

# *Basin Environmental Service Technologies, LLC*

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Lovington, New Mexico 88260  
[jwlowry@basinenv.com](mailto:jwlowry@basinenv.com)  
Office: (575) 396-2378 Fax: (575) 396-1429



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Mike Bratcher  
New Mexico Energy, Minerals and Natural Resources Department  
New Mexico Oil Conservation Division (District 2)  
811 South First Street  
Artesia, New Mexico 88210

Re: Soil Closure Proposal  
Big Eddy Unit #158 Tank Battery  
Unit Letter J (NW/SE), Section 4, Township 22 South, Range 28 East  
NMOCD Ref #s (2RP-2631 & 2662)  
Eddy County, New Mexico

Mr. Bratcher:

This letter has been prepared in regard to BOPCO, L.P.'s Big Eddy Unit #158 Tank Battery (BEU #158) release site. The legal description of the release site is Unit Letter "J" (NW/SE), Section 4, Township 22 South, Range 28 East, in Eddy County, New Mexico. The property affected by the release is owned by the Bureau of Land Management (BLM). The release site GPS coordinates are 32.420070 North and 104.089737 West. A "Site Location Map" is provided as Attachment #1. "General Site Photographs" are provided as Attachment #2

An inferred depth-to-groundwater gradient map utilized by the NMOCD indicates the depth to groundwater is approximately 50-75' bgs at the release site. NMOCD guidelines indicate the BEU #158 release site has an initial ranking score of twenty (20) points. The soil remediation levels for a site with a ranking score of twenty (20) points are as follows:

- Benzene – 10 mg/Kg (ppm)
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX) – 50 mg/Kg (ppm)
- Total Petroleum Hydrocarbons (TPH) – 100 mg/Kg (ppm)

The New Mexico Administrative Code (NMAC) does not currently specify a remediation level for chloride concentrations in soil. Chloride remediation levels are set by the NMOCD on a site-specific basis.

There have been two reportable releases at the BEU #158 tank battery. The first reportable release (2RP-2631) occurred on November 24, 2014. The release was attributed to the failure of a water dump valve, which sent all of the water to the oil tank causing it to overflow. Approximately 37 bbls of produced water

and 5 bbls of crude oil were released, affecting an area measuring approximately 1,500 sq. ft. within the earthen containment. During initial response activities, all of the free-standing fluid was recovered using a vacuum truck and the dump valve was replaced. A “Site and Sample Location Map” is provided as Attachment #3.

The second reportable release (2RP-2662) occurred on December 1, 2014. The release was attributed to the failure of a water dump valve. Approximately 115 bbls of produced water and 20 bbls of crude oil were released, affecting the same 1,500 sq. ft. within the earthen containment as the previous release. During initial response activities, all of the free-standing fluid was recovered using a vacuum truck and the dump valve was replaced. With NMOCD-approval the two releases will be remediated simultaneously and closed under one cover.

On December 2, 2014, Basin set out to conduct an initial investigation at the release site. During the initial investigation, a resilient rock layer at approximately 2.5’ bgs prevented the advancement of delineation trenches. During this time it was decided an environmental drilling rig would be necessary to determine the vertical extent of soil impact.

On January 20, 2015, upon receiving BLM permission, an environmental drilling rig was used to advance an investigative soil bore (SB-1) at the location. Soil bore SB-1 was advanced in the southeast corner of the tank battery facility within the earthen containment. Soil bore SB-1 was advanced to approximately 30’ bgs. During the advancement of the soil bore, five (5) soil samples (SB-1 @ Surface, SB-1 @ 5’, SB-1 @ 10’, SB-1 @ 20’ and SB-1 @ 30’) were collected and submitted to the laboratory for analysis of TPH and chloride concentrations. Laboratory analytical results indicated TPH concentrations ranged from 19,062 ppm for soil samples SB-1 @ Surface to less than the laboratory method detection limit (MDL) for soil samples SB-1 @ 10’, SB-1 @ 20’ and SB-1 @ 30’. Chloride concentrations ranged from 432 ppm for soil sample SB-1 @ Surface to 64.0 ppm for soil sample SB-1 @ 30’. Soil samples SB-1 @ Surface, SB-1 @ 5’ and SB-1 @ 10’ were also analyzed for concentrations BTEX. Laboratory analytical results indicated BTEX concentrations ranged from 10.8 ppm for soil sample SB-1 @ 5’ to less than the appropriate laboratory MDL for soil sample SB-1 @ 10’. Based on laboratory analytical results from confirmation soil samples it was determined that soil was not impacted above regulatory standards beyond approximately 10’ bgs. A “Soil Chemistry Table” is provided as Attachment #4. “Laboratory Analytical Reports” are provided as Attachment #5.

