Bratcher, Mike, EMNRD

From: Jerry Sherrell <jerrys@mec.com>
Sent: Monday, December 5, 2016 10:50 AM
To: Bratcher, Mike, EMNRD
Subject: FW: Map
Attachments: SPILL_OVERVIEW.jpg

From: Davis, Harley [mailto:hcdavis@blm.gov]
Sent: Monday, December 05, 2016 9:58 AM
To: Jerry Sherrell
Cc: Matt Buckles; Rick Flores; Mayer, Forrest; Albert Collar
Subject: Re: Map

attached is a overview of the spill area. The salt water extends further East than the map shows.

On Mon, Dec 5, 2016 at 8:06 AM, Jerry Sherrell <jerrys@mec.com> wrote:

Good Morning Harley,

Could we possibly get a digital copy of the map you had showing the leak, please. I was hoping you could email me a copy.

Jerry W. Sherrell

Mack Energy Corporation

PO Box 960

Artesia, NM 88210

Office 575-748-1288

Cell 575-703-7382

jerrys@mec.com

--

Harley C. Davis
USDOI/BLM
N.R.S./E.P.S.
Pecos District
Roswell Field Office
575-627-0247

From: Matt Buckles
To: Weaver, Crystal, EMNRD; Bratcher, Mike, EMNRD; Davis, Harley (hcdavis@blm.gov) (hcdavis@blm.gov); Jimgriswold@state.nm.us
Cc: Lee Livingston; Jerry Sherrell
Subject: Calgary Release
Date: Friday, May 12, 2017 4:12:57 PM

Just wanted to update everyone on the Calgary work plan. We were able to successfully drill a sample hole at the Calgary Release and the samples have been sent off to Cardinal labs in Hobbs. We should have the results back by the middle of the week and will include the sample data in the work plan and have it ready to submit shortly. Let me know if you have any questions or concerns.

Thanks,

Matt Buckles
Mack Energy Corporation
11344 Lovington Highway
Artesia NM 88210
575-748-1288 Office
575-703-1958 Mobile
575-746-5508 Fax
Email:mattbuckles@mec.com
http://www.mec.com

From: Matt Buckles
To: Weaver, Crystal, EMNRD; Bratcher, Mike, EMNRD; Billings, Bradford, EMNRD; Davis, Harley (hcdavis@blm.gov) (hcdavis@blm.gov); Lee Livingston; Jerry Sherrell; Flores, Rick; Griswold, Jim, EMNRD
Cc: K.freeman@aspengrow.us
Subject: Calgary Release- Mack Energy
Date: Friday, May 26, 2017 11:08:55 AM
Attachments: Calagry Release Work Plan.pdf

Hello,

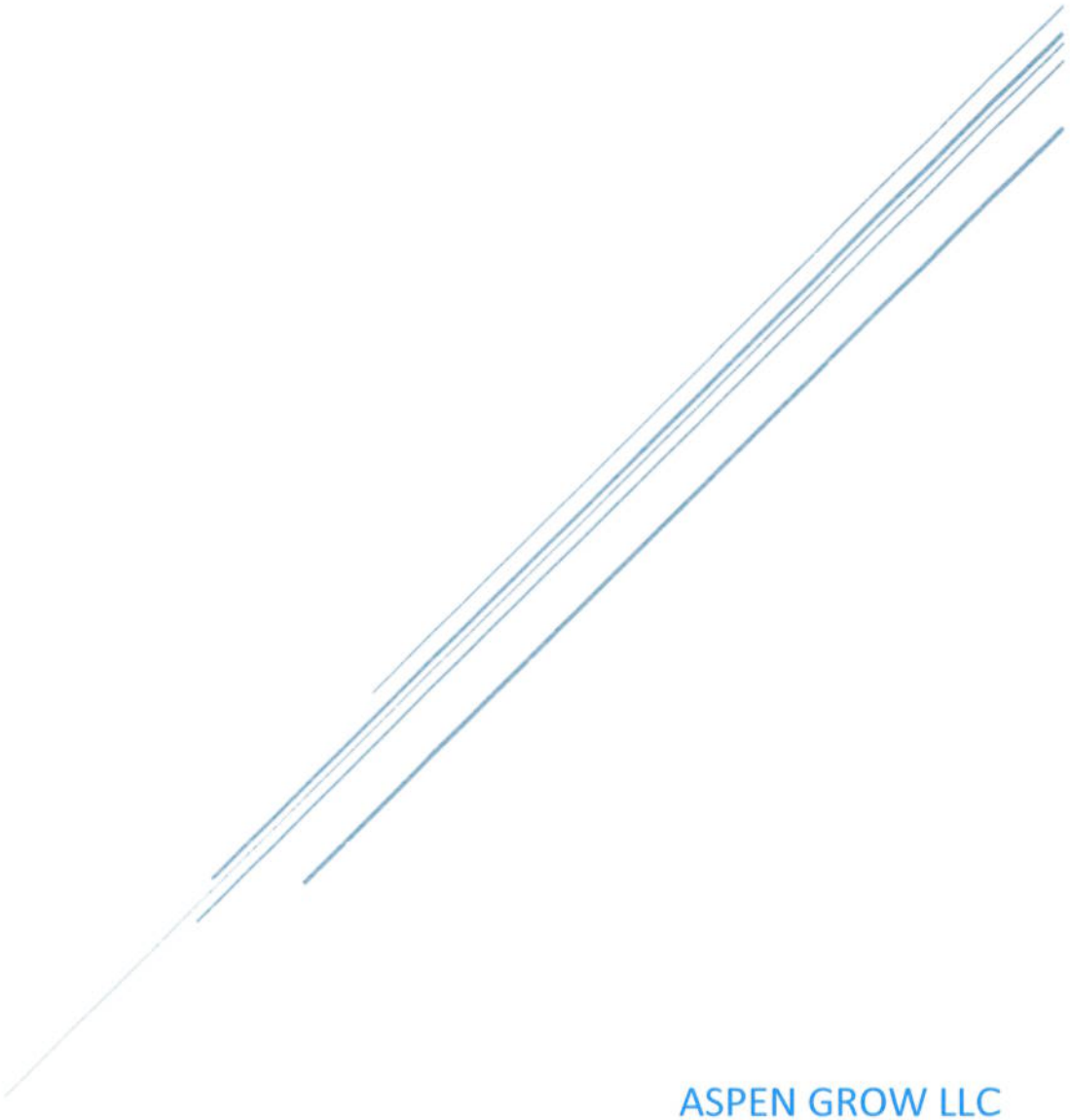
Attached is an updated work plan on the Calgary Release. Please contact me if you have any questions or concerns.

Have a good weekend,

Matt Buckles
Mack Energy Corporation
11344 Lovington Highway
Artesia NM 88210
575-748-1288 Office
575-703-1958 Mobile
575-746-5508 Fax
Email:mattbuckles@mec.com
http://www.mec.com

MACK ENERGY CORPORATION

Calgary Federal #2 Spill Report



ASPEN GROW LLC
REMEDEATION PLAN

TABLE OF CONTENTS

1.0 Introduction

Aspen Grow, LLC, an environmental remediation company, is pleased to submit this Site Remediation Report to Mack Energy Corporation. The location of the leak occurred in Section 25, Township 15S, Range 28E, Chaves County, New Mexico (see Figures 1 & 2). Directions to the site from Loco Hills, New Mexico are as follows: Travel north on Hagerman Cutoff Road for approximately 10.34 miles. Turn west on Pipeline Road and travel 5.6 miles to the Calgary Federal Pad. The GPS coordinates recorded at the site are 32.996844 and -104.079847*.

1.1 Purpose of Remediation Plan

The purpose of this Remediation Plan is to document the remediation activities including the supporting analytical data completed thus far, and to outline the technology and procedures proposed to be employed by Aspen Grow, LLC to remediate the referenced site. This Remediation Plan will be submitted to the Oil Conservation Division (OCD) of the State of New Mexico and the Bureau of Land Management (BLM) for their comments.

