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Remediation Work Plan

Emerald PWU 20 #001H

|30-015-38338|2RP-4109|

Prepared For:

Devon Energy Production

6488 Seven Rivers Hwy

Artesia, New Mexico 88210

Prepared By:

TALON/LPE

408 W. Texas Avenue

Artesia, New Mexico 88210

March 23, 2017

Mr. Mike Shoemaker
Devon Energy Corporation
6488 Seven Rivers Hwy.
Artesia, New Mexico 88210

Subject: **Soil Assessment and Remediation Work Plan**
Emerald PWU 20 #001H
|30-015-38338| 2RP-4109|

Dear Mr. Shoemaker,

Devon Energy Corporation (Devon) has contracted Talon/LPE (Talon) to perform soil assessment and remediation services at the above referenced location. The results of our soil assessment and proposed remediation activities consist of the following.

Site Information

The Emerald PWU 20 #001H is located approximately twenty-five (25) miles southeast of Artesia, New Mexico. The legal location for this release is Unit Letter D, Section 20, Township 19 South and Range 29 East in Eddy County, New Mexico. More specifically the latitude and longitude for the release are 32.6525154 North and -104.1045456 West. A site plan is presented in [Appendix I](#).

According to the soil survey provided by the United States Department of Agriculture Natural Resources Conservation Service, the soil in this area is made up of Tonuco loamy fine sand with 0 to 3 percent slopes, eroded. Drainage courses in this area are normally dry.

Ground Water and Site Ranking

The New Mexico Office of the State Engineer (NMOSE) Water Rights Reporting System indicates that groundwater in the project vicinity is 150-feet below ground surface (BGS). See [Appendix II](#) for the referenced groundwater data.

Therefore the ranking for this site is a **0** based on the following:

Depth to ground water	>100'
Wellhead Protection Area	>1000'
Distance to surface water body	>1000'

Based upon the site ranking of **0**, NMOCD Recommended Remedial Action Levels (RRAL) are 50 mg/kg for BTEX, 10 mg/kg for Benzene, 5,000 mg/kg for TPH and the recommended guideline for Total Chlorides is 1,000 mg/kg.

Incident Description and Initial Remedial Actions

Incident Description

On January 30, 2017, a water dump failed on the 3-phase separator. This resulted in the release of approximately 38bbls of produced water and 2bbls of oil. A vacuum truck was dispatched to the site and was able to recover approximately 14bbls of produced water and 1bbls of oil.

On March 14, 2017, Talon mobilized personnel to the site to perform soil sampling within the impacted area utilizing a hand auger. The results of this soil sampling event are summarized in the table below.

Laboratory Results

See [Appendix IV](#) for complete report of laboratory results.

Sample ID	Depth (feet)	BTEX (mg/kg)	Chlorides (mg/kg)	TPH (mg/kg) GRO	TPH (mg/kg) DRO
S-1	0	2.51	18400	179	16800
S-1 Refusal	0.5	ND	544	ND	247
S-2	0	25.4	7120	828	8010
S-2	0.5	0.95	1760	18.4	248
S-2	1	ND	224	ND	70.8
S-2	2	ND	192	ND	ND
S-3	0	ND	992	ND	ND
S-3	0.5	ND	640	ND	ND
S-3	1	ND	64	ND	ND
S-3 Refusal	1.5	ND	128	ND	ND
S-4	0	ND	80	ND	ND
S-4	0.5	ND	32	ND	ND
S-4 Refusal	1	ND	16	ND	ND
S-5 Refusal	0	ND	432	ND	27.4
S-6 Refusal	0	ND	832	ND	ND
S-7 Refusal	0	ND	17400	ND	76.1

Proposed Remedial Actions


- The impacted area in the vicinity of sample location S-1 will be excavated to a depth of 0.5-feet BGS.
- The impacted area in the vicinity of sample location S-2 will be hand excavated to a depth of 1-foot BGS.
- The impacted area in the vicinity of sample location S-7 will be excavated utilizing field chloride titrations to guide the vertical extent of the excavation. Once field results indicate that the soil in this area is below RRAL's for total chlorides a confirmation soil sample will be taken and delivered to the laboratory for analysis. Should the chloride concentration at the final excavation depth be greater than 250 mg/kg a test trench will be advanced for vertical delineation purposes, per NMOCD guidelines.
- All of the excavated material will be hauled to an NMOCD approved solid waste disposal facility.
- The excavation will be backfilled with caliche and contoured to match the surrounding location.

