



January 12, 2018

#5E26442-BG5

NMOCD District II
Mike Bratcher
811 S. First St.
Artesia, NM 88210

SUBJECT: SOIL REMEDIATION WORK PLAN FOR THE LAYLA 27 SWD #1 RELEASE (2RP-4507),
EDDY COUNTY, NEW MEXICO

Dear Mr. Bratcher,

On behalf of Mewbourne Oil Company, Souder, Miller & Associates (SMA) has prepared this WORK PLAN that describes the assessment, initial delineation and proposed remediation for the release associated with the Layla 27 SWD #1. The site is in Unit H SECTION 27, TOWNSHIP 23S, RANGE 28E, NMPM, Eddy County, New Mexico, on Private land. Figure 1 illustrates the vicinity and location of the site.

Table 1, below, summarizes information regarding the release.

Table 1: Release information and Site Ranking	
Name	Layla 27 SWD #1
Company	Mewbourne Oil Company
RP Number	2RP-4507
API Number	30-015-22638
Location	32.278038, -104.0698242
Estimated Date of Release	11/25/17
Date Reported to NMOCD	11/28/17
Land Owner	Private
Reported To	Crystal Weaver
Source of Release	Equipment Failure
Released Material	Produced Water
Released Volume	160 bbls
Recovered Volume	150 bbls
Net Release	10 bbls
Nearest Waterway	3.3 Miles from Salt Lake
Depth to Groundwater	Estimated to be greater than 100'
Nearest Domestic Water Source	Greater than 1,000 feet
NMOCD Ranking	0

1.0 Background

Loss of power at the Layla 27 SWD #1 caused the injection pumps to shut down. The high tank alarm was therefore not sent, causing the tanks to overflow onto the well pad surface, lease road, and the pasture east of Chevron's tank battery. Vacuum trucks were used to recover 150 bbls of produced water. The release area is shown in Figure 2.

A former release at the site in March 2016 (2RP-3626) resulted in a poly liner installation covering most of the site (also shown in Figure 2). However, the eastern boundary of the liner is immediately east of the tank battery from which the current release occurred.

2.0 Site Ranking and Land Jurisdiction

The release site is located approximately 3.3 miles east of the Salt Lake, with an elevation of approximately 3,040 feet above sea level. According to the Corrective Action Plan for Layla 27 SWD #1 (May 18, 2016, accepted by the NMOCD on 5/24/2016), *"Mewbourne has conducted a groundwater study of the area and has determined that according to the New Mexico Office of the State Engineer the average depth to groundwater for this area is 129 foot below ground surface."* Therefore, depth to groundwater is estimated to be greater than 100 feet below ground surface (bgs).

Recommended Remediation Action Levels (RRALs) are determined by the site ranking according to the NMOCD *Guidelines for Remediation of Leaks, Spills, and Releases* (1993). Below in Table 2 are the remediation standards and the site ranking for this location. Justification for this site ranking is found in Figure 1 and Appendix B.

Table 2.

Soil Remediation Standards	0 to 9	10 to 19	>19
Benzene	10 PPM	10 PPM	10 PPM
BTEX	50 PPM	50 PPM	50 PPM
TPH	5000 PPM	1000 PPM	100 PPM

Depth to Groundwater	NMOCD Numeric Rank
< 50 BGS = 20	
50' to 99' = 10	
>100' = 0	0
Distance to Nearest Surface Water	NMOCD Numeric Rank
< 200' = 20	
200' - 1000' = 10	
>1000' = 0	0
Well Head Protection	NMOCD Numeric Rank
<1000' (or <200' domestic) = 20	
> 1000' = 0	0
Total Site Ranking	0

3.0 Release Characterization

On December 13, 2016, SMA personnel evaluated the release area. Soil samples were collected and field-screened with a mobile titration unit (EPA 4500) to characterize the extent of the release. Samples were collected from three locations using hand tools. Each soil boring was dug to 3.5 feet bgs, with a minimum of two samples collected for laboratory analysis, and field screened at least once per foot.

Sample location L1 appears to be impacted to 2 feet bgs. Sample locations L2 and L3 are impacted to greater than 3.5 feet bgs. Between L1 and L2 there is an high area where the soil had no impact from the release. The total surface impact is estimated to be 1,720 square yards.

All samples were collected and processed according to NMOCD soil sampling procedures. The samples were sent under chain-of-custody protocols to Hall Environmental Analysis Laboratory for analyses including chlorides by Method 300.0, volatile organics (BTEX) by Method 8021B, and MRO, DRO, and GRO by EPA Method 8015D. Sample locations are depicted on Figure 2. All field screening and laboratory results are summarized in Table 3. Laboratory reports are included in Appendix C.

4.0 Soil Remediation Workplan

SMA proposes excavation of affected soils. With approval from area utilities owners via 811 and NMOCD, SMA will continuously guide the excavation activities by collecting composite soil samples for field screening with a mobile titration unit (EPA 4500) and a calibrated PID. Excavation will occur to a minimum depth of four feet bgs within the pasture around the impacted area shown in Figure 2. The final depth of the excavation will be determined by the depth of chloride impact. A plastic 40 mill liner will be placed in the open excavation at the final depth, and a minimum of four sidewall samples will be collected and field screened for chloride impact.

