	CJU #15	CJU #16
		Depth:	0-1 ft	0-1 ft	0-2 ft	0-1 ft	0-1 ft	0-1 ft
		Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled:	Jan-30-13 13:40	Jan-30-13 13:46	Jan-30-13 13:50	Jan-30-13 13:58	Jan-30-13 14:05	Jan-30-13 14:10
BTEX by EPA 8021B		Extracted:	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40	Feb-01-13 08:40
		Analyzed:	Feb-01-13 12:58	Feb-01-13 13:15	Feb-01-13 14:06	Feb-01-13 14:22	Feb-01-13 14:39	Feb-01-13 14:56
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene			ND 0.00107	ND 0.00110	ND 0.00110	ND 0.00113	ND 0.00109	ND 0.00108
Toluene			ND 0.00214	ND 0.00220	ND 0.00220	ND 0.00225	ND 0.00218	ND 0.00215
Ethylbenzene			ND 0.00107	ND 0.00110	ND 0.00110	ND 0.00113	ND 0.00109	ND 0.00108
m_p-Xylenes			ND 0.00214	ND 0.00220	ND 0.00220	ND 0.00225	ND 0.00218	ND 0.00215
o-Xylene			ND 0.00107	ND 0.00110	ND 0.00110	ND 0.00113	ND 0.00109	ND 0.00108
Total Xylenes			ND 0.00107	ND 0.00110	ND 0.00110	ND 0.00113	ND 0.00109	ND 0.00108
Total BTEX			ND 0.00107	ND 0.00110	ND 0.00110	ND 0.00113	ND 0.00109	ND 0.00108
Inorganic Anions by EPA 300/300.1		Extracted:	Feb-04-13 22:41	Feb-04-13 22:58	Feb-04-13 23:16	Feb-05-13 00:08	Feb-05-13 00:25	Feb-05-13 00:43
SUB: E871002		Analyzed:	Feb-04-13 22:41	Feb-04-13 22:58	Feb-04-13 23:16	Feb-05-13 00:08	Feb-05-13 00:25	Feb-05-13 00:43
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride			ND 1.07	825 1.08	692 1.11	1030 1.13	711 1.08	883 1.08
Percent Moisture		Extracted:						
		Analyzed:	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30
		Units/RL:	% RL	% RL	% RL	% RL	% RL	% RL
Percent Moisture			6.71 1.00	9.17 1.00	9.79 1.00	11.3 1.00	8.44 1.00	7.57 1.00
TPH By SW8015B Mod		Extracted:	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45	Feb-01-13 14:45
		Analyzed:	Feb-02-13 05:41	Feb-02-13 06:06	Feb-02-13 06:32	Feb-02-13 06:57	Feb-02-13 07:22	Feb-02-13 07:47
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
C6-C10 Gasoline Range Hydrocarbons			ND 16.1	ND 16.5	17.1 16.7	ND 16.8	ND 16.4	ND 16.1
C10-C28 Diesel Range Hydrocarbons			ND 16.1	202 16.5	347 16.7	ND 16.8	ND 16.4	ND 16.1
Total TPH			ND 16.1	202 16.5	364 16.7	ND 16.8	ND 16.4	ND 16.1

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*Nicholas Straccione*

Nicholas Straccione  
Project Manager



Project Id: 0113-12  
Contact: Aaron Edrington  
Project Location: Jal.NM

Project Name: Cooper Jal Unit #512

Date Received in Lab: Thu Jan-31-13 08:00 am  
Report Date: 06-FEB-13

Project Manager: Nicholas Straccione

<i>Analysis Requested</i>		Lab Id:	456729-019	456729-020	456729-021
		Field Id:	CJU #17	CJU #18	CJU #19
		Depth:	0-1 ft	0-1 ft	0-1 ft
		Matrix:	SOIL	SOIL	SOIL
		Sampled:	Jan-30-13 14:15	Jan-30-13 14:21	Jan-30-13 14:27
<b>BTEX by EPA 8021B</b>		Extracted:	Feb-01-13 08:40	Feb-04-13 11:00	Feb-04-13 11:00
		Analyzed:	Feb-01-13 15:12	Feb-04-13 12:47	Feb-04-13 13:04
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL
			ND 0.00105	ND 0.00104	ND 0.00111
			ND 0.00211	ND 0.00208	ND 0.00222
			ND 0.00105	ND 0.00104	ND 0.00111
			ND 0.00211	ND 0.00208	ND 0.00222
			ND 0.00105	ND 0.00104	ND 0.00111
			ND 0.00105	ND 0.00104	ND 0.00111
			ND 0.00105	ND 0.00104	ND 0.00111
<b>Inorganic Anions by EPA 300/300.1 SUB: E871002</b>		Extracted:	Feb-05-13 07:58	Feb-05-13 08:15	Feb-05-13 11:33
		Analyzed:	Feb-05-13 07:58	Feb-05-13 08:15	Feb-05-13 11:33
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL
			66.8 1.05	7.18 1.04	220 1.11
<b>Percent Moisture</b>		Extracted:	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30
		Analyzed:	Feb-01-13 12:30	Feb-01-13 12:30	Feb-01-13 12:30
		Units/RL:	% RL	% RL	% RL
			5.13 1.00	4.62 1.00	10.0 1.00
<b>TPH By SW8015B Mod</b>		Extracted:	Feb-01-13 14:45	Feb-01-13 14:45	Feb-04-13 14:50
		Analyzed:	Feb-02-13 08:13	Feb-02-13 08:38	Feb-05-13 02:57
		Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL
			ND 15.8	ND 15.7	ND 16.7
			ND 15.8	ND 15.7	18.3 16.7
			ND 15.8	ND 15.7	18.3 16.7
			ND 15.8	ND 15.7	18.3 16.7