BOPCO proposed the following remediation activities to help advance the BEU #158 release site toward and NMOCD approved closure:

- The active tank battery facility will be relocated and placed within a Falcon<sup>®</sup> Containment System that has been constructed on the eastern edge of the tank battery pad.
- Upon relocating the tank battery facility, affected soil beneath the former tank battery facility will be excavated to approximately 10’ bgs, or the maximum extent practicable.
- The excavation sidewalls will be advanced until laboratory analytical results from confirmation soil samples indicate concentrations of BTEX, TPH and chloride are below NMOCD regulatory guidelines.

- In the event soil exhibiting concentrations of BTEX, TPH or chloride above NMOCD regulatory guidelines is not able to be excavated, a 20-millimeter poly liner may be used to “cap” affected soils. This engineering control is designed to inhibit the vertical migration of contaminants left in-situ.
- Upon completion of excavation activities, the excavated area will be backfilled with non-impacted material and graded to meet the needs of the well pad.

Upon completion of the remediation activities, Basin will prepare a “Remediation Summary and Site Closure Request” detailing remediation activities and the results of confirmation soil sampling.

If you have any questions or need any additional information, please feel free to contact me by phone or email.

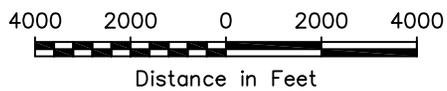
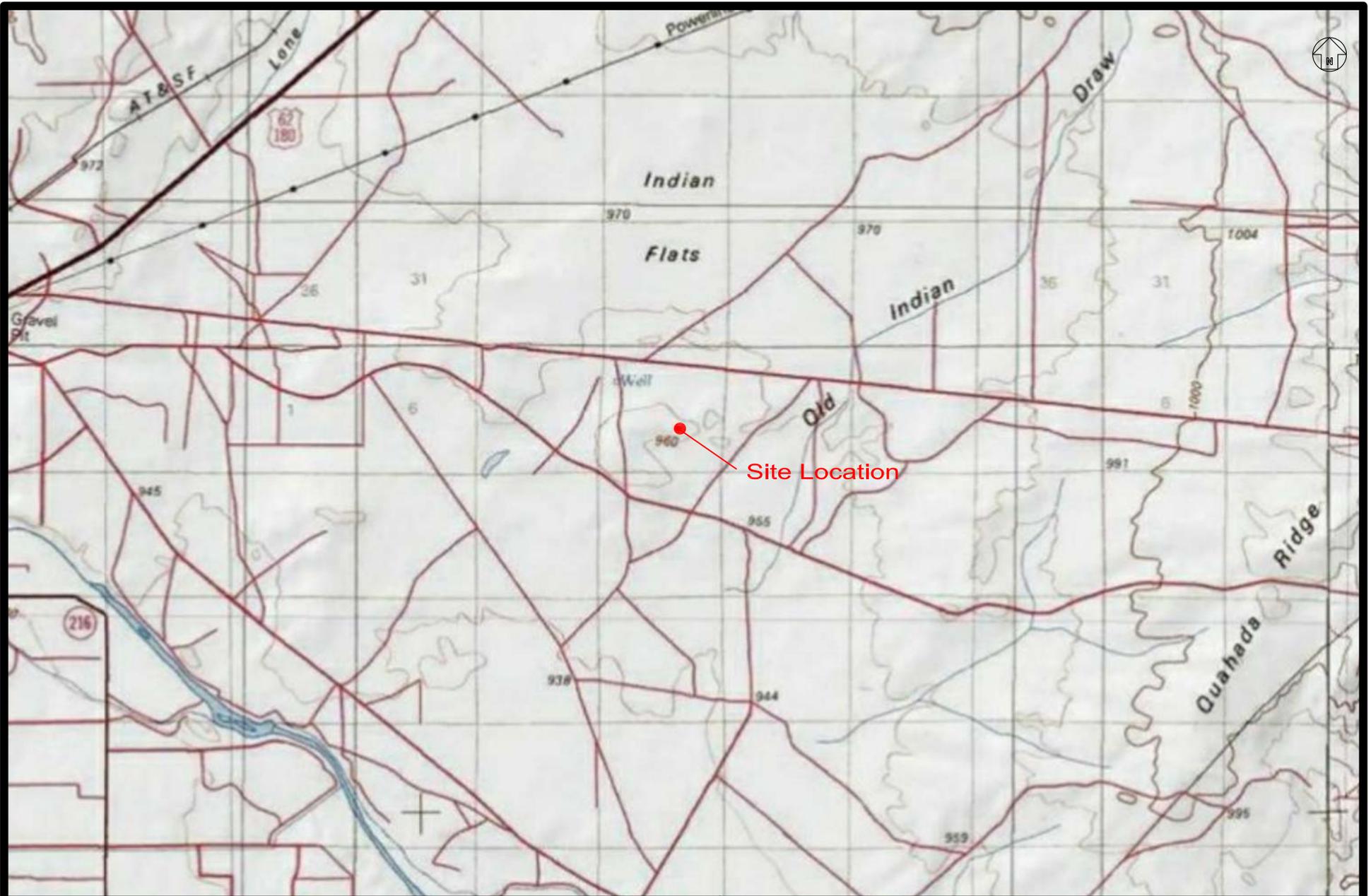
Respectfully,