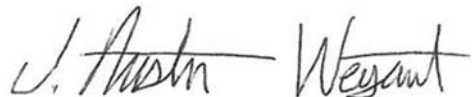
The samples will be sent under chain-of-custody protocols to Hall Environmental Analysis Laboratory for analyses including chlorides by Method 300.0, volatile organics (BTEX) by Method 8021B, and MRO, DRO, and GRO by EPA Method 8015D. Approximately 2,236 cubic yards of contaminated soil are projected to be removed and replaced with clean backfill material to return the surface to previous contours. The contaminated soil will be transported for proper disposal at Lea Land, near Carlsbad, NM, an NMOCD permitted disposal facility.

5.0 Scope and Limitations

The scope of our services consisted of the performance of assessment sampling, verification of release stabilization, regulatory liaison, and preparation of this work plan. All work has been performed in accordance with generally accepted professional environmental consulting practices for oil and gas releases in the Permian Basin in New Mexico.

If there are any questions regarding this report, please contact either Austin Weyant at 575-689-8801 or Shawna Chubbuck at 505-325-7535.

Submitted by:
SOUDER, MILLER & ASSOCIATES

A handwritten signature in black ink that reads "Austin Weyant". The signature is written in a cursive, flowing style.

Austin Weyant
Project Scientist

Reviewed by:

A handwritten signature in blue ink that reads "Shawna Chubbuck". The signature is written in a cursive, flowing style.

Shawna Chubbuck
Senior Scientist

ATTACHMENTS:

Figures:

Figure 1: Site Vicinity and NMOSE Well Location Map

Figure 2: Sample Location Map

Tables:

Table 3: Summary of Sample Results

Appendices:

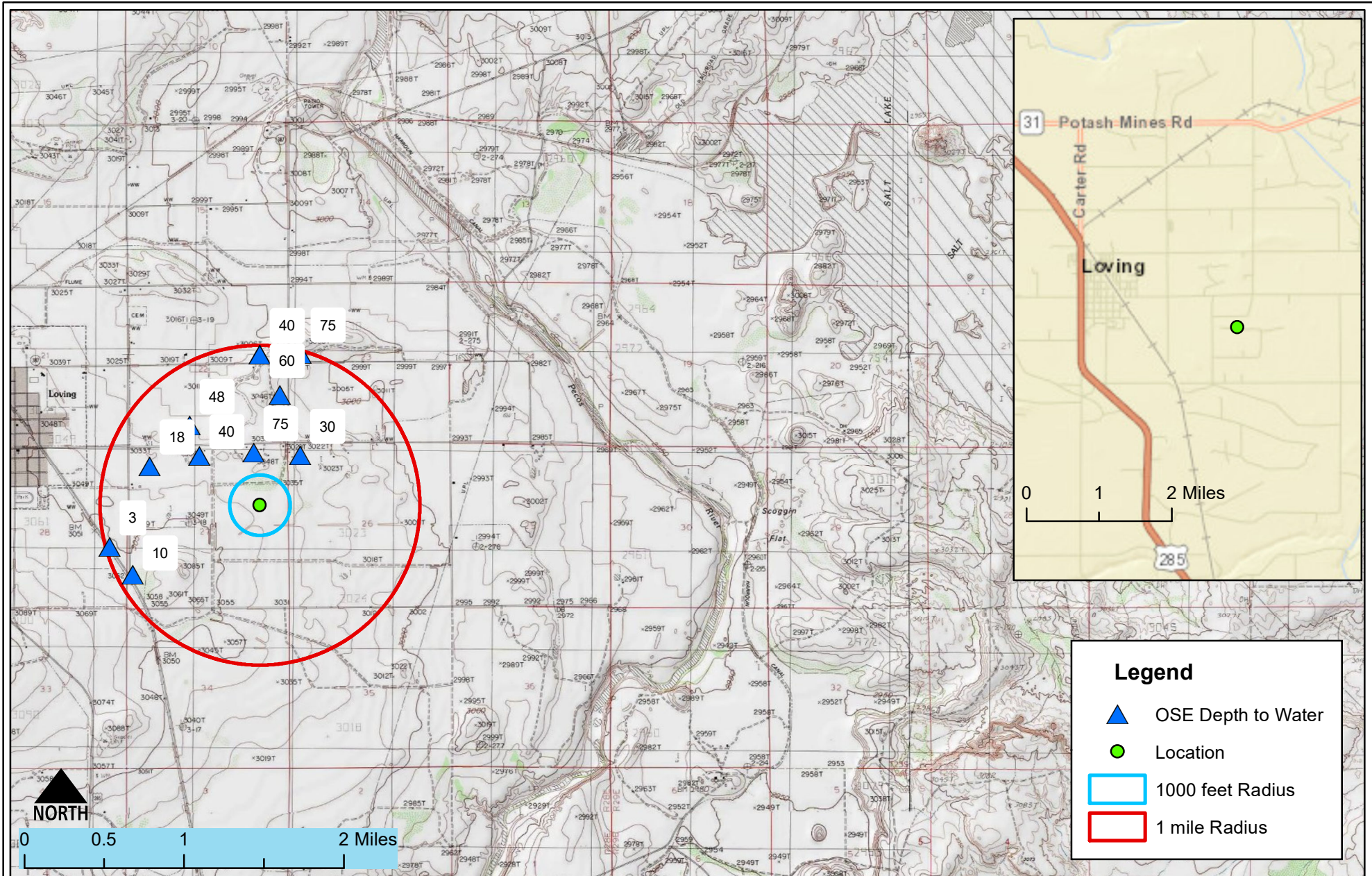
Appendix A: Form C141 Initial

Appendix B: Laboratory Analytical Reports

Appendix C: Field Notes

FIGURE 1:
SITE VICINITY AND NMOSE WELL
LOCATION MAP

Document: C:\Users\lcom\Documents\GIS DATA\MAPS\Layla figure 1.mxd



Site Vicinity and NMOSE Well Location Map
Layla 27 SWD #1 - Mewbourne Oil Company
S: H T23S R28E, Eddy County New Mexico

Figure 1

Date Saved:
12/28/2017

Revisions		
By:	Date:	Descr:
By:	Date:	Descr:

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Drawn	Lucas Middleton
Checked	
Approved	



201 South Halaguena Street
Carlsbad, New Mexico 88221
(575) 689-7040
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FIGURE 2:
SAMPLE LOCATION MAP



Sample Location Map
Layla 27 SWD #1
S:27 T23S R28E, New Mexico

Figure 2

Date Saved:
1/9/2018

Revisions		Descr:
By:	Date:	

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Drawn	<u>Lucas Middleton</u>
Checked	_____
Approved	_____



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TABE 4:
SUMMARY OF SAMPLE RESULTS

Layla SWD Sample Summary Table

Table 3

Sample Number on Figure 2	Sample Date	Depth (feet bgs)	Action Taken	BTEX ppm	Benzene mg/Kg	GRO mg/Kg	DRO mg/Kg	MRO mg/Kg	Total TPH mg/Kg	Cl- Field Screens (ppm)	Cl- Laboratory mg/Kg
R1-S	12/13/2017	surface		--	--	--	--	--	--	28000+	--
L1-S	12/13/2017	surface		--	--	--	--	--	--	19500	--
L1-1'	12/13/2017	1		--	--	--	--	--	--	1821	--
L1-2'	12/13/2017	2		--	--	--	--	--	--	3538	--
L1-3.5'	12/13/2017	3.5		--	--	--	--	--	--	522	--
L2-1'	12/13/2017	1		--	--	--	--	--	--	1186	--
L2-2'	12/13/2017	2		--	--	--	--	--	--	753	--
L2-3'	12/13/2017	3		--	--	--	--	--	--	3668	--
L2-3.5'	12/13/2017	3.5		--	--	--	--	--	--	2181	--
L3-1'	12/13/2017	1		--	--	--	--	--	--	7118	--
L3-2'	12/13/2017	2		--	--	--	--	--	--	4188	--
L3-3'	12/13/2017	3		--	--	--	--	--	--	4072	--
L3-3.5	12/13/2017	3.5		--	--	--	--	--	--	3914	--
BG1	12/14/2017	1		--	--	--	--	--	--	<30	--

exceeds RRAL's

excavated

"--" = Not Analyzed

APPENDIX A:
FORM C141 INITIAL

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

NOV 29 2017

Form C-141
Revised August 8, 2011

RECEIVED to appropriate District Office in
accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

NAME: AB1738951999 OPERATOR ☒ Initial Report ☐ Final Report

Name of Company: Mewbourne Oil Company <u>14744</u>	Contact: Zack Thomas	
Address: PO Box 5270 Hobbs NM 88241	Telephone No. 575-393-5905	
Facility Name: Layla 27 SWD #1	Facility Type: SWD	
Surface Owner: Private	Mineral Owner: Fee	API No. 30-015-22638

LOCATION OF RELEASE

Unit Letter H	Section 27	Township 23S	Range 28E	Feet from the 1980'	North/South Line North	Feet from the 990'	East/West Line East	County Eddy
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Latitude 32.278038 Longitude -104.0698242