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Nicholas Straccione  
Project Manager



## Flagging Criteria

- 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      **MQL** Method 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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(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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 905963

Sample: 456729-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 01/31/13 14:36

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0277	0.0300	92	80-120	
4-Bromofluorobenzene	0.0263	0.0300	88	80-120	

Lab Batch #: 905963

Sample: 456729-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 01/31/13 14:52

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0254	0.0300	85	80-120	
4-Bromofluorobenzene	0.0326	0.0300	109	80-120	

Lab Batch #: 905963

Sample: 456729-003 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 01/31/13 15:42

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0293	0.0300	98	80-120	
4-Bromofluorobenzene	0.0279	0.0300	93	80-120	

Lab Batch #: 905963

Sample: 456729-004 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 01/31/13 15:58

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0279	0.0300	93	80-120	
4-Bromofluorobenzene	0.0266	0.0300	89	80-120	

Lab Batch #: 905963

Sample: 456729-005 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 01/31/13 16:15

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0249	0.0300	83	80-120	
4-Bromofluorobenzene	0.0315	0.0300	105	80-120	

\* Surrogate outside of Laboratory QC limits

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

\*\*\* Poor recoveries due to dilution

Surrogate Recovery [D] =  $100 \times A / B$

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



## Form 2 - Surrogate Recoveries

Project Name: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906075

Sample: 456729-006 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 11:01

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0316	0.0300	105	80-120	
4-Bromofluorobenzene	0.0283	0.0300	94	80-120	

Lab Batch #: 906075

Sample: 456729-008 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 11:33

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0272	0.0300	91	80-120	
4-Bromofluorobenzene	0.0270	0.0300	90	80-120	

Lab Batch #: 906075

Sample: 456729-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 11:52

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0328	0.0300	109	80-120	
4-Bromofluorobenzene	0.0318	0.0300	106	80-120	

Lab Batch #: 906075

Sample: 456729-010 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 12:09

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0248	0.0300	83	80-120	
4-Bromofluorobenzene	0.0292	0.0300	97	80-120	

Lab Batch #: 906075

Sample: 456729-011 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 12:25

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0302	0.0300	101	80-120	
4-Bromofluorobenzene	0.0320	0.0300	107	80-120	

\* Surrogate outside of Laboratory QC limits

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

\*\*\* Poor recoveries due to dilution

Surrogate Recovery [D] =  $100 \times A / B$

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



## Form 2 - Surrogate Recoveries

Project Name: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906075

Sample: 456729-012 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 12:41

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0269	0.0300	90	80-120	
4-Bromofluorobenzene	0.0309	0.0300	103	80-120	

Lab Batch #: 906075

Sample: 456729-013 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 12:58

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0268	0.0300	89	80-120	
4-Bromofluorobenzene	0.0295	0.0300	98	80-120	

Lab Batch #: 906075

Sample: 456729-014 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 13:15

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0338	0.0300	113	80-120	
4-Bromofluorobenzene	0.0302	0.0300	101	80-120	

Lab Batch #: 906075

Sample: 456729-015 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 14:06

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0295	0.0300	98	80-120	
4-Bromofluorobenzene	0.0271	0.0300	90	80-120	

Lab Batch #: 906075

Sample: 456729-016 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 14:22

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0263	0.0300	88	80-120	
4-Bromofluorobenzene	0.0315	0.0300	105	80-120	

\* 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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906075

Sample: 456729-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 14:39

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0281	0.0300	94	80-120	
4-Bromofluorobenzene	0.0334	0.0300	111	80-120	

Lab Batch #: 906075

Sample: 456729-018 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 14:56

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0254	0.0300	85	80-120	
4-Bromofluorobenzene	0.0301	0.0300	100	80-120	

Lab Batch #: 906075

Sample: 456729-019 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 15:12

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0300	0.0300	100	80-120	
4-Bromofluorobenzene	0.0244	0.0300	81	80-120	

Lab Batch #: 906075

Sample: 456729-007 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 15:29

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0270	0.0300	90	80-120	
4-Bromofluorobenzene	0.0317	0.0300	106	80-120	

Lab Batch #: 906117

Sample: 456729-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 00:09

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	107	100	107	70-135	
o-Terphenyl	57.7	50.0	115	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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906117

Sample: 456729-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 00:34

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	100	106	70-135	
o-Terphenyl	57.5	50.1	115	70-135	

Lab Batch #: 906117

Sample: 456729-003 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 01:00

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	105	99.8	105	70-135	
o-Terphenyl	55.5	49.9	111	70-135	

Lab Batch #: 906117

Sample: 456729-004 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 01:26

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	107	99.9	107	70-135	
o-Terphenyl	57.4	50.0	115	70-135	