1.2 Project Overview

On November 26, 2016, a steel flowline developed a leak in the pasture near the Calgary Federal #2 Well. The site consists of several flowlines carrying crude oil and produced water to a nearby tank battery. The accidently leaked fluid (crude oil and produced water) impacted an area under and around the flowlines to the West and Southeast of the leak site. A total of approximately 160 bbl. of fluids (40 bbl. of oil and 120 bbl. of produced water) were estimated to have leaked. The estimated total size of the area impacted by the leaking fluid was approximately 20,000 square feet.

To the West of the flowlines, the leaking fluid flowed about 450 feet down drainage. The majority of the flows to the West were confined to a narrow path about three feet in width. Artificial barriers were placed intermittently along the flow path to the West to restrict further migration of the contamination from possible storm water runoff.

To the East, the leak flowed onto a semi-flat area towards the tank battery. The size of the area impacted to the East of the flowlines was approximately 200 feet long by 65 feet wide.

The top 3.5 feet of contaminated soil from an area of about 150 feet by 60 feet on the Southeast side of the flowlines was excavated and transported to an approved off-site disposal facility. The soil in the entire area impacted by the leak was sampled and analyzed for Total Petroleum Hydrocarbons (TPH) and chlorides. The results of the soil analysis conducted by Permian Basin Environmental Lab indicated elevated levels of TPH and chlorides throughout the site. Further excavation of the site was discontinued after encountering a layer of caliche.

Aspen Grow, LLC re-tested the soils for the entire site to determine the levels of TPH and chlorides. Vertical and horizontal delineation soil samples were collected inside and outside the

impacted area to characterize the area and to delineate the background levels of chlorides and TPH in adjacent native soils. Elevated levels of TPH and BTEX were detected at the following locations: SP2, SP3, SP4, SP5, SP6, SP7 and SP10. Elevated levels of chlorides were detected at the following locations: SP3, SP2, SP16, SP4, SP5, SP6-down to 4 feet, SP7, SP9, SP10, SP11 and SP14. Sampling was also completed via coring rig on SP21 (site of release) which showed the release is below the recommended chloride level at 5 feet and is clean at 10 feet and 15 feet. (see Table 1 – Analytical Results).

1.3 Proposed Remediation

Aspen Grow's approach to remediating and restoring soils contaminated with TPH and chlorides is biologically based. Aspen Grow has developed a proprietary line of liquid probiotic soil products with chelating, carbon and nutrient complexing capabilities. The products are formulated utilizing a combination of essential organic acids, enzymes, naturally occurring microbial cultures, elemental minerals and bio-stimulants that have demonstrated their ability to balance and restore the natural ecosystem of the soil. By balancing and restoring the natural ecosystem of the soil, toxins and salts are easily broken down and consumed by soil bacterium or leached below the root zone in the soil with the addition of water. Detoxifying and restoring the natural balance of the soil also produces a soil ecosystem that is conducive for revegetating and restoring the native plant populations.

Aspen Grow, LLC proposes to apply our proprietary probiotic product with fresh water to the contaminated site at the rate of 13 ounces per 1,000 square feet. The application of water and product will be applied with a sprinkler type system to control the application rate, minimize the potential for runoff and enhance the percolation of water and product into the soil for maximum effectiveness. Controlling the application rate will also minimize the potential for surface erosion to occur.

Remediation of this site is expected to take up to ten (10) weeks. The combination of water and product will be applied weekly over the entire site. Aspen Grow, LLC will collect soil samples and have them analyzed after the tenth week to determine the levels of TPH and chlorides in the soil. It is our understanding the current regulatory compliance levels for TPH and chlorides are less than 5,000 mg/kg and less than 600 mg/kg respectively. If after ten (10) weeks of treatment the level of TPH and/or chlorides in any soil samples taken exceed the regulatory compliance limits, Aspen Grow, LLC will continue to treat the affected area until the levels are within the regulatory compliance limits from Surface to 4 feet ground depth per OCD specifications. Upon release of this spill site by the OCD and BLM, Mack Oil Corporation will back fill the area that was removed with clean uncontaminated soil with similar characteristics and re-seed with native grasses.

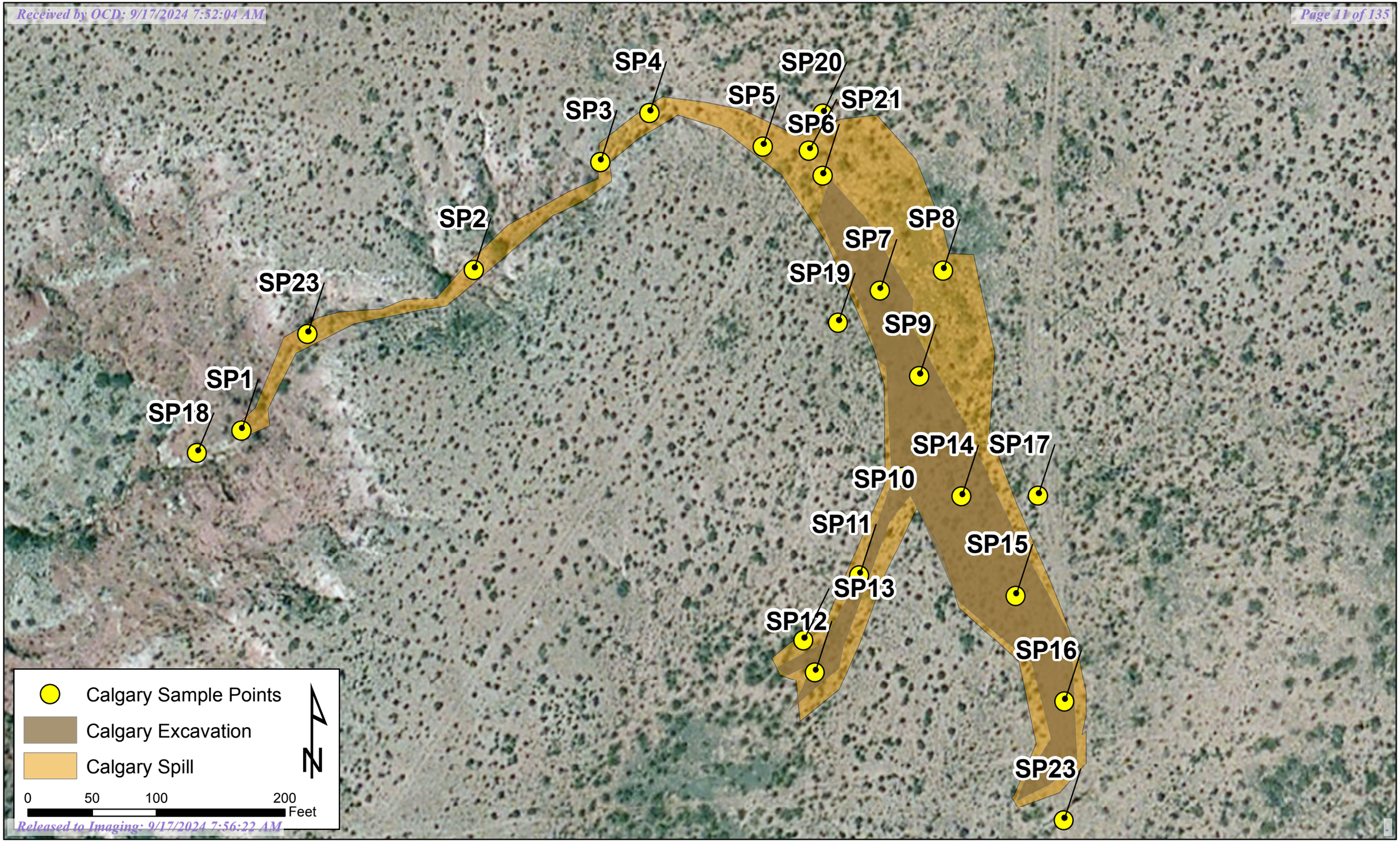
Aspen Grow's proprietary products do contain trace amounts of nitrate and sulfate, which are essential nutrients for the naturally occurring bacterium in the soils and aid in the breakdown of TPH. The rate at which they are applied is well below New Mexico's Water Quality Standards 206.6.6.2.3103 listed in subsection A, B, and C.