per OCD calculation

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release: Estimated 1000 bbls <u>160 bbls</u>	Volume Recovered: PW (150 bbls)
Source of Release: Water tank	Date and Hour of Occurrence 11-25-17	Date and Hour of Discovery 11-25-17 8:00 am
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Mike Bratcher	
By Whom? Zack Thomas	Date and Hour 11-27-17 5:00 pm	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	
If a Watercourse was Impacted, Describe Fully.*		
Describe Cause of Problem and Remedial Action Taken.* Loss of power caused injection pumps to shut down. High tank alarm was not sent causing tanks to overflow.		
Describe Area Affected and Cleanup Action Taken.* Affected area- Well pad surface, lease road, and a 60'x20' area of the pasture East of Chevrons tank battery. Vacuum trucks were used to recover 150 bbls of produced water. Final remediation will be conducted in accordance with the NMOCD's Guidelines for Remediation of Spills, Leaks and Releases.		
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>Z. Thomas</u>		OIL CONSERVATION DIVISION	
Printed Name: Zack Thomas		Approved by Environmental Specialist: <u>[Signature]</u>	
Title: Environmental Rep.		Approval Date: <u>12/4/17</u>	Expiration Date: <u>NIA</u>
E-mail Address: zthomas@mewbourne.com		Conditions of Approval: <u>see attached</u>	
Date: 11-28-17		Attached: ☒ <u>2RP-4507</u>	
Phone: 575-602-2188			

Operator/Responsible Party,

The OCD has received the form C-141 you provided on **11/29/17** regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number 2RP-4507 has been assigned. **Please refer to this case number in all future correspondence.**

It is the Division's obligation under both the Oil & Gas Act and Water Quality Act to provide for the protection of public health and the environment. Our regulations (19.15.29.11 NMAC) state the following,

The responsible person shall complete division-approved corrective action for releases that endanger public health or the environment. The responsible person shall address releases in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC. [emphasis added]

Release characterization is the first phase of corrective action unless the release is ongoing or is of limited volume and all impacts can be immediately addressed. Proper and cost-effective remediation typically cannot occur without adequate characterization of the impacts of any release. Furthermore, the Division has the ability to impose reasonable conditions upon the efforts it oversees. **As such, the Division is requiring a workplan for the characterization of impacts associated with this release be submitted to the OCD District II office in Artesia on or before 12/29/17. If and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

The goals of a characterization effort are: 1) determination of the lateral and vertical extents along with the magnitude of soil contamination. 2) determine if groundwater or surface waters have been impacted. 3) If groundwater or surface waters have been impacted, what are the extents and magnitude of that impact. 4) The characterization of any other adverse impacts that may have occurred (examples: impacts on vegetation, impacts on wildlife, air quality, loss of use of property, etc.). To meet these goals as quickly as possible, the following items must, at a minimum, be addressed in the release characterization workplan and subsequent reporting:

- Horizontal delineation of soil impacts in each of the four cardinal compass directions. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C₆ thru C₃₆), and for chloride by Method 300. This is not an exclusive list of potential contaminants. Analyzed parameters should be modified based on the nature of the released substance(s). Soil sampling must be both within the impacted area and beyond.
- Vertical delineation of soil impacts. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C₆ thru C₃₆), and for chloride by Method 300. As above, this is not an exclusive list of potential contaminants and can be modified. Vertical characterization samples should be taken at depth intervals no greater than five feet apart. Lithologic description of encountered soils must also be provided. At least ten vertical feet of soils with contaminant concentrations at or below these values must be demonstrated as existing above the water table.
- Nominal detection limits for field and laboratory analyses must be provided.
- Composite sampling is not generally allowed.
- Field screening and assessment techniques are acceptable (headspace, titration, EC [include algorithm for validation purposes], EM, etc.), but the sampling and assay procedures must be clearly defined. Copies of field notes are highly desirable. A statistically significant set of split samples must be submitted for confirmatory laboratory analysis, including the laterally farthest and vertically deepest sets of soil samples. Make sure there are at least two soil samples submitted

for laboratory analysis from each borehole or test pit (highest observed contamination and deepest depth investigated). Copies of the actual laboratory results must be provided including chain of custody documentation.

- Probable depth to shallowest protectable groundwater and lateral distance to nearest surface water. If there is an estimate of groundwater depth, the information used to arrive at that estimate must be provided. If there is a reasonable assumption that the depth to protectable water is 50 feet or less, the responsible party should anticipate the need for at least one groundwater monitoring well to be installed in the area of likely maximum contamination.

- If groundwater contamination is encountered, an additional investigation workplan may be required to determine the extents of that contamination. Groundwater and/or surface water samples, if any, must be analyzed by a competent laboratory for volatile organic hydrocarbons (typically Method 8260 full list), total dissolved solids, pH, major anions and cations including chloride and sulfate, dissolved iron, and dissolved manganese. The investigation workplan must provide the groundwater sampling method(s) and sample handling protocols. To the fullest extent possible, aqueous analyses must be undertaken using nominal method detection limits. As with the soil analyses, copies of the actual laboratory results must be provided including chain of custody documentation.

- Accurately scaled and well-drafted site maps must be provided providing the location of borings, test pits, monitoring wells, potentially impacted areas, and significant surface features including roads and site infrastructure that might limit either the release characterization or remedial efforts. Field sketches may be included in subsequent reporting, but should not be considered stand-alone documentation of the site's layout. Digital photographic documentation of the location and fieldwork is recommended, especially if unusual circumstances are encountered.

Nothing herein should be interpreted to preclude emergency response actions or to imply immediate remediation by removal cannot proceed as warranted. Nonetheless, characterization of impacts and confirmation of the effectiveness of remedial efforts must still be provided to the OCD before any release incident will be closed.