Lab Batch #: 906117

Sample: 456729-005 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 01:51

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	108	99.7	108	70-135	
o-Terphenyl	58.2	49.9	117	70-135	

Lab Batch #: 906117

Sample: 456729-007 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 02:43

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	109	99.5	110	70-135	
o-Terphenyl	58.3	49.8	117	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] =  $100 \times A / B$

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



## Form 2 - Surrogate Recoveries

Project Name: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906117

Sample: 456729-008 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 03:08

### 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	56.8	50.0	114	70-135	

Lab Batch #: 906117

Sample: 456729-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 03:34

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	107	100	107	70-135	
o-Terphenyl	56.5	50.0	113	70-135	

Lab Batch #: 906117

Sample: 456729-010 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 03:59

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	99.8	106	70-135	
o-Terphenyl	56.8	49.9	114	70-135	

Lab Batch #: 906117

Sample: 456729-011 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 04:50

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	109	99.7	109	70-135	
o-Terphenyl	59.2	49.9	119	70-135	

Lab Batch #: 906117

Sample: 456729-012 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 05:16

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	107	99.8	107	70-135	
o-Terphenyl	57.8	49.9	116	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] =  $100 \times A / B$

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

# Form 2 - Surrogate Recoveries

Project Name: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906117

Sample: 456729-013 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 05:41

## 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	57.6	50.1	115	70-135	

Lab Batch #: 906117

Sample: 456729-014 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 06:06

## SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	109	100	109	70-135	
o-Terphenyl	59.5	50.0	119	70-135	

Lab Batch #: 906117

Sample: 456729-015 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 06:32

## SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	100	106	70-135	
o-Terphenyl	59.3	50.1	118	70-135	

Lab Batch #: 906117

Sample: 456729-016 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 06:57

## SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	99.5	107	70-135	
o-Terphenyl	57.8	49.8	116	70-135	

Lab Batch #: 906117

Sample: 456729-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 07:22

## SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	102	99.9	102	70-135	
o-Terphenyl	55.7	50.0	111	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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906117

Sample: 456729-018 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 07:47

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	99.5	107	70-135	
o-Terphenyl	57.5	49.8	115	70-135	

Lab Batch #: 906117

Sample: 456729-019 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 08:13

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	107	99.9	107	70-135	
o-Terphenyl	57.5	50.0	115	70-135	

Lab Batch #: 906117

Sample: 456729-020 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 08:38

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	108	99.7	108	70-135	
o-Terphenyl	57.5	49.9	115	70-135	

Lab Batch #: 906231

Sample: 456729-020 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/04/13 12:47

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0277	0.0300	92	80-120	
4-Bromofluorobenzene	0.0259	0.0300	86	80-120	

Lab Batch #: 906231

Sample: 456729-021 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/04/13 13:04

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0282	0.0300	94	80-120	
4-Bromofluorobenzene	0.0263	0.0300	88	80-120	

\* 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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906208

Sample: 456729-006 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/05/13 02:31

### 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	57.3	50.1	114	70-135	

Lab Batch #: 906208

Sample: 456729-021 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/05/13 02:57

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	106	100	106	70-135	
o-Terphenyl	57.5	50.0	115	70-135	

Lab Batch #: 905963

Sample: 633199-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 01/31/13 09:52

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0353	0.0300	118	80-120	
4-Bromofluorobenzene	0.0308	0.0300	103	80-120	

Lab Batch #: 906075

Sample: 633269-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/01/13 10:28

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0284	0.0300	95	80-120	
4-Bromofluorobenzene	0.0287	0.0300	96	80-120	

Lab Batch #: 906117

Sample: 633297-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/01/13 23:43

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	110	100	110	70-135	
o-Terphenyl	59.7	50.1	119	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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906231

Sample: 633343-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/04/13 12:31

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0262	0.0300	87	80-120	
4-Bromofluorobenzene	0.0242	0.0300	81	80-120	

Lab Batch #: 906208

Sample: 633336-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/05/13 02:05

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	109	99.9	109	70-135	
o-Terphenyl	58.8	50.0	118	70-135	

Lab Batch #: 905963

Sample: 633199-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 01/31/13 09:36

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0331	0.0300	110	80-120	
4-Bromofluorobenzene	0.0334	0.0300	111	80-120	

Lab Batch #: 906075

Sample: 633269-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/01/13 09:23

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0288	0.0300	96	80-120	
4-Bromofluorobenzene	0.0304	0.0300	101	80-120	

Lab Batch #: 906117

Sample: 633297-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/01/13 22:52

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	100	100	100	70-135	
o-Terphenyl	57.1	50.0	114	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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906231

Sample: 633343-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/04/13 11:57

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0314	0.0300	105	80-120	
4-Bromofluorobenzene	0.0329	0.0300	110	80-120	

Lab Batch #: 906208

Sample: 633336-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/05/13 01:13

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	107	99.7	107	70-135	
o-Terphenyl	59.8	49.9	120	70-135	

Lab Batch #: 905963

Sample: 633199-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 01/31/13 09:19

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0305	0.0300	102	80-120	
4-Bromofluorobenzene	0.0332	0.0300	111	80-120	