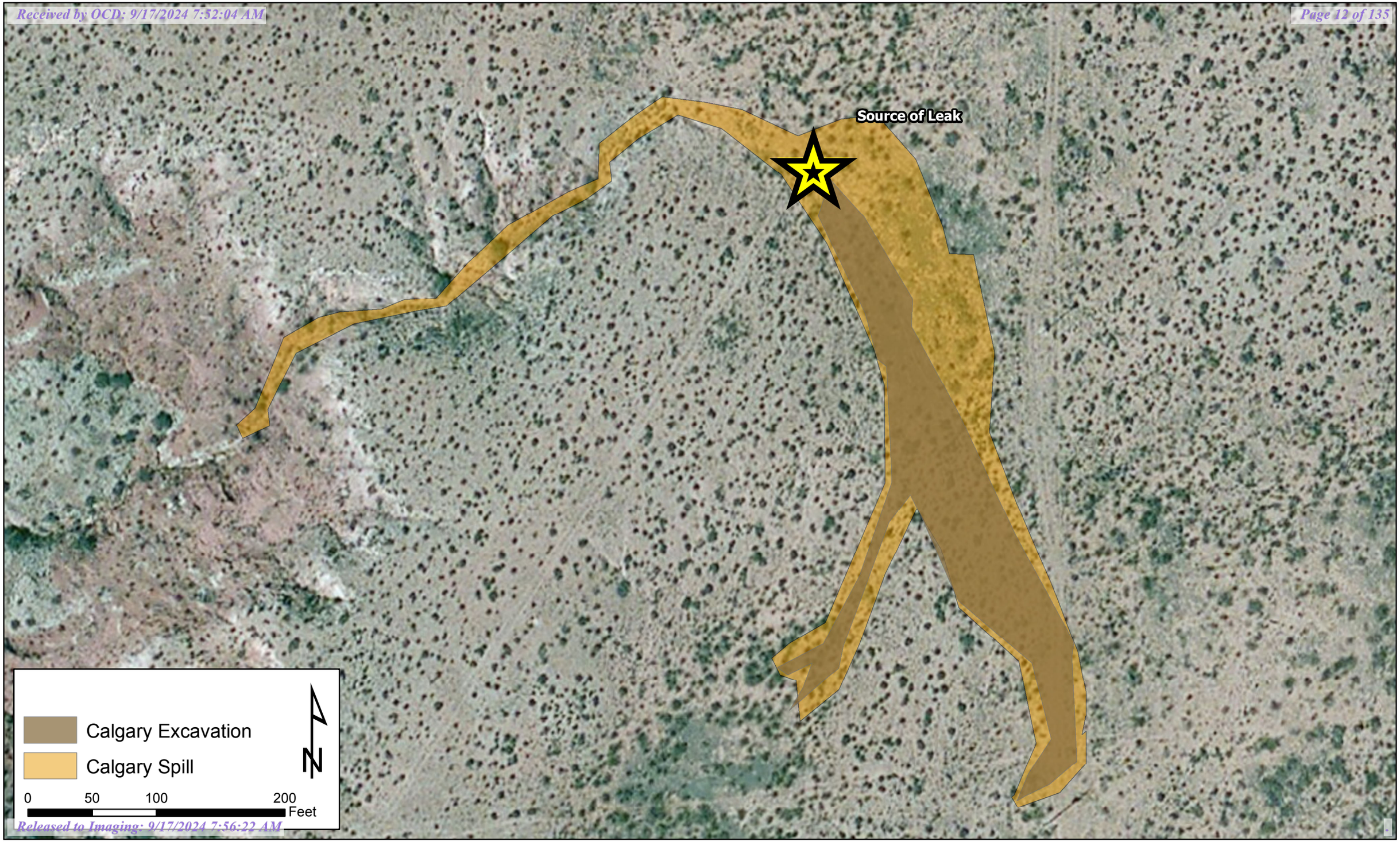
1.4 Contact Information

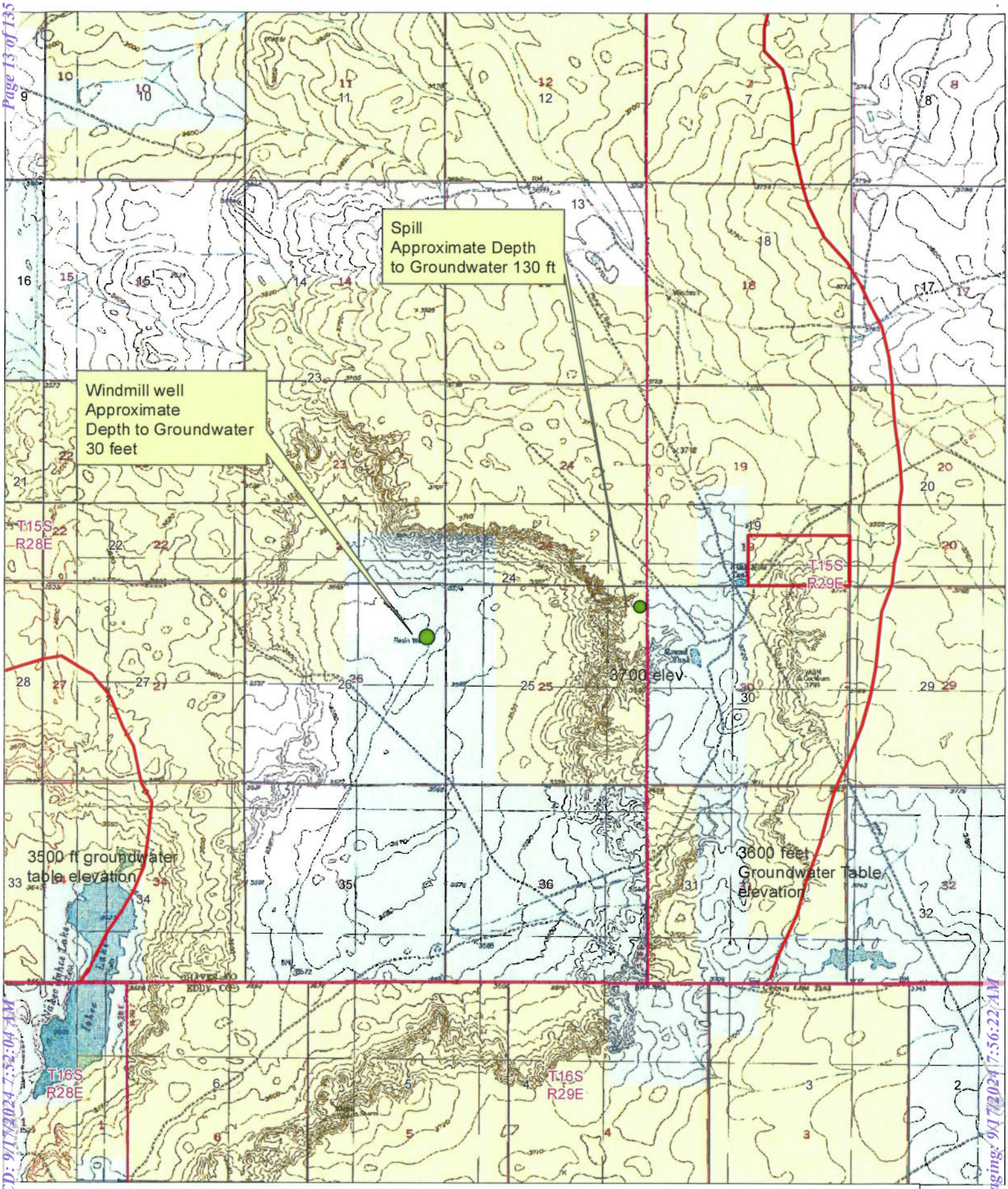
Mack Energy Corporation
11344 Lovington Highway
Artesia, New Mexico 88210
575-748-1288 / Matt Buckles