Jim Griswold

OCD Environmental Bureau Chief

1220 South St. Francis Drive

Santa Fe, New Mexico 87505

505-476-3465

jim.griswold@state.nm.us

Weaver, Crystal, EMNRD

From: Weaver, Crystal, EMNRD
Sent: Wednesday, November 29, 2017 9:12 AM
To: 'Zack Thomas'; Bratcher, Mike, EMNRD
Subject: RE: Layla 27 SWD #1

Zack,

It is noted that on the Initial C-141 submitted that the total volume of the production fluids released (even though it says estimate) matches the total volume of the production fluids recovered. A circumstance where that might make sense would be something like if a spill was released into lined secondary containment that had no breaches or leaks. However, for an instance such as this where the spill made it onto the well pad, lease road and pasture, OCD finds it difficult to accept and process a C-141 that states almost total volume recovery without any saturation. Please revise the Initial C-141 with volumes that better correlate to what occurred on this incident.

Thank you,

Crystal Weaver

Environmental Specialist
OCD – Artesia District II
811 S. 1st Street
Artesia, NM 88210
Office: 575-748-1283 ext. 101
Cell: 575-840-5963
Fax: 575-748-9720

From: Zack Thomas [mailto:zthomas@mewbourne.com]
Sent: Wednesday, November 29, 2017 7:18 AM
To: Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>; Weaver, Crystal, EMNRD <Crystal.Weaver@state.nm.us>
Subject: Layla 27 SWD #1

I called the and left a messege about this release. Attached is the C141.



Zack Thomas
Environmental Rep.
Mewbourne Oil Company
PO Box 5270
Hobbs, NM 88241 US

Weaver, Crystal, EMNRD

From: Weaver, Crystal, EMNRD
Sent: Thursday, November 30, 2017 8:56 AM
To: 'Zack Thomas'
Cc: Bratcher, Mike, EMNRD
Subject: RE: pab1609148979_08_04_2016_01_21_41.pdf

Hello Zack,

No as I mentioned I took care of it. We will just use that info till the full delineation gives us any further information.

Thanks,

Crystal Weaver
Environmental Specialist
OCD – Artesia District II
811 S. 1st Street
Artesia, NM 88210
Office: 575-748-1283 ext. 101
Cell: 575-840-5963
Fax: 575-748-9720

-----Original Message-----

From: Zack Thomas [mailto:zthomas@mewbourne.com]
Sent: Thursday, November 30, 2017 8:38 AM
To: Weaver, Crystal, EMNRD <Crystal.Weaver@state.nm.us>
Cc: Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>
Subject: RE: pab1609148979_08_04_2016_01_21_41.pdf

Crystal,

Ok, so do you want me to edit the C141 and send you an updated copy?

Zack Thomas
Environmental Rep.
Mewbourne Oil Company
PO Box 5270
Hobbs, NM 88241 US

Phone: (575) 393-5905 | Fax: (575) 397-6252
(575) 602-2188
Email: zthomas@Mewbourne.com

-----Original Message-----

From: Weaver, Crystal, EMNRD [mailto:Crystal.Weaver@state.nm.us]
Sent: Wednesday, November 29, 2017 4:56 PM
To: Zack Thomas
Cc: Bratcher, Mike, EMNRD
Subject: Re: pab1609148979_08_04_2016_01_21_41.pdf

Following this form with further assessment via a proper delineation of the release will give us a better idea of impact and penetration.

Thanks in advance.

Crystal Weaver
Environmental Specialist
OCD - Artesia District 2
811 S. 1st Street
Artesia, NM 88210
Office: 575-748-1238 ext. 101
Cell: 575-840-5963
Fax: 575-748-9720

> On Nov 29, 2017, at 4:35 PM, Weaver, Crystal, EMNRD <Crystal.Weaver@state.nm.us> wrote:

>

> Zack,

>

> OCD used a spill volume estimating tool to do a calculation for saturation of soil/penetration for production fluid volume lost on this release and upon reviewing the conclusive results of the calculation OCD has decided to make a conservative change on the C-141 Initial form to release volume of 160bbbls lost and we will leave what you have written as the 150bbbls recovered. Leaving a net remaining volume for remediation of approximately 10bbbls. I haven't finished attaching the COAs to the form yet but I did still want to send you a copy of the changes I made to the form, so please see attached.

>

> Thank you,

>

>

>

> Crystal Weaver
> Environmental Specialist
> OCD – Artesia District II
> 811 S. 1st Street
> Artesia, NM 88210
> Office: 575-748-1283 ext. 101
> Cell: 575-840-5963
> Fax: 575-748-9720

>

>

>

> -----Original Message-----

> From: Zack Thomas [mailto:zthomas@mewbourne.com]
> Sent: Wednesday, November 29, 2017 1:55 PM
> To: Weaver, Crystal, EMNRD <Crystal.Weaver@state.nm.us>
> Subject: pab1609148979_08_04_2016_01_21_41.pdf
>
> Crystal,
>
> This is one of many I've submitted and got approved. The number of barrels released is just an estimate. We know that we released a little more than that but we dont know by how much.
>
> <Scanned from a Xerox Multifunction Printer.pdf>

APPENDIX B:
LABORATORY ANALYTICAL
REPORTS

January 03, 2018

AUSTIN WEYANT

SOUDER MILLER AND ASSOCIATES

201 S. HALAGUENO

CARLSBAD, NM 88220

RE: LAYLA SWD #001

Enclosed are the results of analyses for samples received by the laboratory on 12/15/17 13:45.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-10. 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/ga/lab_accred_certif.html.