Joel W. Lowry  
Basin Environmental Service Technologies, LLC

Attachments:

- Attachment #1: Site Location Map
- Attachment #2: General Site Photographs
- Attachment #3: Site and Sample Location Map
- Attachment #4: Soil Chemistry Table
- Attachment #5: Laboratory Analytical Reports



Distance in Feet

Figure 1  
 Site Location Map  
 BOPCO, LP  
 Big Eddy Unit #153 Tank Battery  
 Eddy County, New Mexico  
 NMOCD Ref #'s 2RP-2631 & 2662

## Basin Environmental Service Technologies

Prep By: JWL

Checked By: BJA

February 2, 2015

Scale 1"=4000'



Photograph of the November 24, 2014, release at the BEU #158 Tank Battery.



Photograph of the November 24, 2014, release at the BEU #158 Tank Battery.



Photograph of the December 1, 2014, release at the BEU #158 Tank Battery.



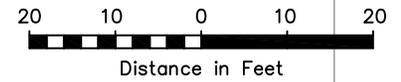
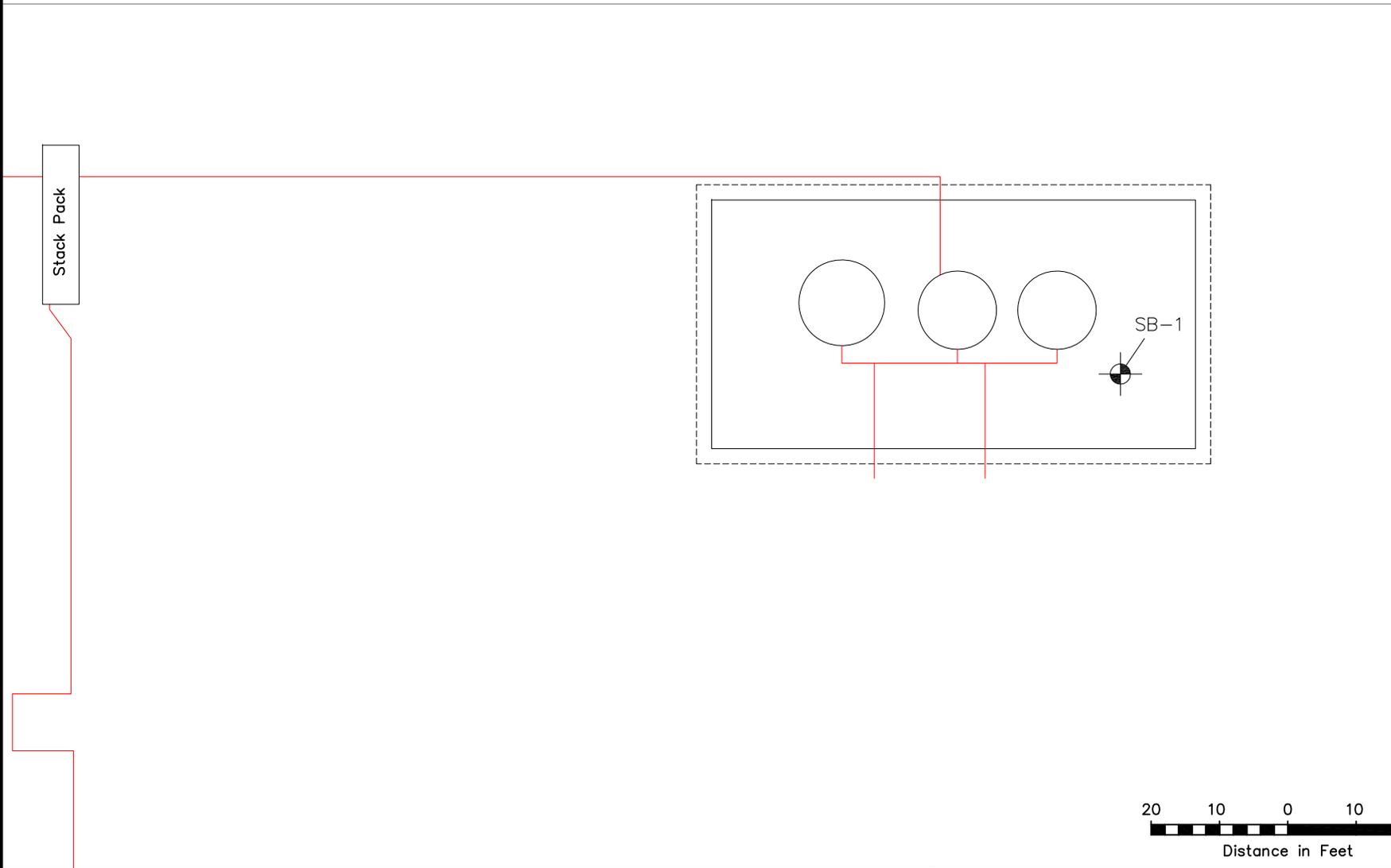
Photograph of the December 1, 2014, release at the BEU #158 Tank Battery.



Photograph of soil boring activities at the BEU #158 Tank Battery.



Photograph of the Falcon® containment system at the BEU #158 Tank Battery.



Legend:

- Fence
- Caliche Well Pad
- Pipeline
- Fire Wall
- ⊙ Soil Bore Location

Figure 2  
Site & Sample Location Map  
BOPCO, L.P.  
BEU #158 Tank Battery  
Eddy County, New Mexico  
NMOCD Ref #s 2RP-2631 & 2662

Basin Environmental Services

Prep By: JWL	Checked By: BJA
January 30, 2015	Scale 1"=20'