Aspen Grow, LLC
3001 W. Loop 250 N. Ste. C-105-166
Midland, Texas 79705
210-213-0397 / Kevin Freeman

Calgary Federal 2 release-Laboratory Analytical Results Summary											
Date	Sample ID	Depth (ft)	Chlorides	TPH - GRO	TPH - DRO	TPH-Total	Benzene	Toluene	Ethylbenzene	Xylene	BTEX
			SM4500Cl-B	TPH 8015m			BTEX 8021b				
12/28/2016	SP1	0-1	32	10	22.9	42.9	0.05	0.05	0.05	0.15	0.3
12/28/2016	SP2	0-1	4400	26100	4430	33120			29.2	56.5	85.7
12/28/2016	SP3	0-1	4240	7440	1470	9173	0.12	1.15	5.27	8.98	15.52
3/2/2017	SP4	0-1	2420			47100	0.187	0.671	8.21	15.75	24.818
3/2/2017	SP5	0-1	4970			4820	0.062	0.745	6.68	10.72	18.207
3/2/2017	SP6	0-1	2890			13400	7.85	78.7	60.5	75.4	222.45
3/2/2017	SP6	0-2	4890			11900	14.2	116	102	129	361.2
3/2/2017	SP6	2-3	6320			2440	0.0679	2.16	3.15	3.78	9.1579
3/2/2017	SP6	3-4	6190								0
3/2/2017	SP7	0-1	11800								0
3/2/2017	SP8	0-1	21.7								0
3/2/2017	SP8	1-2	<1.05								0
3/2/2017	SP9	0-1	3890								0
3/2/2017	SP10	0-1	6430			7930	<0.220	0.503	5.08	9.22	14.803
3/2/2017	SP11	0-1	1650								0
3/2/2017	SP12	0-1	5.65								0
3/2/2017	SP13	0-1	<1.09								0
3/2/2017	SP14	0-1	1430								0
3/2/2017	SP15	0-1	984			27900	0.191	5.62	41.5	64.6	111.911
3/2/2017	SP16	0-1	3150								0
3/2/2017	SP17	0-1	<1.06								0
3/2/2017	SP18	0-1	<1.02								0
3/2/2017	SP19	0-1	<1.05								0
3/2/2017	SP20	0 to 1	<1.05								0
5/10/2017	SP21	5 to 6'	560	11.3	664	675.3	<0.050	<0.050	0.233	0.505	0.738
5/11/2017	SP21	6 to 7 '	528	<10.0	42.7	42.7	<0.050	<0.050	0.053	<.150	<.300
5/12/2017	SP21	11 to 12	272	<10.0	17.5	17.5	<0.050	<0.050	<0.050	<.150	<.300
5/13/2017	SP21	16 to 17	160	<10.0	16.8	16.8	<0.050	<0.050	0.078	<.150	<.300
5/14/2017	SP21	21 to 22	96	<10.0	<10.0	0	<0.050	<0.050	<0.050	<.150	<.300
5/15/2017	SP22	0 to 1	176	51.3	7680	7731.3	<0.050	<0.050	0.109	0.45	0.559
5/16/2017	SP 23	0 to 1	48	<10.0	<10.0	0	<0.050	<0.050	0.065	0.256	0.321


SP4
SP20
SP5
SP21
SP3
SP6
SP2
SP8
SP7
SP23
SP19
SP9
SP1
SP18
SP14
SP17
SP10
SP11
SP15
SP13
SP12
SP16
SP23
Calgary Sample Points
Calgary Excavation
Calgary Spill
N
0
50
100
200
Feet


Source of Leak
Calgary Excavation
Calgary Spill
N
0
50
100
200
Feet



Depth to Water for Spill (Geohydrology Groundwater Table Map)

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

0 0.175 0.35 0.7 1.05 1.4 Miles

N W E S

Bratcher, Mike, EMNRD

From: Griswold, Jim, EMNRD
Sent: Wednesday, June 14, 2017 3:03 PM
To: matt.buckles@mec.com
Cc: Bratcher, Mike, EMNRD; Weaver, Crystal, EMNRD; Billings, Bradford, EMNRD; Oberding, Tomas, EMNRD
Subject: OCD Case 2R-4037 Mack Energy/Calgary Federal #2 release

Matt,

Sorry for the delay. I have reviewed the relevant information regarding the 11/26/16 release of an estimated 40 bbls of crude oil and 120 bbls of produced water from a flowline near the Calgary Federal #2. The OCD District 2 office in Artesia had previously assigned this release case number 2R-4037. Please refer to this case number in future correspondence. I think it is important to note the latitude/longitude provided on the initial form C-141 appears to be about 1,350 northwest of the spill location depicted in various aerial photographs provided in various reports from SESI and Aspen Grow. Nonetheless, the updated remediation plan developed by Aspen Grow, LLC on behalf of Mack Energy is **approved** with the following conditions:

The soil contamination data indicate soil contamination resides at depths of less than five feet in the eastern area of the spill and is very shallow along the western drainage. Using the spill footprint estimates provided by Aspen Grow, I estimate an affected soil volume of about 53,350 cubic feet. If one assumes an effective soil porosity of 10%, it should take 950 bbls of liquid to saturate those soils. The plan states "The application of water and product will be applied with a sprinkler type system to control the application rate, minimize the potential runoff and enhance the percolation of water and product into the soil for maximum effectiveness." The plan goes on to say, "Remediation of this site is expected to take up to ten (10) weeks. The combination of water and product will be applied weekly over the entire site." As such, the application of product mixed in fresh water is limited to no more than 1,000 bbls over the 10 weeks.

During the treatment time period, some form of liquid containment needs to be placed at the bottom of the western drainage and inspected regularly. If during the period, standing fluids are observed within the containment (be it rainwater or otherwise) it must be sampled and appropriately analyzed for dissolved-phase hydrocarbons and chloride.

Once the application is completed and a modest amount of time has passed for Aspen Grow's product to work, soil sampling is needed to verify remediation. Soil samples must be gathered approximately every 100 feet along the western drainage (at least 6 samples) and in the eastern spill area samples must be gathered on a grid pattern with approximate 50 foot centers extending across and marginally beyond the spill area. The eastern area samples must be gathered at depths of 2 and 5 feet beneath surface. All soil samples must be analyzed for BTEX constituents using either Method 8021 or 8260, for TPH via Method 8015 extended range (C6 thru C36), **not** Texas Method 1005, and for chlorides using Method 300 (**not** SM4500). Please direct the sampler(s) to determine GPS coordinates at each sample location such that an accurate site may can be presented.

A comprehensive report on the remedial activities and their success must be provided to the OCD. This report should also provide better dimensions of the previously excavated area, the disposition of those contaminated soils, and whether or not backfilling has been undertaken. Backfilling, grading, and revegetation of the affected area should be undertaken at the direction of the BLM. As Aspen Grow's product does not appear to be focused on the remediation of chloride in soils, if chloride contamination persists in the shallow soils it may need to be addressed before case closure is considered.

Please retain a copy of this email for your files as no hardcopy will be sent. If you have any questions, please feel free to contact either myself or OCD staff in Artesia. Thanks.

Jim Griswold
Environmental Bureau Chief
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
505.476.3465
email: jim.griswold@state.nm.us

From:	Weaver, Crystal, EMNRD
To:	mattbuckles@mec.com; hcdavis@blm.gov
Cc:	Bratcher, Mike, EMNRD; ballen@sesi-nm.com; scontreras@sesi-nm.com
Subject:	Signed Initial C-141 for Calgary Federal #2 with Conditions of Approval
Date:	Tuesday, December 27, 2016 10:51:00 AM
Attachments:	4037 - COAs & signed C-141 intial.pdf

RE: Mack Energy Corp. * Calgary Federal #2 * 30-005-64100 * 2RP-4037

Hello Matt,

I have included a scanned copy of the signed Initial C-141 Remediation Permit along with an attached Conditions of Approval. The OCD tracking number for this event is 2RP-4037.