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

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

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

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:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
L1 - S	H703492-01	Soil	13-Dec-17 10:29	15-Dec-17 13:45
L1 - 1	H703492-02	Soil	13-Dec-17 10:40	15-Dec-17 13:45
L1 - 2	H703492-03	Soil	13-Dec-17 10:42	15-Dec-17 13:45
L1 - 3.5	H703492-04	Soil	13-Dec-17 10:50	15-Dec-17 13:45
L2 - 1	H703492-05	Soil	13-Dec-17 11:05	15-Dec-17 13:45
L2 - 2	H703492-06	Soil	13-Dec-17 11:16	15-Dec-17 13:45
L2 - 3	H703492-07	Soil	13-Dec-17 11:23	15-Dec-17 13:45
L2 - 3.5	H703492-08	Soil	13-Dec-17 11:37	15-Dec-17 13:45
L3 - 2	H703492-09	Soil	13-Dec-17 11:50	15-Dec-17 13:45
L3 - 3.5	H703492-10	Soil	13-Dec-17 12:01	15-Dec-17 13:45

Cardinal Laboratories

*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence or any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damage including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220

Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONE

Reported:
03-Jan-18 10:44

L1 - S H703492-01 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
---------	--------	-----	-----------------	-------	----------	-------	---------	----------	--------	-------

Cardinal Laboratories

Volatile Organic Compounds by EPA Method 8021

Benzene*	<0.500	0.500	mg/kg	500	7122203	MS	23-Dec-17	8021B	
Toluene*	17.8	0.500	mg/kg	500	7122203	MS	23-Dec-17	8021B	
Ethylbenzene*	11.2	0.500	mg/kg	500	7122203	MS	23-Dec-17	8021B	
Total Xylenes*	132	1.50	mg/kg	500	7122203	MS	23-Dec-17	8021B	
Total BTEX	161	3.00	mg/kg	500	7122203	MS	23-Dec-17	8021B	
Surrogate: 4-Bromofluorobenzene (PID)		106 %		72-148	7122203	MS	23-Dec-17	8021B	

Petroleum Hydrocarbons by GC FID

S-04

GRO C6-C10*	1400	10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
DRO >C10-C28*	6660	10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
EXT DRO >C28-C36	915	10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
Surrogate: 1-Chlorooctane		202 %		28.3-164	7122004	MS	22-Dec-17	8015B	
Surrogate: 1-Chlorooctadecane		172 %		34.7-157	7122004	MS	22-Dec-17	8015B	

Green Analytical Laboratories

Soluble (DI Water Extraction)

Chloride	21100	1000	mg/kg wet	1000	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44**L1 - 1****H703492-02 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Green Analytical Laboratories**Soluble (DI Water Extraction)**

Chloride	1920		100	mg/kg wet	100	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44**L1 - 2**
H703492-03 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Green Analytical Laboratories**Soluble (DI Water Extraction)**

Chloride	1430		100	mg/kg wet	100	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220

Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONE

Reported:
03-Jan-18 10:44

L1 - 3.5 H703492-04 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Cardinal Laboratories

Volatile Organic Compounds by EPA Method 8021

Benzene*	<0.050		0.050	mg/kg	50	7122203	MS	23-Dec-17	8021B	
Toluene*	0.059		0.050	mg/kg	50	7122203	MS	23-Dec-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7122203	MS	23-Dec-17	8021B	
Total Xylenes*	1.11		0.150	mg/kg	50	7122203	MS	23-Dec-17	8021B	
Total BTEX	1.17		0.300	mg/kg	50	7122203	MS	23-Dec-17	8021B	
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			<i>114 %</i>	<i>72-148</i>		<i>7122203</i>	<i>MS</i>	<i>23-Dec-17</i>	<i>8021B</i>	

Petroleum Hydrocarbons by GC FID

GRO C6-C10*	13.5		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
DRO >C10-C28*	121		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
EXT DRO >C28-C36	39.4		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
<i>Surrogate: 1-Chlorooctane</i>			<i>80.4 %</i>	<i>28.3-164</i>		<i>7122004</i>	<i>MS</i>	<i>22-Dec-17</i>	<i>8015B</i>	
<i>Surrogate: 1-Chlorooctadecane</i>			<i>85.7 %</i>	<i>34.7-157</i>		<i>7122004</i>	<i>MS</i>	<i>22-Dec-17</i>	<i>8015B</i>	

Green Analytical Laboratories

Soluble (DI Water Extraction)