**TABLE 1  
CONCENTRATIONS OF BENZENE, BTEX, TPH & CHLORIDE IN SOIL**

**BOPCO, LP  
BEU #158 TANK BATTERY  
EDDY COUNTY, NEW MEXICO  
NMOCD REFERENCE #s: 2RP-2613 & 2RP-2662**

SAMPLE LOCATION	SAMPLE DEPTH (BGS)	SAMPLE DATE	SOIL STATUS	METHOD: EPA SW 846-8021B, 5030					METHOD: 8015M			TOTAL TPH C <sub>6</sub> -C <sub>35</sub> (mg/Kg)	4500 CI-B CHLORIDE (mg/Kg)
				BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL-BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)	TOTAL BTEX (mg/Kg)	GRO C <sub>6</sub> -C <sub>12</sub> (mg/Kg)	DRO C <sub>12</sub> -C <sub>28</sub> (mg/Kg)	ORO C <sub>28</sub> -C <sub>35</sub> (mg/Kg)		
SB-1 @ Surface	Surface	1/20/2015	In-Situ	<0.200	<0.200	0.258	1.01	1.27	562	18,500	<100	<b>19,062</b>	<b>432</b>
SB-1 @ 5'	5'	1/20/2015	In-Situ	<0.200	0.921	0.668	9.23	10.8	451	3,230	<10.0	<b>3,781</b>	<b>416</b>
SB-1 @ 10'	10'	1/20/2015	In-Situ	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	<10.0	<b>256</b>
SB-1 @ 20'	20'	1/20/2015	In-Situ	-	-	-	-	-	<10.0	<10.0	<10.0	<10.0	112
SB-1 @ 30'	30'	1/20/2015	In-Situ	-	-	-	-	-	<10.0	<10.0	<10.0	<10.0	64.0
<b>NMOCD Criteria</b>				<b>10</b>				<b>50</b>				<b>1,000</b>	<b>250</b>

- = Not analyzed.



January 27, 2015

JOEL LOWRY

Basin Environmental Service

P.O. Box 301

Lovington, NM 88260

RE: BEU #158

Enclosed are the results of analyses for samples received by the laboratory on 01/23/15 14:05.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene

Lab Director/Quality Manager

**Analytical Results For:**

 Basin Environmental Service  
 JOEL LOWRY  
 P.O. Box 301  
 Lovington NM, 88260  
 Fax To: (575) 396-1429

 Received: 01/23/2015  
 Reported: 01/27/2015  
 Project Name: BEU #158  
 Project Number: NONE GIVEN  
 Project Location: EDDY COUNTY, NM

 Sampling Date: 01/21/2015  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Celey D. Keene

**Sample ID: SB-1 @ SURFACE (H500230-01)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.200	0.200	01/24/2015	ND	1.73	86.3	2.00	4.78	
Toluene*	<0.200	0.200	01/24/2015	ND	1.68	83.8	2.00	5.78	
<b>Ethylbenzene*</b>	<b>0.258</b>	0.200	01/24/2015	ND	1.64	81.8	2.00	5.48	
<b>Total Xylenes*</b>	<b>1.01</b>	0.600	01/24/2015	ND	4.94	82.4	6.00	5.56	
<b>Total BTEX</b>	<b>1.27</b>	1.20	01/24/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 104 % 61-154

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>432</b>	16.0	01/26/2015	ND	400	100	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS						S-06
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10</b>	<b>562</b>	100	01/27/2015	ND	192	96.1	200	1.01		
<b>DRO &gt;C10-C28</b>	<b>18500</b>	100	01/27/2015	ND	192	96.2	200	3.37		
EXT DRO >C28-C35	<100	100	01/27/2015	ND						

Surrogate: 1-Chlorooctane 210 % 47.2-157

Surrogate: 1-Chlorooctadecane 323 % 52.1-176

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 Basin Environmental Service  
 JOEL LOWRY  
 P.O. Box 301  
 Lovington NM, 88260  
 Fax To: (575) 396-1429

 Received: 01/23/2015  
 Reported: 01/27/2015  
 Project Name: BEU #158  
 Project Number: NONE GIVEN  
 Project Location: EDDY COUNTY, NM

 Sampling Date: 01/21/2015  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Celey D. Keene