Lab Batch #: 906075

Sample: 633269-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/01/13 10:11

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0306	0.0300	102	80-120	
4-Bromofluorobenzene	0.0337	0.0300	112	80-120	

Lab Batch #: 906117

Sample: 633297-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/01/13 23:17

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	106	99.9	106	70-135	
o-Terphenyl	60.5	50.0	121	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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906231

Sample: 633343-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/04/13 12:14

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0345	0.0300	115	80-120	
4-Bromofluorobenzene	0.0334	0.0300	111	80-120	

Lab Batch #: 906208

Sample: 633336-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 02/05/13 01:39

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	109	99.8	109	70-135	
o-Terphenyl	61.1	49.9	122	70-135	

Lab Batch #: 905963

Sample: 456729-001 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 01/31/13 16:32

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0310	0.0300	103	80-120	
4-Bromofluorobenzene	0.0354	0.0300	118	80-120	

Lab Batch #: 906075

Sample: 456729-006 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 16:20

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0307	0.0300	102	80-120	
4-Bromofluorobenzene	0.0316	0.0300	105	80-120	

Lab Batch #: 906117

Sample: 456729-020 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 09:04

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	99.4	99.9	99	70-135	
o-Terphenyl	57.4	50.0	115	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] =  $100 \times A / B$ 

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



## Form 2 - Surrogate Recoveries

Project Name: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906231

Sample: 456729-020 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/04/13 18:22

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0274	0.0300	91	80-120	
4-Bromofluorobenzene	0.0340	0.0300	113	80-120	

Lab Batch #: 906208

Sample: 456724-001 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/05/13 05:31

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	107	100	107	70-135	
o-Terphenyl	63.0	50.1	126	70-135	

Lab Batch #: 906075

Sample: 456729-006 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/01/13 16:02

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0302	0.0300	101	80-120	
4-Bromofluorobenzene	0.0271	0.0300	90	80-120	

Lab Batch #: 906117

Sample: 456729-020 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/02/13 09:30

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	103	99.8	103	70-135	
o-Terphenyl	56.8	49.9	114	70-135	

Lab Batch #: 906231

Sample: 456729-020 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/04/13 18:39

### SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0345	0.0300	115	80-120	
4-Bromofluorobenzene	0.0335	0.0300	112	80-120	

\* 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: Cooper Jal Unit #512

Work Orders : 456729,

Project ID: 0113-12

Lab Batch #: 906208

Sample: 456724-001 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 02/05/13 05:56

### SURROGATE RECOVERY STUDY

TPH By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	108	100	108	70-135	
o-Terphenyl	64.0	50.1	128	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.





Project Name: Cooper Jal Unit #512

Work Order #: 456729

Project ID:

0113-12

Lab Batch #: 906129

Sample: 633301-1-BKS

Matrix: Solid

Date Analyzed: 02/04/2013

Date Prepared: 02/04/2013

Analyst: RKO

Reporting Units: mg/kg

Batch #: 1

## BLANK /BLANK SPIKE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
Analytes						
Chloride	<1.00	100	102	102	80-120	

Lab Batch #: 906260

Sample: 633371-1-BKS

Matrix: Solid

Date Analyzed: 02/05/2013

Date Prepared: 02/05/2013

Analyst: RKO

Reporting Units: mg/kg

Batch #: 1

## BLANK /BLANK SPIKE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
Analytes						
Chloride	<1.00	100	101	101	80-120	

Lab Batch #: 906268

Sample: 633375-1-BKS

Matrix: Solid

Date Analyzed: 02/04/2013

Date Prepared: 02/04/2013

Analyst: RKO

Reporting Units: mg/kg

Batch #: 1

## BLANK /BLANK SPIKE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
Analytes						
Chloride	<1.00	100	104	104	80-120	

Lab Batch #: 906270

Sample: 633378-1-BKS

Matrix: Solid

Date Analyzed: 02/05/2013

Date Prepared: 02/05/2013

Analyst: RKO

Reporting Units: mg/kg

Batch #: 1

## BLANK /BLANK SPIKE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
Analytes						
Chloride	<5.00	500	517	103	80-120	

Blank Spike Recovery [D] = 100\*[C]/[B]

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

BRL - Below Reporting Limit



Project Name: Cooper Jal Unit #512

Work Order #: 456729

Analyst: KEB

Lab Batch ID: 905963

Sample: 633199-1-BKS

Units: mg/kg

Date Prepared: 01/31/2013

Batch #: 1

Project ID: 0113-12

Date Analyzed: 01/31/2013

Matrix: Solid

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY														
Units: mg/kg	BTEX by EPA 8021B	Analytes	Blank Sample Result	Spike Added	Blank Spike Result	Blank Spike %R	Spike Added	Blank Spike Duplicate Result	Blk. Spk Dup. %R	RPD %	Control Limits %R	Control Limits %RPD	Flag	
			[A]	[B]	[C]	[D]	[E]	[F]	[G]					

Analyst: KEB

Lab Batch ID: 906075

Sample: 633269-1-BKS

Date Prepared: 02/01/2013

Batch #: 1

Date Analyzed: 02/01/2013

Matrix: Solid

66

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY														
Units: mg/kg	BTEX by EPA 8021B	Analytes	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	
					</									