Chloride	325		10.0	mg/kg wet	10	B712181	JDA	29-Dec-17	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44**L2 - 1**
H703492-05 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Cardinal Laboratories**Petroleum Hydrocarbons by GC FID****S-04**

GRO C6-C10*	4230		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
DRO >C10-C28*	16100		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
EXT DRO >C28-C36	2080		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
<i>Surrogate: 1-Chlorooctane</i>			429 %	28.3-164		7122004	MS	22-Dec-17	8015B	
<i>Surrogate: 1-Chlorooctadecane</i>			286 %	34.7-157		7122004	MS	22-Dec-17	8015B	

Green Analytical Laboratories**Soluble (DI Water Extraction)**

Chloride	2540		100	mg/kg wet	100	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44**L2 - 2**
H703492-06 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Green Analytical Laboratories**Soluble (DI Water Extraction)**

Chloride	1390		100	mg/kg wet	100	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44**L2 - 3**
H703492-07 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Green Analytical Laboratories**Soluble (DI Water Extraction)**

Chloride	3620		250	mg/kg wet	250	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44**L2 - 3.5**
H703492-08 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Green Analytical Laboratories**Soluble (DI Water Extraction)**

Chloride	4310		250	mg/kg wet	250	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONEReported:
03-Jan-18 10:44**L3 - 2****H703492-09 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Green Analytical Laboratories**Soluble (DI Water Extraction)**

Chloride	5170		250	mg/kg wet	250	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220

Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONE

Reported:
03-Jan-18 10:44

L3 - 3.5 H703492-10 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Cardinal Laboratories

Petroleum Hydrocarbons by GC FID

GRO C6-C10*	<10.0		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
DRO >C10-C28*	57.9		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
EXT DRO >C28-C36	50.2		10.0	mg/kg	1	7122004	MS	22-Dec-17	8015B	
Surrogate: 1-Chlorooctane			88.5 %	28.3-164		7122004	MS	22-Dec-17	8015B	
Surrogate: 1-Chlorooctadecane			92.3 %	34.7-157		7122004	MS	22-Dec-17	8015B	

Green Analytical Laboratories

Soluble (DI Water Extraction)

Chloride	5950		250	mg/kg wet	250	B712181	JDA	02-Jan-18	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220

Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONE

Reported:
03-Jan-18 10:44

Volatile Organic Compounds by EPA Method 8021 - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7122203 - Volatiles										
Blank (7122203-BLK1)										
Prepared: 22-Dec-17 Analyzed: 23-Dec-17										
Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
Surrogate: 4-Bromofluorobenzene (PID)	0.0939		mg/kg	0.100		93.9	72-148			
LCS (7122203-BS1)										
Prepared: 22-Dec-17 Analyzed: 23-Dec-17										
Benzene	1.79	0.050	mg/kg	2.00		89.3	79.5-124			
Toluene	1.83	0.050	mg/kg	2.00		91.4	75.5-127			
Ethylbenzene	1.89	0.050	mg/kg	2.00		94.6	77.7-125			
Total Xylenes	5.85	0.150	mg/kg	6.00		97.6	70.9-124			
Surrogate: 4-Bromofluorobenzene (PID)	0.0930		mg/kg	0.100		93.0	72-148			
LCS Dup (7122203-BSD1)										
Prepared: 22-Dec-17 Analyzed: 23-Dec-17										
Benzene	1.78	0.050	mg/kg	2.00		88.9	79.5-124	0.496	6.5	
Toluene	1.81	0.050	mg/kg	2.00		90.4	75.5-127	1.05	7.02	
Ethylbenzene	1.88	0.050	mg/kg	2.00		94.2	77.7-125	0.339	7.83	
Total Xylenes	5.79	0.150	mg/kg	6.00		96.6	70.9-124	1.05	7.78	
Surrogate: 4-Bromofluorobenzene (PID)	0.0911		mg/kg	0.100		91.1	72-148			

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

SOUDER MILLER AND ASSOCIATES
201 S. HALAGUENO
CARLSBAD NM, 88220

Project: LAYLA SWD #001
Project Number: NONE GIVEN
Project Manager: AUSTIN WEYANT
Fax To: NONE

Reported:
03-Jan-18 10:44

Petroleum Hydrocarbons by GC FID - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 7122004 - General Prep - Organics

Blank (7122004-BLK1)

Prepared: 20-Dec-17 Analyzed: 22-Dec-17

GRO C6-C10	ND	10.0	mg/kg							
DRO >C10-C28	ND	10.0	mg/kg							
EXT DRO >C28-C35	ND	10.0	mg/kg							
EXT DRO >C28-C36	ND	10.0	mg/kg							
Total TPH C6-C28	ND	10.0	mg/kg							
Surrogate: 1-Chlorooctane	46.7		mg/kg	50.0		93.3	28.3-164			
Surrogate: 1-Chlorooctadecane	49.7		mg/kg	50.0		99.5	34.7-157			

LCS (7122004-BS1)