Should you have any questions or if further information is required, please do not hesitate to contact our office at (575)-746-8768

Respectfully submitted,

TALON/LPE


Sheldon L. Hitchcock
Project Manager


David J. Adkins
District Manager

Attachments

Appendix I Site Plan
Appendix II Groundwater Data
Appendix III Initial C-141
Appendix IV Rooting Depth Data
Appendix V Laboratory Results

APPENDIX I

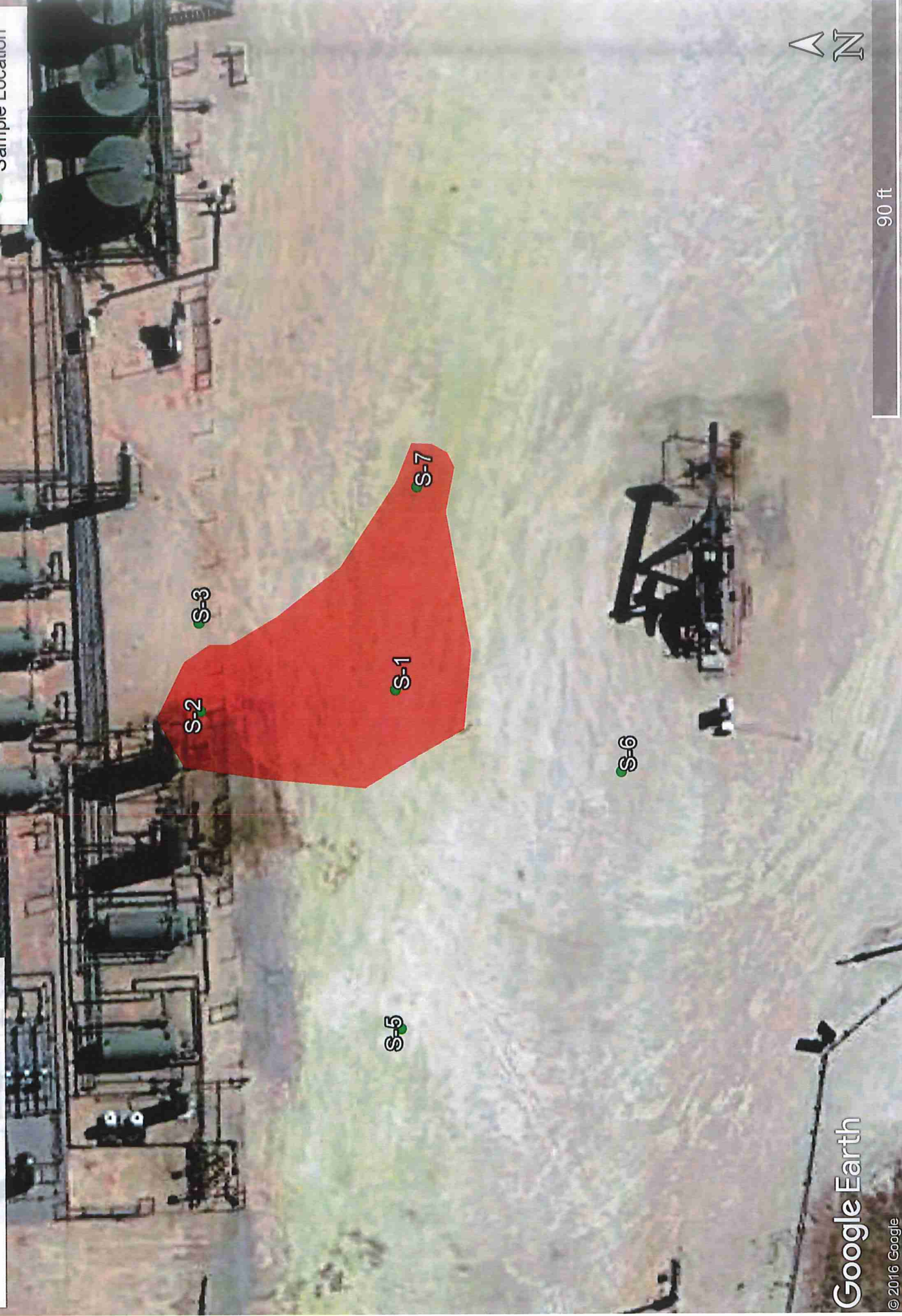
SITE PLAN

Emerald PWU 20 #1H

Devon Energy

Legend

- Impacted Area
- Sample Location



Google Earth

© 2016 Google

90 ft

APPENDIX II

GROUNDWATER DATA



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the
POD suffix indicates the
POD has been replaced
& no longer serves a
water right file.)