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



**Project Name: Cooper Jal Unit #512**
**Work Order #: 456729**
**Analyst: KEB**
**Lab Batch ID: 906231**
**Sample: 633343-1-BKS**
**Units: mg/kg**
**Date Prepared: 02/04/2013**
**Batch #: 1**
**Project ID: 0113-12**
**Date Analyzed: 02/04/2013**
**Matrix: Solid**

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY												
Analytes	BTEX by EPA 8021B											
	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	
	Benzene	<0.00100	0.100	0.0854	85	0.0996	0.0856	86	0	70-130	35	
	Toluene	<0.00200	0.100	0.0831	83	0.0996	0.0805	81	3	70-130	35	
	Ethylbenzene	<0.00100	0.100	0.0813	81	0.0996	0.0835	84	3	71-129	35	
	m_p-Xylenes	<0.00200	0.200	0.160	80	0.199	0.161	81	1	70-135	35	
	o-Xylene	<0.00100	0.100	0.0807	81	0.0996	0.0813	82	1	71-133	35	

**Analyst: KEB**
**Lab Batch ID: 906117**
**Sample: 633297-1-BKS**
**Date Prepared: 02/01/2013**
**Batch #: 1**
**Date Analyzed: 02/01/2013**
**Matrix: Solid**

67

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY														
Units: mg/kg	TPH By SW8015B Mod	Analytes	Blank Sample Result	Spike Added	Blank Spike Result	Blank Spike %R	Spike Added	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R	RPD %	Control Limits %R	Control Limits %RPD	Flag	
			[A]	[B]	[C]	[D]	[E]			[G]				
								</						

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

**Project Name: Cooper Jal Unit #512**

Work Order #: 456729

Analyst: KEB

Lab Batch ID: 906208

Sample: 633336-1-BKS

Date Prepared: 02/04/2013

Batch #: 1

Project ID: 0113-12

Date Analyzed: 02/05/2013

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY											
Units: mg/kg											
Analytes	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
	C6-C10 Gasoline Range Hydrocarbons	<15.0	997	1030	103	998	1050	105	2	70-135	35
	C10-C28 Diesel Range Hydrocarbons	<15.0	997	1060	106	998	1070	107	1	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





**Project Name: Cooper Jal Unit #512**

**Work Order #:** 456729

**Lab Batch #:** 905963

**Date Analyzed:** 01/31/2013

**Date Prepared:** 01/31/2013

**Project ID:** 0113-12

**Analyst:** KEB

**QC- Sample ID:** 456729-001 S

**Batch #:** 1

**Matrix:** Soil

**Reporting Units:** mg/kg

MATRIX / MATRIX SPIKE RECOVERY STUDY						
BTEX by EPA 8021B	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Analytes						
Benzene	<0.00107	0.107	0.0929	87	70-130	
Toluene	<0.00214	0.107	0.0779	73	70-130	
Ethylbenzene	<0.00107	0.107	0.0757	71	71-129	
m_p-Xylenes	<0.00214	0.214	0.140	65	70-135	X
o-Xylene	<0.00107	0.107	0.0762	71	71-133	

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



**Project Name: Cooper Jal Unit #512**

Work Order #: 456729

Lab Batch ID: 906075

Date Analyzed: 02/01/2013

Reporting Units: mg/kg

Project ID: 0113-12

QC- Sample ID: 456729-006 S

Date Prepared: 02/01/2013

Batch #: 1 Matrix: Soil

Analyst: KEB

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY											
Reporting Units: mg/kg											
BTEX by EPA 8021B  Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
	Benzene	<0.00104	0.104	0.0988	95	0.103	0.0799	78	21	70-130	35
	Toluene	<0.00207	0.104	0.104	100	0.103	0.0780	76	29	70-130	35
	Ethylbenzene	<0.00104	0.104	0.104	100	0.103	0.0766	74	30	71-129	35
	m_p-Xylenes	<0.00207	0.207	0.198	96	0.207	0.145	70	31	70-135	35
	o-Xylene	<0.00104	0.104	0.0955	92	0.103	0.0732	71	26	71-133	35

Lab Batch ID: 906231

Date Analyzed: 02/04/2013

Reporting Units: mg/kg

QC- Sample ID: 456729-020 S

Date Prepared: 02/04/2013

Batch #: 1 Matrix: Soil

Analyst: KEB

Reporting Units: mg/kg												
MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY												
BTEX by EPA 8021B  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	
	Benzene	<0.00105	0.105	0.102	97	0.105	0.0895	85	13	70-130	35	
	Toluene	<0.00210	0.105	0.0958	91	0.105	0.0851	81	12	70-130	35	
	Ethylbenzene	<0.00105	0.105	0.0952	91	0.105	0.0871	83	9	71-129	35	
	m_p-Xylenes	<0.00210	0.210	0.185	88	0.211	0.164	78	12	70-135	35	
	o-Xylene	<0.00105	0.105	0.0890	85	0.105	0.0835	80	6	71-133	35	

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

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not ApplicableN = See Narrative, EQL = Estimated Quantitation Limit