Thank you,

Crystal Weaver

Environmental Specialist

OCD – Artesia District II

811 S. 1st Street

Artesia, NM 88210

Office: 575-748-1283

Fax: 575-748-9720

NM OIL CONSERVATION
ARTESIA DISTRICT
DEC 14 2016
RECEIVED

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

nAB1635457735

OPERATOR

X Initial Report ☐ Final Report

Name of Company MACK ENERGY CORPORATION 13837	Contact MATT BUCKLES
Address PO BOX 960 ARTESIA, NM 88211-0960	Telephone No. 575-748-1288
Facility Name Calgary Federal #2	Facility Type Flowline

Surface Owner BLM	Mineral Owner BLM	API No. 30-005-64100

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
A	25	15S	28E	1320	North	330	East	Chaves

Latitude 32.996844 **Longitude** -104.079847

NATURE OF RELEASE

Type of Release Oil and PRODUCED WATER	Volume of Release 160 BBLS	Volume Recovered 0 BBLS
Source of Release Flow Line	Date and Hour of Occurrence 11/26/16 @ 7:00 AM	Date and Hour of Discovery 11/26/2016 @ 7:00AM
Was Immediate Notice Given? X Yes ☐ No ☐ Not Required	If YES, To Whom? Mike Bratcher and Harley Davis	
By Whom? Jerry Sherrell	Date and Hour 11/28/2016 8:30am	
Was a Watercourse Reached? ☐ Yes X No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*
A 2 7/8" steel flowline developed a leak between the Calgary #2 well and the tank battery. Immediately upon discovery all oil was dug out and hauled off for proper disposal. We also used 32 sx of oil gator for use in the canyon to keep oil from leaching any further.

Describe Area Affected and Cleanup Action Taken.*
The area affected is the NE of sec 25 T 15S R28E. ESTIMATED RELEASE OF 160 BBLS (40 bbls of oil and 120 bbls of produced water). We have teamed up with Safety & Environmental Solutions out of Hobbs, NM to complete a horizontal and vertical site delineation.

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: Matt Buckles	OIL CONSERVATION DIVISION
Printed Name: MATT BUCKLES	Signed By Mike Bratcher Approved by Environmental Specialist:
Title: ENVIRONMENTAL	Approval Date: 12/15/16 Expiration Date: N/A
E-mail Address: mattbuckles@mec.com	Conditions of Approval: See attached Attached X
Date:12/12/2016 Phone: 575-748-1288	

* Attach Additional Sheets If Necessary

2RP-4037

Operator/Responsible Party,

The OCD has received the form C-141 you provided on **12/14/16** regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number 2RP-4037 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 1/6/16. 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; C_6 thru C_{36}), 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; C_6 thru C_{36}), 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

Bratcher, Mike, EMNRD

From: Matt Buckles <mattbuckles@mec.com>
Sent: Wednesday, December 14, 2016 11:47 AM
To: Bratcher, Mike, EMNRD; Davis, Harley (hcdavis@blm.gov)
Cc: Jerry Sherrell; ballen@sesi-nm.com; scontreras@sesi-nm.com
Subject: C-141 Calgary St #2
Attachments: C-141 Calgary #2 Initial.pdf

Attached is the initial C-141 for the release from the flowline on the Calgary #2.

Thanks,

Matt Buckles
Mack Energy Corporation
11344 Lovington Highway
Artesia NM 88210
575-748-1288 Office
575-703-1958 Mobile
575-746-5508 Fax
Email:mattbuckles@mec.com
http://www.mec.com

From: Rebecca Pons
To: hcdavis@blm.gov; Matt Buckles; Bratcher, Mike, EMNRD; Weaver, Crystal, EMNRD
Cc: ballen@sesi-nm.com; books2@sesi-nm.com
Subject: Calgary #2 Work Plan
Date: Wednesday, January 25, 2017 10:53:48 AM
Attachments: Calgary Work Plan.pdf

Hello!
I have attached, per Bob Allen (SESI) and Matt Buckles (Mack Energy), the Work Plan for the Mack Energy Calgary #2 Release. Please review and let us know if you have any questions.
Thank You
Tara Martin
Safety & Environmental Solutions, Inc.
703 East Clinton Street
Hobbs, NM 88240
Office: (575) 397-0510

Mack Energy Corporation
Calgary Federal #2
Site Investigation Work Plan
Section 25, Township 15S, Range 28E
Chaves, New Mexico

January 25, 2017

Prepared for:

Mack Energy Corporation
P.O. Box 960
Artesia, New Mexico 88211-0960

By:

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 102
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

Safety & Environmental Solutions, Inc., hereinafter referred to as (SESI) was engaged by Mack Energy to perform a site delineation at the Calgary Federal #2 concerning a one hundred sixty (160) bbl. release of oil and produced water.

According to the C-141: A 2 7/8" steel flowline developed a leak between the Calgary #2 well and the tank battery. An estimated release of 160 bbl (40 bbl of oil and 120 bbl of produced water) was released on the NE section of Sec 25, Township 15S, Range 28E. The oil was immediately dug out and hauled off for proper disposal. A 32 sx of oil gator was also used in the canyon to keep oil from leaching any further.

II. Surface and Ground Water

According to the BLM representative onsite the Calgary Federal #2, the average depth to groundwater in the vicinity of the site location is 130' bgs.

IV. Characterization

The target cleanup levels are determined using the *Guidelines for Remediation of Leaks, Spills and Releases* published by the NMOCD (August 13, 1993). Based on the ranking criteria presented below, the applicable Recommended Remediation Action Levels (RRAL) are 10 parts per million (ppm) Benzene, 50 ppm combined benzene, toluene, ethyl benzene, and total xylenes (BTEX), and 5,000 ppm Total Petroleum Hydrocarbons (TPH). Characterization of vertical extent of chloride concentration to a level of 250 mg/kg (PPM) is also required.

Depth to Ground Water:			
(Vertical distance from contaminants to seasonal high water elevation of groundwater)	Less than 50 feet	20 points	
	50 feet to 99 feet	10 points	
	>100 feet	0 points	**X**
Wellhead Protection Area:			
(Less than 200 feet from a private domestic water source; or less than 1000 feet from all other water sources)	Yes	20 points	
	No	0 points	**X**
Distance to Surface Water:			
(Horizontal distance to perennial lakes, ponds, rivers, streams, creeks, irrigation canals and ditches)	Less than 200 feet	20 points	
	200 feet to 1000 feet	10 points	
	>1000 feet	0 points	**X**
RANKING SCORE (TOTAL POINTS)			**0**

V. Work Performed

On December 12, 2016, Bob Allen (SESI), was onsite for the initial site assessment. Site photos were taken, the area was mapped, and white flags were put in place for the One Call.