Prepared: 20-Dec-17 Analyzed: 22-Dec-17

GRO C6-C10	193	10.0	mg/kg	200		96.7	76.6-119			
DRO >C10-C28	184	10.0	mg/kg	200		92.1	81.4-124			
Total TPH C6-C28	378	10.0	mg/kg	400		94.4	79.4-121			
Surrogate: 1-Chlorooctane	45.8		mg/kg	50.0		91.6	28.3-164			
Surrogate: 1-Chlorooctadecane	48.9		mg/kg	50.0		97.8	34.7-157			

LCS Dup (7122004-BSD1)

Prepared: 20-Dec-17 Analyzed: 22-Dec-17

GRO C6-C10	196	10.0	mg/kg	200		97.8	76.6-119	1.03	7.94	
DRO >C10-C28	193	10.0	mg/kg	200		96.4	81.4-124	4.58	9.83	
Total TPH C6-C28	388	10.0	mg/kg	400		97.1	79.4-121	2.78	8.57	
Surrogate: 1-Chlorooctane	46.3		mg/kg	50.0		92.7	28.3-164			
Surrogate: 1-Chlorooctadecane	49.5		mg/kg	50.0		99.1	34.7-157			

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 SOUDER MILLER AND ASSOCIATES
 201 S. HALAGUENO
 CARLSBAD NM, 88220

 Project: LAYLA SWD #001
 Project Number: NONE GIVEN
 Project Manager: AUSTIN WEYANT
 Fax To: NONE

 Reported:
 03-Jan-18 10:44

Soluble (DI Water Extraction) - Quality Control
Green Analytical Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B712181 - General Prep - Wet Chem										
Blank (B712181-BLK1)				Prepared: 21-Dec-17 Analyzed: 29-Dec-18						
Chloride	ND	10.0	mg/kg wet							
LCS (B712181-BS1)				Prepared: 21-Dec-17 Analyzed: 29-Dec-17						
Chloride	252	10.0	mg/kg wet	250		101	85-115			
LCS Dup (B712181-BSD1)				Prepared: 21-Dec-17 Analyzed: 29-Dec-17						
Chloride	252	10.0	mg/kg wet	250		101	85-115	0.191	20	

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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.
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



101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: Souder Miller & Assoc. Project Manager: Austin Weyant Address: 201 S. Hargrave City: Carlsbad, NM State: TX Zip: 88220 Phone #: 575 991 9295 Fax #: Project #: Project Name: Layla SWD #001 Project Location: Sampler Name: MRS/LCM		BILL TO P.O. #: 5270 Company: Newbourne Attn: Zalk Thomas Address: PO Box 5270 City: Hobbs State: NM Zip: 88241 Phone #: (575) 398-5905 Fax #: 575-397-0252		ANALYSIS REQUEST															
FOR LAB USE ONLY Lab I.D. H703492		Sample I.D.		MATRIX (GIRAB OR (COMP. # CONTAINERS GROUNDWATER WASTEWATER SOIL OIL SLUDGE OTHER:		PRESERV ACID/BASE: ICE/COOL OTHER:		SAMPLING DATE TIME		EPA 300.0 (Chloride) EPA SW 846-3021B (BTEX) EPA SW 8015M (TPH)									
1		L1-5						12/13/17 10:29		X X X									
2		L1-1						10:40		X									
3		L1-2						10:42		X									
4		L1-3.5						10:50		X X									
5		L2-1						11:05		X X									
6		L2-2						11:16		X									
7		L2-3						11:23		X									
8		L2-3.5						11:37		X									
9		L3-2						11:50		X									
10		L3-3.5						12:01		X									

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Relinquished By: M. Panjani Date: 12/15/17 Time: 10:30	Received By: Janora Eldabey Date: 12/15/17 Time: 1:45	Phone Result: ☐ Yes ☐ No Add'l Phone #: Fax Result: ☐ Yes ☐ No Add'l Fax #: REMARKS: please email results to lucas.middleton@soudermiller.com
Delivered By: (Circle One) 14.78 Sampler - UPS - Bus - Other: Corrected 14.95	Sample Condition Cool Intact ☐ Yes ☒ No	CHECKED BY: (Initials) TP. #75

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

APPENDIX C: FIELD NOTES

~~ECO~~ Mewbourne
Layla SWD

Met Zach onsite @ 9:30

mapped spill

lined vs. unlined

~~grab~~ collected samples: goes into pasture staining, arid soil patches. island of unflooded soil.

* send lab to Cardina / edited bill Zach
* call about carrier

time	sample	screen
10:25	L1-Surface	13.7
10:35	R1-Surface	2.2 → rowant dig any more pad
10:40	L1-1'	1.45
10:42	L1-2'	2.64
10:50	L1-3.5'	0.55

11:05 - L2-1' - 1.01

11:10 - L2-2' - ~~0.14~~ 0.71

11:27 L2-3' - 2.73 - clay/sandy

11:37 - L2-3.5' - 1.7

11:40 - L3-1' - 5.12

11:50 - L3-2' - 3.09

11:50 - L3-3' - 3.01 - clay soapy

12:01 - L3-3.5' - 2.90

12:05 BG1-1' - 0.15