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





**Project Name: Cooper Jal Unit #512**

Work Order #: 456729

Lab Batch ID: 906129

Date Analyzed: 02/04/2013

Reporting Units: mg/kg

Project ID: 0113-12

QC-Sample ID: 456729-001 S

Date Prepared: 02/04/2013

Batch #: 1 Matrix: Soil

Analyst: RKO

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY											
Reporting Units: mg/kg											
	Inorganic Anions by EPA 300/300.1										
	Analytes										
Chloride	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
	772	106	734	0	106	735	0	0	80-120	20	X

Lab Batch ID: 906129

Date Analyzed: 02/04/2013

Reporting Units: mg/kg

QC-Sample ID: 456767-001 S

Date Prepared: 02/04/2013

Batch #: 1 Matrix: Soil

Analyst: RKO

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY											
Reporting Units: mg/kg	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
Inorganic Anions by EPA 300/300.1											
Analytes											
Chloride	3.20	99.2	106	104	99.2	107	105	1	80-120	20	

Lab Batch ID: 906260

Date Analyzed: 02/05/2013

Reporting Units: mg/kg

QC-Sample ID: 456939-001 S

Date Prepared: 02/05/2013

Batch #: 1 Matrix: Soil

Analyst: RKO

Reporting Units: mg/kg											
MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY											
Inorganic Anions by EPA 300/300.1  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
Chloride	25.1	108	132	99	108	133	100	1	80-120	20	

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

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

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

Project Name: Cooper Jal Unit #512

Work Order #: 456729

Lab Batch ID: 906268

Date Analyzed: 02/04/2013

Reporting Units: mg/kg

Project ID: 0113-12

QC- Sample ID: 456729-011 S

Date Prepared: 02/04/2013

Batch #: 1 Matrix: Soil

Analyst: RKO

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY**

Inorganic Anions by EPA 300/300.1	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
Analytes											
Chloride	668	107	651	0	107	651	0	0	80-120	20	X

Lab Batch ID: 906268

Date Analyzed: 02/05/2013

Reporting Units: mg/kg

QC- Sample ID: 456755-017 S

Date Prepared: 02/05/2013

Batch #: 1 Matrix: Soil

Analyst: RKO

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY**

Inorganic Anions by EPA 300/300.1	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
Analytes											
Chloride	2870	616	2950	13	616	2950	13	0	80-120	20	X

Lab Batch ID: 906270

Date Analyzed: 02/05/2013

Reporting Units: mg/kg

QC- Sample ID: 456867-004 S

Date Prepared: 02/05/2013

Batch #: 1 Matrix: Soil

Analyst: RKO

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY**

Inorganic Anions by EPA 300/300.1	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
Analytes											
Chloride	613	617	1160	89	617	1170	90	1	80-120	20	

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

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

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



**Project Name: Cooper Jal Unit #512**

Work Order #: 456729

Lab Batch ID: 906117

Date Analyzed: 02/02/2013

Reporting Units: mg/kg

Project ID: 0113-12

QC- Sample ID: 456729-020 S

Batch #: 1 Matrix: Soil

Date Prepared: 02/01/2013

Analyst: KEB

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY												
Reporting Units: mg/kg												
TPH By SW8015B Mod		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
Analytes												
C6-C10 Gasoline Range Hydrocarbons		<15.7	1050	1010	96	1050	1020	97	1	70-135	35	
C10-C28 Diesel Range Hydrocarbons		<15.7	1050	1090	104	1050	1110	106	2	70-135	35	

Lab Batch ID: 906208

Date Analyzed: 02/05/2013

Reporting Units: mg/kg

QC- Sample ID: 456724-001 S

Batch #: 1 Matrix: Soil

Date Prepared: 02/04/2013

Analyst: KEB

Reporting Units: mg/kg												
MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY												
TPH By SW8015B Mod		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
Analytes												
C6-C10 Gasoline Range Hydrocarbons		<17.5	1160	1200	103	1160	1200	103	0	70-135	35	
C10-C28 Diesel Range Hydrocarbons		692	1160	1810	96	1160	1690	86	7	70-135	35	

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

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

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

**Project Name: Cooper Jal Unit #512**

**Work Order #: 456729**

**Lab Batch #: 906020**

**Project ID: 0113-12**

**Date Analyzed: 02/01/2013 12:30**

**Date Prepared: 02/01/2013**

**Analyst: WRU**

**QC- Sample ID: 456729-001 D**

**Batch #: 1**

**Matrix: Soil**

**Reporting Units: %**

SAMPLE / SAMPLE DUPLICATE RECOVERY					
Percent Moisture	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Percent Moisture	6.62	6.98	5	20	

**Lab Batch #: 906023**

**Date Analyzed: 02/01/2013 12:30**

**Date Prepared: 02/01/2013**

**Analyst: WRU**

**QC- Sample ID: 456729-021 D**

**Batch #: 1**

**Matrix: Soil**

**Reporting Units: %**

SAMPLE / SAMPLE DUPLICATE RECOVERY					
Percent Moisture	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Percent Moisture	10.0	10.1	1	20	

Spike Relative Difference RPD  $200 * |(B-A)/(B+A)|$   
All Results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit





☐ 4143 Greenbriar Drive, Stafford, TX 77477 281-240-4200  
☐ 5332, Blackberry Drive, San Antonio, TX 78238 210-509-3334  
☐ 9701 Harry Hines Blvd., Dallas, TX 75220 214-902-0300







# ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

☒ 12600 West I-20 East, Odessa, TX 79765 432-563-1800  
☐ 842 Cantwell, Corpus Christi, TX 78408 361-8840371

Serial #: 307937 Page 1 of 3

Company-City: Enrico Environmental Associates Phone: (713) 812-1511  
Project Name-Location: Project ID  
Cooper Tel Unit #512 - JAL NM  
Prof. State: TX, AL, FL, GA, LA, MS, NC, NM Proj. Manager (PM): 0113 -12  
NJ, PA, SC, TN, UT Other NM Aaron Edgington Fax No:  
E-mail Results to: gedning@eco-mail.com (713) 978-1419  
Invoice to: ☐ Accounting ☐ Invoice with Final Report ☐ Invoice must have a P.O.  
Bill to: Lynn Weakley (lynn@eco-mail.com)  
Quote/Pricing: P.O. No.: ☐ Call for P.O.  
Reg Program: UST DRY-CLEAN Land-Fill Waste-Disp NPDES DW TRRP  
QAPP Per-Contract CLP AGCEE NAVY DOE DOD USACE OTHER:  
Special DLs (GW DW QAPP MDLs RLs See Lab PM Included Call PM)

Sampler Name: Aaron Edgington Signature: [Signature]

Sample ID	Sampling Date	Time (MTH)	Depth (ft)	Matrix	Composite	Grab	# Containers	Container Size	Container Type	Preservatives	VCOs: Full-List	VCOs: PP 10	PAHs SIM	TX-1005 DRO	SVOCs: Full-List	OC Pesticides	Metals: RCRA-8	SPLP - TCLP	EDB / DBCP	TOTAL	Addr:	Hold Samples ( )	Sample Clean-	Addr:	
CJU #1	1/30/13	12:20PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #2	1/30/13	12:33PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #3	1/30/13	12:40PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #4	1/30/13	12:45PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #5	1/30/13	12:50PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #6	1/30/13	12:58PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #7	1/30/13	1:03PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #8	1/30/13	1:09PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #9	1/30/13	1:16PM	1' S	X	X	X	1	4	C	O	X			X							X				
CJU #10	1/30/13	1:21PM	1' S	X	X	X	1	4	C	O	X			X							X				
Relinquished by (Initials and Sign)										Date & Time		Relinquished to (Initials and Sign)		Date & Time		Total Containers per COC:		Cooler Temp:		50°C					
1) 										1/30/13 8:00 AM		2) 													
3) 												4) 													
5) 												6) 													

Preservatives: Various (V), HCl pH<2 (H), H<sub>2</sub>SO<sub>4</sub> pH<2 (S), HNO<sub>3</sub> pH<2 (N), Asbic Acid&NaOH (A), ZnAc&NaOH (Z), (Cool, <4C) (C), None (NA), See Label (L), Other (O) TCE  
Cont. Size: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (40), 1L (1), 500ml (5), Tedlar Bag (B), Various (V), Other \_\_\_\_\_ Cont. Type: Glass Amb (A), Glass Clear (C), Plastic (P), Various (V)  
Matrix: Air (A), Product (P), Solid (S), Water (W), Liquid (L)

Committed to Excellence in Service and Quality

Notice: Signature of this document and relinquishment of these samples constitutes a valid purchase order from client company to Xenco Laboratories and its affiliates, subcontractors and assigns under Xenco's standard terms and conditions of service unless previously negotiated under a fully executed client contract.









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☐ 8701 Harry Hines Blvd., Dallas, TX 75220 214-902-0300

# ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

☒ 12600 West I-20 East, Odessa, TX 79765 432-563-1800  
☐ 842 Cantwell, Corpus Christi, TX 78408 361-8940371