On December 20, 2016, Dave Boyer (SESI), was onsite with Mack Energy staff, NMOCD, and BLM representatives to discuss a sampling plan. Sampling began. Samples were taken on each: the east sidewall base, the west side wall base, the bottom of the trench. One sample was taken on the east surface, one background, and two in the drainage arroyo below furthest spill extent. The sample points were mapped using the Juno 3B. The samples were properly packaged, preserved and transported to Cardinal Laboratories of Hobbs, NM by chain of custody, and analyzed for TPH (total petroleum hydrocarbons)(Method 8015M), BTEX, and Chlorides. The results are presented in the table below:

Soil Sample Results: Cardinal Laboratories 12-20-16									
SAMPLE ID	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	TPH GRO	TPH DRO	TPH EXT DRO	Chlorides
ESW-1, 4.3’	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	160
ESW-2, 3.4’	<0.050	0.068	0.854	2.23	3.15	81.9	1170	188	416
ESW-3, 2.3’	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	226	57.5	464
WSW-1,1.3’	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	16.0
WSW-2,1.6’	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	48.0
WSW-3, 2.4’	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	32.0
S-1, 0-0.7’	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	32.0
Bkg-1, 0-0.7’	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	16.0
SP-B1	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	6240
SP-B-2	0.080	1.38	2.78	4.80	9.05	57.7	717	134	6880
SP-B3	34.2	183	157	194	569	3290	7440	1230	3760

On December 21, 2017, Bob Allen (SESI), was onsite to sample the arroyo. The sample points were mapped using the Juno 3B. The samples were properly packaged, preserved and transported to Cardinal Laboratories of Hobbs, NM by chain of custody, and analyzed for TPH (total petroleum hydrocarbons)(Method 8015M), BTEX, and Chlorides. The results are presented in the table below:

Soil Sample Results: Cardinal Laboratories 12-21-16									
SAMPLE ID	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	TPH GRO	TPH DRO	TPH EXT DRO	Chlorides
ASP-1	0.120	1.15	5.27	8.98	15.5	2630	7440	1470	4240
ASP-2	<2.00	<2.00	29.2	56.5	85.7	2590	26100	4430	4400
ASP-3	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	22.9	32.0

IV. Action Plan

Based on the results of the sampling analysis, and TPH and chloride limits of 5,000 and 1,000 mg/kg respectively (based on a depth to groundwater of 130 feet), the following remedial actions are recommended:

1. East sidewall – the east sidewall samples at the depths sampled show no exceedance of the above constituent limits. However, staining was observed on the sidewall in the vicinity and between ESW-2 and ESW-3. It is recommended that the east sidewall be cut back several feet to remove obvious staining and odor. The surface sample S-1 located 2 to 3 feet east of the existing trench did not show contamination so excavation east of that location is not necessary.
2. West sidewall – samples from the west sidewall were clean. No further sidewall excavation is necessary.
3. Excavation trench bottom – three samples from the trench bottom exceeded TPH or chloride levels, or both. Additional removal of material is needed especially in the shallow depression at the south end of the excavation near Sample Point B3 followed by resampling.
4. Samples ASP-1 and ASP-2 both exceeded TPH and chloride levels by a considerable amount. However the small width and shallow depth of the impact in the very narrow, steep and rocky drainage-way is limited and action to remove the contamination would likely cause more environmental damage (sediment transport and deposition in un-impacted areas) than currently exists. It is recommended that the application of a microbial product such as Micro-Blaze be considered followed by subsequent sampling to gauge effectiveness.
5. Sample ASP-3 was further down the drainage-way and did not exhibit any impacts from the release. No further action is necessary at that location. However, if follow up sampling at ASP-1 and ASP-2 is performed, sampling of ASP-3 is suggested to determine if migration has occurred to that location from the upper drainage areas.

V. Figures & Appendices

Figure 1 - Vicinity Map
Figure 2 - Site Plan
Appendix A – C-141
Appendix B – Groundwater
Appendix C – Analytical Results
Appendix D – Photo Documentation

Figure 1
Vicinity Map

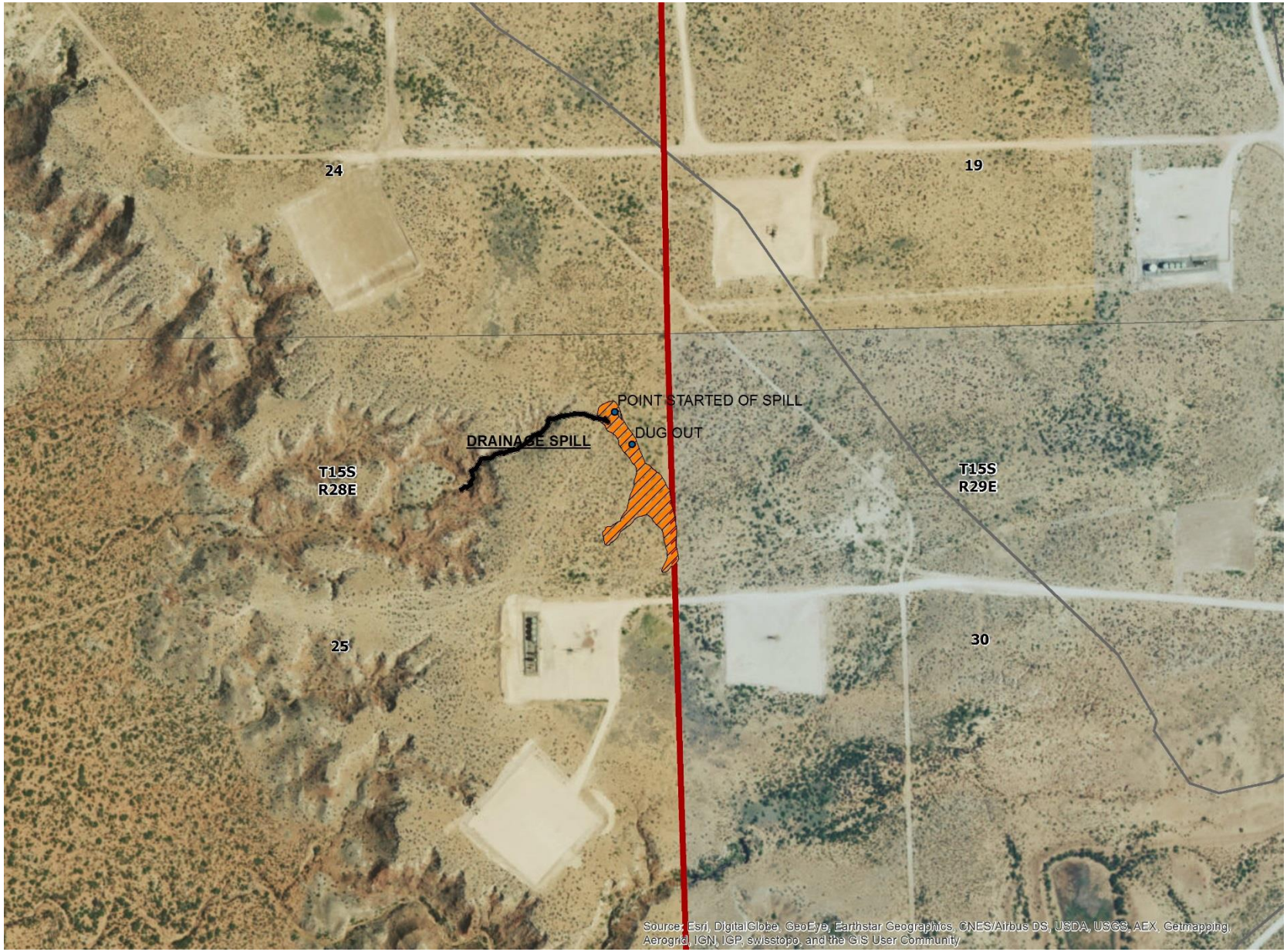
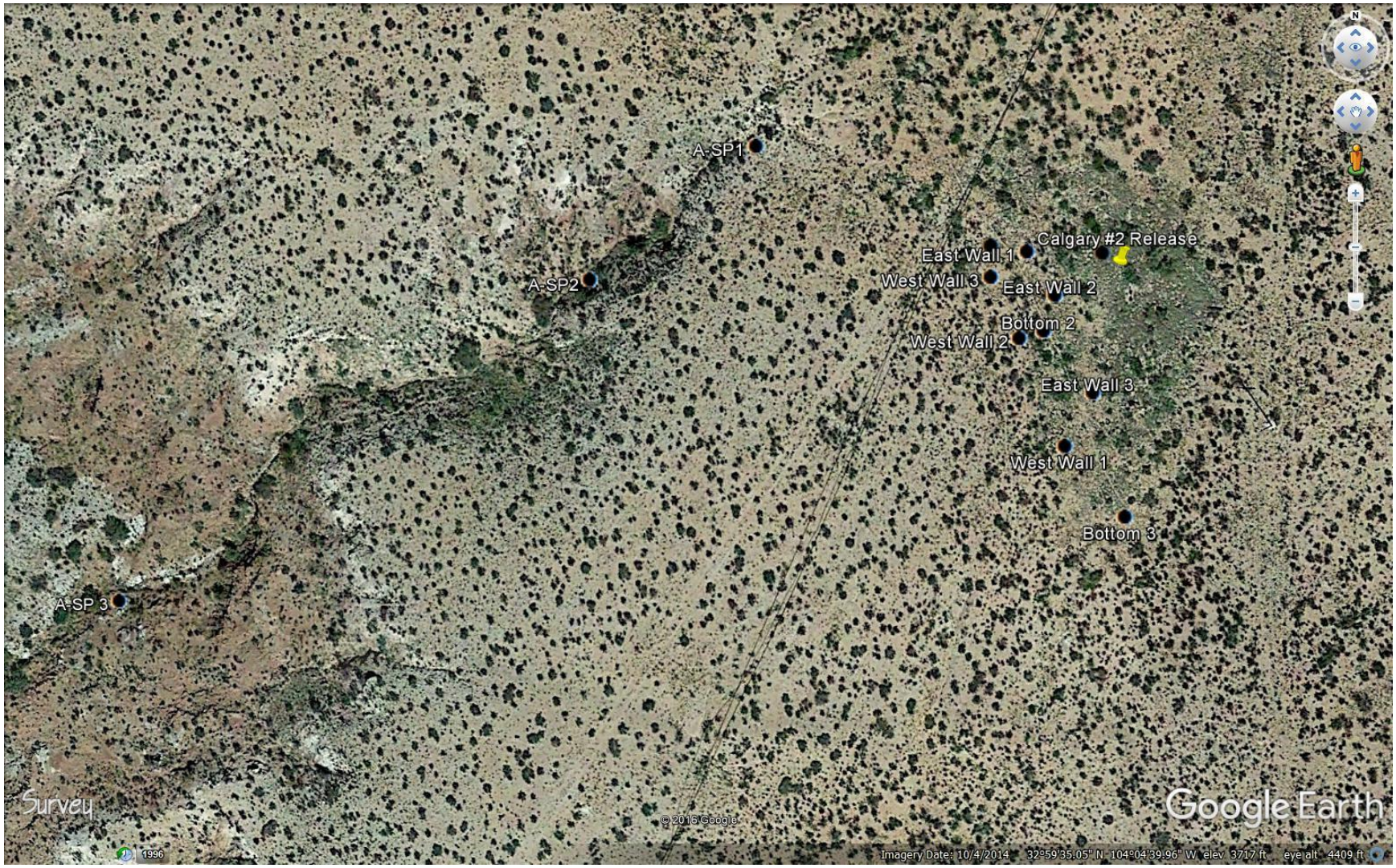