(R=POD has
been replaced,
O=orphaned,
C=the file is
closed)

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

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
CP 00646			ED	1	1	4	07	19S	29E	583155	3615551	2673	199	150	49

Average Depth to Water: 150 feet

Minimum Depth: 150 feet

Maximum Depth: 150 feet

Record Count: 1

UTMNAD83 Radius Search (in meters):

Easting (X): 584079

Northing (Y): 3613043

Radius: 3000

APPENDIX III

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

NM OIL CONSERVATION
ARTESIA DISTRICT

FEB 06 2017

Form C-141
Revised August 8, 2011

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

Release Notification and Corrective Action

NAB170395/412 OPERATOR ☒ Initial Report ☐ Final Report
Name of Company Devon Energy Production Company 6131 Contact Danny Velo, Production Foreman
Address 6488 Seven Rivers Hwy Artesia, NM 88210 Telephone No. 575-703-3360
Facility Name Emerald PWU 20 1H Facility Type Oil
Surface Owner State Mineral Owner State API No 30-015-38338

LOCATION OF RELEASE

Unit Letter D	Section 20	Township 19S	Range 29E	Feet from the 400	North/South Line North	Feet from the 330	East/West Line West	County Eddy
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Latitude: 32.6525154

Longitude: -104.1045456

NATURE OF RELEASE

Type of Release Produced Water & Oil	Volume of Release 38bbls produced water / 2bbls oil	Volume Recovered 14bbls produced water / 1bbl oil
Source of Release Three Phase Separator	Date and Hour of Occurrence January 30, 2017 @ 1:30 AM	Date and Hour of Discovery January 30, 2017 @ 1:30 AM
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Mike Bratcher, OCD Shelly Tucker, BLM	
By Whom? Hub Perry, Production Foreman	Date and Hour Mike Bratcher, OCD January 30, 2017 2:10 PM Shelly Tucker, BLM January 30, 2017 2:23 PM	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse N/A	

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

Describe Cause of Problem and Remedial Action Taken.*

Water dump cracked due to sand wash out on the 3-phase separator. The well was shut in at the well head to stop the release. Repairs have been made and the separator is back in service.

Describe Area Affected and Cleanup Action Taken.*

Approximately 38bbls produced water and 2bbl oil was released on location in approximately a 35' wide by 50' long area. A vacuum truck was contacted and recovered 14bbls produced water and 1bbl oil from location. Environmental agency will be contacted for remediation.

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

Signature: <u>Sheila Fisher</u>	OIL CONSERVATION DIVISION	
Printed Name: Sheila Fisher	Signed By <u>[Signature]</u> Approved by Environmental Specialist:	
Title: Field Admin Support	Approval Date: <u>2/7/17</u>	Expiration Date: <u>N/A</u>
E-mail Address: <u>Sheila.fisher@dmn.com</u>	Conditions of Approval: <u>See attached</u>	Attached <input type="checkbox"/>
Date: 2/6/16 Phone: 575.748.1829		

* Attach Additional Sheets If Necessary

22P-410

APPENDIX IV

LABORATORY RESULTS



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

March 16, 2017

KIMBERLY WILSON

TALON LPE

408 W. TEXAS AVE.

ARTESIA, NM 88210

RE: EMERALD PWU 20-1

Enclosed are the results of analyses for samples received by the laboratory on 03/15/17 10:03.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. 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.