Serial #: 307969

Page 3 of 3

Company-City <i>Environmental Compliance Associates</i> (713) 818-1131 Project ID <i>0113-12</i>		Phone <i>713 818-1131</i>		Lab Only: <i>450729</i>							
Project Name-Location <i>Cooper Tel Unit #12 - Tel, NM</i>		Previously done at XENCO		TAT: ASAP 5h 12h 24h 48h 3d 5d 7d 10d 21d Standard TAT is project specific. It is typically 5-7 Working Days for level II and 10+ Working days for level III and IV data.							
Proj. State: TX, AL, FL, GA, LA, MS, NC, NJ, PA, SC, TN, UT, VA, WA, WI, WY		Proj. Manager (PM) <i>Aaron Edington</i>									
E-mail Results to <input type="checkbox"/> PM and <input type="checkbox"/> FAX No: <i>aed@edcomail.com</i> (713) 978-6119		Fax No: <i>(713) 978-6119</i>									
Invoice to <input type="checkbox"/> Accounting <input type="checkbox"/> Inc. Invoice with Final Report <input type="checkbox"/> Invoice must have a P.O.											
Bill to: <i>Lynn Westbury (lynna@edcomail.com)</i>											
Quote/Pricing: P.O. No: <input type="checkbox"/> Call for P.O.											
Reg Program: UST DRY-CLEAN Land-Fill Waste-Disp NPDES DW TRRP											
QAPP Per-Contract CLP AGCEE NAVY DOE DOD USAGE OTHER:											
Special DLs (GW DW QAPP MDLs RLs See Lab PM Included Call PM)											
Sampler Name <i>Aaron Edington</i> Signature <i>[Signature]</i>											
Sample ID	Sampling Date	Time (MST)	Depth (ft)	Matrix	Composite	Grab	# Containers	Container Size	Container Type	Preservatives	
1 C5U #19	1/30/13	2:27PM	1'S	S	X	1	4	C	D	X	
2											
3											
4											
5											
6											
7											
8											
9											
10											
Relinquished by (Initials and Sign)		Date & Time		Relinquished to (Initials and Sign)		Date & Time		Total Containers per COC:		Cooler Temp: 1.0 °C	
1) <i>[Signature]</i>		1/31/13 1:38:00		5) <i>[Signature]</i>		1/31/13 1:38:00		13/138:00			
2) <i>[Signature]</i>											
3) <i>[Signature]</i>											
4) <i>[Signature]</i>											
5) <i>[Signature]</i>											
Preservatives: Various (V), HCl pH<2 (H), H2SO4 pH<2 (S), HNO3 pH<2 (N), Asbc Acid&NaOH (A), ZnAc&NaOH (Z), (Cool, <4C) (C), None (NA), See Label (L), Other (O) <i>See</i> Cont. Size: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (40), 1L (1), 500ml (5), TediBag (B), Various (V), Other <i>See</i> Matrix: Air (A), Product (P), Solid (S), Water (W), Liquid (L) Notice: Signature of this document and relinquishment of these samples constitutes a valid purchase order from client company to Xenco Laboratories and its affiliates, subcontractors and assigns under Xenco's standard terms and conditions of service unless previously negotiated under a fully executed client contract. Committed to Excellence in Service and Quality www.xenco.com											





# XENCO Laboratories



## Prelogin/Nonconformance Report- Sample Log-In

Client: Environmental Compliance Associates

Date/ Time Received: 01/31/2013 08:00:00 AM

Work Order #: 456729

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)?	1
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	Yes
#5 Custody Seals intact on sample bottles?	Yes
#6 *Custody Seals Signed and dated?	Yes
#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)?	Yes
#20 VOC samples have zero headspace (less than 1/4 inch bubble)?	Yes
#21 <2 for all samples preserved with HNO3,HCL, H2SO4?	Yes
#22 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH?	Yes

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

Analyst:

PH Device/Lot#:

Checklist completed by: \_\_\_\_\_

Date: \_\_\_\_\_

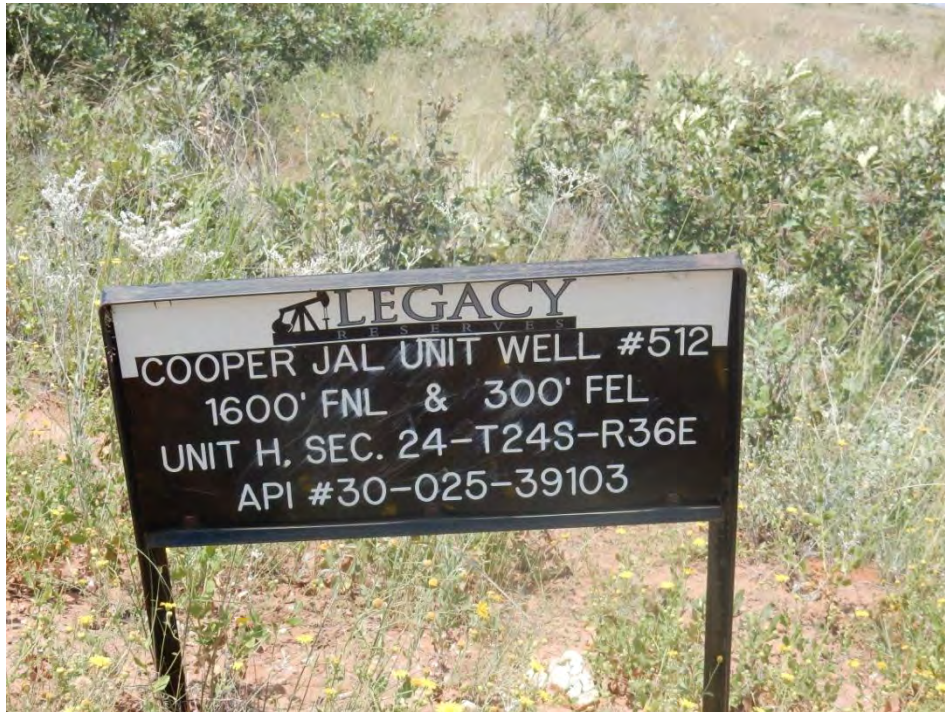
Checklist reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_



## **Appendix C**

### **Photographs**



Site Location, September 8, 2017



Site Prior to Remediation Viewing South, September 8, 2017





Site Prior to Remediation Viewing North, September 8, 2017



Site Prior to Remediation Viewing East, September 8, 2017