24
19
POINT STARTED OF SPILL
DUG OUT
DRAINAGE SPILL
T15S
R28E
T15S
R29E
25
30
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 2
Site Plan

Mack Calgary—All Sample Points



Sample Points – South

Mack Calgary—Sample Points North

Appendix A
C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

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

Release Notification and Corrective Action

OPERATOR

X Initial Report ☐ Final Report

Name of Company MACK ENERGY CORPORATION	Contact MATT BUCKLES
Address PO BOX 960 ARTESIA, NM 88211-0960	Telephone No. 575-748-1288
Facility Name Calgary Federal #2	Facility Type Flowline

Surface Owner BLM	Mineral Owner BLM	API No. 30-005-64100

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
A	25	15S	28E	1320	North	330	East	Chaves

Latitude_ 32.996844__ **Longitude**_-104.079847 __

NATURE OF RELEASE

Type of Release Oil and PRODUCED WATER	Volume of Release 160 BBLS	Volume Recovered 0 BBLS
Source of Release Flow Line	Date and Hour of Occurrence 11/26/16 @ 7:00 AM	Date and Hour of Discovery 11/26/2016 @ 7:00AM
Was Immediate Notice Given? X Yes ☐ No ☐ Not Required	If YES, To Whom? Mike Bratcher and Harley Davis	
By Whom? Jerry Sherrell	Date and Hour 11/28/2016 8:30am	
Was a Watercourse Reached? ☐ Yes X No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*
A 2 7/8" steel flowline developed a leak between the Calgary #2 well and the tank battery. Immediately upon discovery all oil was dug out and hauled off for proper disposal. We also used 32 sx of oil gator for use in the canyon to keep oil from leaching any further.

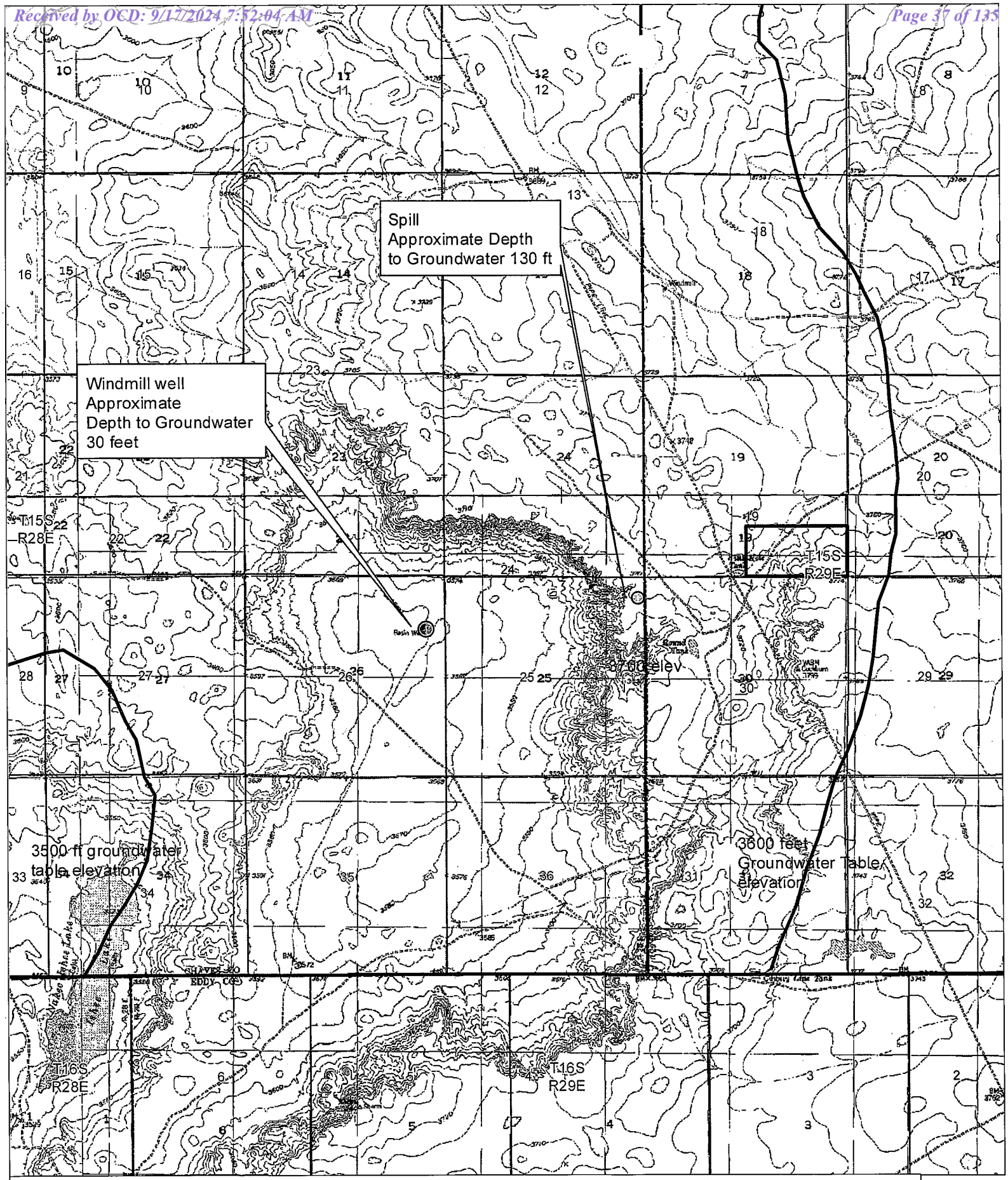
Describe Area Affected and Cleanup Action Taken.*
The area affected is the NE of sec 25 T 15S R28E. ESTIMATED RELEASE OF 160 BBLS (40 bbls of oil and 120 bbls of produced water). We have teamed up with Safety & Environmental Solutions out of Hobbs, NM to complete a horizontal and vertical site delineation.
.