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,

Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-1 0' (H700675-01)

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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	2.51	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTEX	2.51	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 133 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	18400	16.0	03/15/2017	ND	400	100	400	7.69	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	179	10.0	03/16/2017	ND	184	92.2	200	0.325		
DRO >C10-C28	16800	10.0	03/16/2017	ND	194	97.1	200	0.595		

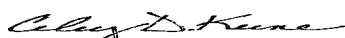
Surrogate: 1-Chlorooctane 150 % 25.1-158

Surrogate: 1-Chlorooctadecane 386 % 26.8-170

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-1 0.5' REFUSAL (H700675-02)

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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTEX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	544	16.0	03/15/2017	ND	400	100	400	7.69	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	247	10.0	03/16/2017	ND	194	97.1	200	0.595	

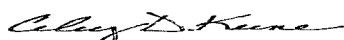
Surrogate: 1-Chlorooctane 92.5 % 25.1-158

Surrogate: 1-Chlorooctadecane 83.7 % 26.8-170

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

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KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-2 0' (H700675-03)

BTX 8021B		mg/kg	Analyzed By: MS					S-04	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	1.61	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	3.27	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	20.5	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTX	25.4	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 186 % 72-148

Chloride, SM4500Cl-B		mg/kg	Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	7120	16.0	03/15/2017	ND	400	100	400	7.69	

TPH 8015M		mg/kg	Analyzed By: MS					S-04	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	828	10.0	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	8010	10.0	03/16/2017	ND	194	97.1	200	0.595	

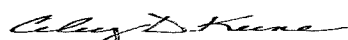
Surrogate: 1-Chlorooctane 209 % 25.1-158

Surrogate: 1-Chlorooctadecane 197 % 26.8-170

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*=Accredited Analyte

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KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-2 0.5' (H700675-04)

BTX 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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	0.091	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	0.856	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTX	0.948	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 108 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1760	16.0	03/15/2017	ND	400	100	400	7.69	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	18.4	10.0	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	248	10.0	03/16/2017	ND	194	97.1	200	0.595	

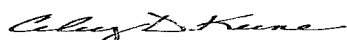
Surrogate: 1-Chlorooctane 97.6 % 25.1-158

Surrogate: 1-Chlorooctadecane 85.8 % 26.8-170

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

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KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-2 1' (H700675-05)

BTX 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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	224	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	70.8	10.0	03/16/2017	ND	194	97.1	200	0.595	

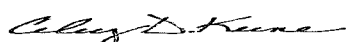
Surrogate: 1-Chlorooctane 90.3 % 25.1-158

Surrogate: 1-Chlorooctadecane 91.5 % 26.8-170

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-3 0' (H700675-06)

BTX 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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 101 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	992	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

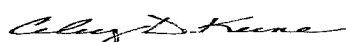
Surrogate: 1-Chlorooctane 87.1 % 25.1-158

Surrogate: 1-Chlorooctadecane 91.7 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-3 0.5' (H700675-07)

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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTEX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 102 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	640	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

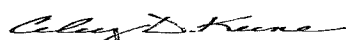
Surrogate: 1-Chlorooctane 95.5 % 25.1-158

Surrogate: 1-Chlorooctadecane 97.2 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-3 1' (H700675-08)

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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTEX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

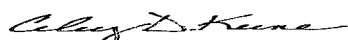
Surrogate: 1-Chlorooctane 95.4 % 25.1-158

Surrogate: 1-Chlorooctadecane 97.2 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-3 1.5' REFUSAL (H700675-09)

BTX 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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 103 % 72-148

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	128	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

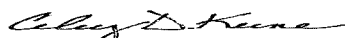
Surrogate: 1-Chlorooctane 95.2 % 25.1-158

Surrogate: 1-Chlorooctadecane 100 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 TALON LPE
 KIMBERLY WILSON
 408 W. TEXAS AVE.
 ARTESIA NM, 88210
 Fax To: (575) 745-8905

 Received: 03/15/2017
 Reported: 03/16/2017
 Project Name: EMERALD PWU 20-1
 Project Number: 700794.216.01
 Project Location: EDDY COUNTY, NM

 Sampling Date: 03/14/2017
 Sampling Type: Soil
 Sampling Condition: Cool & Intact
 Sample Received By: Celey D. Keene

Sample ID: S-4 0' (H700675-10)

BTX 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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 102 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	80.0	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

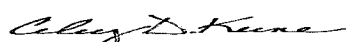
Surrogate: 1-Chlorooctane 95.1 % 25.1-158

Surrogate: 1-Chlorooctadecane 99.7 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-4 0.5' (H700675-11)

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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTEX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 102 % 72-148