**Sample ID: SB-1 @ 5' (H500230-02)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.200	0.200	01/24/2015	ND	1.73	86.3	2.00	4.78	
<b>Toluene*</b>	<b>0.921</b>	0.200	01/24/2015	ND	1.68	83.8	2.00	5.78	
<b>Ethylbenzene*</b>	<b>0.668</b>	0.200	01/24/2015	ND	1.64	81.8	2.00	5.48	
<b>Total Xylenes*</b>	<b>9.23</b>	0.600	01/24/2015	ND	4.94	82.4	6.00	5.56	
<b>Total BTEX</b>	<b>10.8</b>	1.20	01/24/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 109 % 61-154

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>416</b>	16.0	01/26/2015	ND	400	100	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10</b>	<b>451</b>	10.0	01/26/2015	ND	192	96.1	200	1.01		
<b>DRO &gt;C10-C28</b>	<b>3230</b>	10.0	01/26/2015	ND	192	96.2	200	3.37		
EXT DRO >C28-C35	<10.0	10.0	01/26/2015	ND						

Surrogate: 1-Chlorooctane 171 % 47.2-157

Surrogate: 1-Chlorooctadecane 130 % 52.1-176

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 Basin Environmental Service  
 JOEL LOWRY  
 P.O. Box 301  
 Lovington NM, 88260  
 Fax To: (575) 396-1429

 Received: 01/23/2015  
 Reported: 01/27/2015  
 Project Name: BEU #158  
 Project Number: NONE GIVEN  
 Project Location: EDDY COUNTY, NM

 Sampling Date: 01/21/2015  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Celey D. Keene

**Sample ID: SB-1 @ 10' (H500230-03)**

BTEX 8021B		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	01/24/2015	ND	1.73	86.3	2.00	4.78		
Toluene*	<0.050	0.050	01/24/2015	ND	1.68	83.8	2.00	5.78		
Ethylbenzene*	<0.050	0.050	01/24/2015	ND	1.64	81.8	2.00	5.48		
Total Xylenes*	<0.150	0.150	01/24/2015	ND	4.94	82.4	6.00	5.56		
Total BTEX	<0.300	0.300	01/24/2015	ND						

Surrogate: 4-Bromofluorobenzene (PID) 101 % 61-154

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>Chloride</b>	<b>256</b>	16.0	01/26/2015	ND	400	100	400	3.92		

TPH 8015M		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	01/26/2015	ND	192	96.1	200	1.01		
DRO >C10-C28	<10.0	10.0	01/26/2015	ND	192	96.2	200	3.37		
EXT DRO >C28-C35	<10.0	10.0	01/26/2015	ND						

Surrogate: 1-Chlorooctane 92.2 % 47.2-157

Surrogate: 1-Chlorooctadecane 103 % 52.1-176

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 Basin Environmental Service  
 JOEL LOWRY  
 P.O. Box 301  
 Lovington NM, 88260  
 Fax To: (575) 396-1429

 Received: 01/23/2015  
 Reported: 01/27/2015  
 Project Name: BEU #158  
 Project Number: NONE GIVEN  
 Project Location: EDDY COUNTY, NM

 Sampling Date: 01/21/2015  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Celey D. Keene

**Sample ID: SB-1 @ 20' (H500230-05)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>112</b>	16.0	01/26/2015	ND	400	100	400	3.92	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	01/26/2015	ND	192	96.1	200	1.01	
DRO >C10-C28	<10.0	10.0	01/26/2015	ND	192	96.2	200	3.37	
EXT DRO >C28-C35	<10.0	10.0	01/26/2015	ND					
<i>Surrogate: 1-Chlorooctane</i>	98.2 %	47.2-157							
<i>Surrogate: 1-Chlorooctadecane</i>	117 %	52.1-176							

**Sample ID: SB-1 @ 30' (H500230-07)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>64.0</b>	16.0	01/26/2015	ND	400	100	400	3.92	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	01/26/2015	ND	192	96.1	200	1.01	
DRO >C10-C28	<10.0	10.0	01/26/2015	ND	192	96.2	200	3.37	
EXT DRO >C28-C35	<10.0	10.0	01/26/2015	ND					
<i>Surrogate: 1-Chlorooctane</i>	107 %	47.2-157							
<i>Surrogate: 1-Chlorooctadecane</i>	119 %	52.1-176							

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

- S-06 The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

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Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