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

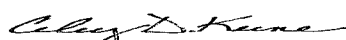
Surrogate: 1-Chlorooctane 93.3 % 25.1-158

Surrogate: 1-Chlorooctadecane 91.2 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-4 1' REFUSAL (H700675-12)

BTX 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	03/16/2017	ND	2.01	100	2.00	1.32	
Toluene*	<0.050	0.050	03/16/2017	ND	1.88	93.9	2.00	1.12	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	1.26	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.34	89.0	6.00	1.02	
Total BTX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 72-148

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

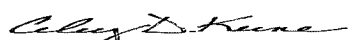
Surrogate: 1-Chlorooctane 92.2 % 25.1-158

Surrogate: 1-Chlorooctadecane 96.8 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-5 0' R (H700675-13)

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	03/16/2017	ND	2.00	99.8	2.00	0.479	
Toluene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	0.616	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.86	93.1	2.00	0.899	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.32	88.7	6.00	0.918	
Total BTEX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	432	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	27.4	10.0	03/16/2017	ND	194	97.1	200	0.595	

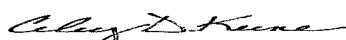
Surrogate: 1-Chlorooctane 84.9 % 25.1-158

Surrogate: 1-Chlorooctadecane 89.6 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-6 0' R (H700675-14)

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	03/16/2017	ND	2.00	99.8	2.00	0.479	
Toluene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	0.616	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.86	93.1	2.00	0.899	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.32	88.7	6.00	0.918	
Total BTEX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	832	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

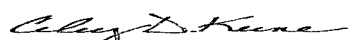
Surrogate: 1-Chlorooctane 92.8 % 25.1-158

Surrogate: 1-Chlorooctadecane 95.7 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-7 0' R (H700675-15)

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	03/16/2017	ND	2.00	99.8	2.00	0.479	
Toluene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	0.616	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.86	93.1	2.00	0.899	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.32	88.7	6.00	0.918	
Total BTEX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	17400	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	76.1	10.0	03/16/2017	ND	194	97.1	200	0.595	

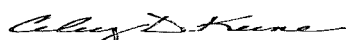
Surrogate: 1-Chlorooctane 76.3 % 25.1-158

Surrogate: 1-Chlorooctadecane 81.4 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TALON LPE
KIMBERLY WILSON
408 W. TEXAS AVE.
ARTESIA NM, 88210
Fax To: (575) 745-8905

Received: 03/15/2017
Reported: 03/16/2017
Project Name: EMERALD PWU 20-1
Project Number: 700794.216.01
Project Location: EDDY COUNTY, NM

Sampling Date: 03/14/2017
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Celey D. Keene

Sample ID: S-2 2' (H700675-16)

BTX 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	03/16/2017	ND	2.00	99.8	2.00	0.479	
Toluene*	<0.050	0.050	03/16/2017	ND	1.87	93.5	2.00	0.616	
Ethylbenzene*	<0.050	0.050	03/16/2017	ND	1.86	93.1	2.00	0.899	
Total Xylenes*	<0.150	0.150	03/16/2017	ND	5.32	88.7	6.00	0.918	
Total BTX	<0.300	0.300	03/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	03/15/2017	ND	416	104	400	0.00	

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	03/16/2017	ND	184	92.2	200	0.325	
DRO >C10-C28	<10.0	10.0	03/16/2017	ND	194	97.1	200	0.595	

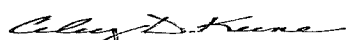
Surrogate: 1-Chlorooctane 92.9 % 25.1-158

Surrogate: 1-Chlorooctadecane 96.7 % 26.8-170

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Celey D. Keene, Lab Director/Quality Manager

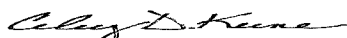
Notes and Definitions

S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
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

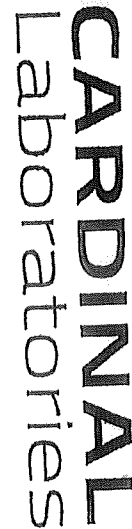
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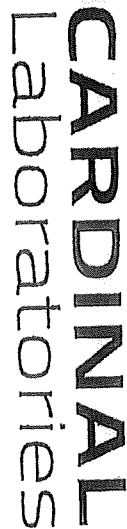
Celey D. Keene, Lab Director/Quality Manager



Page 1 of 2

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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