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: Matt Buckles	OIL CONSERVATION DIVISION	
Printed Name: MATT BUCKLES	Approved by Environmental Specialist:	
Title: ENVIRONMENTAL	Approval Date:	Expiration Date:
E-mail Address: mattbuckles@mec.com	Conditions of Approval:	Attached ☐
Date:12/12/2016 Phone: 575-748-1288		

* Attach Additional Sheets If Necessary

Appendix B
Groundwater



Depth to Water for Spill (Geohydrology Groundwater Table Map)

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

0 0.175 0.35 0.7 1.05 1.4 Miles

N W E S

Appendix C
Analytical Results

CARDINAL Laboratories

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

December 30, 2016

Bob Allen

Safety & Environmental Solutions

703 East Clinton

Hobbs, NM 88240

RE: MAC-16-003

Enclosed are the results of analyses for samples received by the laboratory on 12/21/16 17:00.

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 accreditated 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,

Mike Snyder For Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: ESW-1 4.3' (H602857-01)

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	12/22/2016	ND	2.00	100	2.00	0.129	
Toluene*	<0.050	0.050	12/22/2016	ND	2.07	104	2.00	1.25	
Ethylbenzene*	<0.050	0.050	12/22/2016	ND	2.03	102	2.00	1.58	
Total Xylenes*	<0.150	0.150	12/22/2016	ND	6.08	101	6.00	1.39	
Total BTEX	<0.300	0.300	12/22/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *123 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**160**	16.0	12/28/2016	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	12/22/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	<10.0	10.0	12/22/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	<10.0	10.0	12/22/2016	ND					

Surrogate: 1-Chlorooctane *71.7 %* *35-147*

Surrogate: 1-Chlorooctadecane *85.1 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: ESW-2 3.4' (H602857-02)

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	12/22/2016	ND	2.00	100	2.00	0.129	
Toluene*	**0.068**	0.050	12/22/2016	ND	2.07	104	2.00	1.25	
Ethylbenzene*	**0.854**	0.050	12/22/2016	ND	2.03	102	2.00	1.58	
Total Xylenes*	**2.23**	0.150	12/22/2016	ND	6.08	101	6.00	1.39	
Total BTEX	**3.15**	0.300	12/22/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *140 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**416**	16.0	12/28/2016	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	**81.9**	10.0	12/22/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	**1170**	10.0	12/22/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	**188**	10.0	12/22/2016	ND					

Surrogate: 1-Chlorooctane *108 %* *35-147*

Surrogate: 1-Chlorooctadecane *110 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: ESW-3 2.3' (H602857-03)

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	12/22/2016	ND	2.00	100	2.00	0.129	
Toluene*	<0.050	0.050	12/22/2016	ND	2.07	104	2.00	1.25	
Ethylbenzene*	<0.050	0.050	12/22/2016	ND	2.03	102	2.00	1.58	
Total Xylenes*	<0.150	0.150	12/22/2016	ND	6.08	101	6.00	1.39	
Total BTEX	<0.300	0.300	12/22/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *124 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**464**	16.0	12/28/2016	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	12/22/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	**226**	10.0	12/22/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	**57.5**	10.0	12/22/2016	ND					

Surrogate: 1-Chlorooctane *94.8 %* *35-147*

Surrogate: 1-Chlorooctadecane *110 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: WSW-1 1.3' (H602857-04)

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	12/22/2016	ND	2.00	100	2.00	0.129	
Toluene*	<0.050	0.050	12/22/2016	ND	2.07	104	2.00	1.25	
Ethylbenzene*	<0.050	0.050	12/22/2016	ND	2.03	102	2.00	1.58	
Total Xylenes*	<0.150	0.150	12/22/2016	ND	6.08	101	6.00	1.39	
Total BTEX	<0.300	0.300	12/22/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *123 %* *73.6-140*

Chloride, SM4500Cl-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	12/28/2016	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	12/22/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	<10.0	10.0	12/22/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	<10.0	10.0	12/22/2016	ND					

Surrogate: 1-Chlorooctane *64.3 %* *35-147*

Surrogate: 1-Chlorooctadecane *76.8 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: WSW-2 1.6' (H602857-05)

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	12/22/2016	ND	2.00	100	2.00	0.129	
Toluene*	<0.050	0.050	12/22/2016	ND	2.07	104	2.00	1.25	
Ethylbenzene*	<0.050	0.050	12/22/2016	ND	2.03	102	2.00	1.58	
Total Xylenes*	<0.150	0.150	12/22/2016	ND	6.08	101	6.00	1.39	
Total BTEX	<0.300	0.300	12/22/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *124 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**48.0**	16.0	12/28/2016	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	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	<10.0	10.0	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	<10.0	10.0	12/23/2016	ND					

Surrogate: 1-Chlorooctane *78.4 %* *35-147*

Surrogate: 1-Chlorooctadecane *93.5 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: WSW-3 2.4' (H602857-06)

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	12/22/2016	ND	2.00	100	2.00	0.129	
Toluene*	<0.050	0.050	12/22/2016	ND	2.07	104	2.00	1.25	
Ethylbenzene*	<0.050	0.050	12/22/2016	ND	2.03	102	2.00	1.58	
Total Xylenes*	<0.150	0.150	12/22/2016	ND	6.08	101	6.00	1.39	
Total BTEX	<0.300	0.300	12/22/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *123 %* *73.6-140*

Chloride, SM4500Cl-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	12/28/2016	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	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	<10.0	10.0	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	<10.0	10.0	12/23/2016	ND					

Surrogate: 1-Chlorooctane *94.6 %* *35-147*

Surrogate: 1-Chlorooctadecane *81.6 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: S-1 0-0.7' (H602857-07)

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	12/22/2016	ND	2.00	100	2.00	0.129	
Toluene*	<0.050	0.050	12/22/2016	ND	2.07	104	2.00	1.25	
Ethylbenzene*	<0.050	0.050	12/22/2016	ND	2.03	102	2.00	1.58	
Total Xylenes*	<0.150	0.150	12/22/2016	ND	6.08	101	6.00	1.39	
Total BTEX	<0.300	0.300	12/22/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *123 %* *73.6-140*

Chloride, SM4500Cl-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	12/28/2016	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	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	<10.0	10.0	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	<10.0	10.0	12/23/2016	ND					

Surrogate: 1-Chlorooctane *74.3 %* *35-147*

Surrogate: 1-Chlorooctadecane *85.5 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: BKG-1 0-0.7' (H602857-08)

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	12/28/2016	ND	1.91	95.7	2.00	2.70	
Toluene*	<0.050	0.050	12/28/2016	ND	2.02	101	2.00	2.11	
Ethylbenzene*	<0.050	0.050	12/28/2016	ND	1.98	98.9	2.00	2.63	
Total Xylenes*	<0.150	0.150	12/28/2016	ND	5.95	99.1	6.00	2.49	
Total BTEX	<0.300	0.300	12/28/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *129 %* *73.6-140*

Chloride, SM4500Cl-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	12/28/2016	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	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	<10.0	10.0	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	<10.0	10.0	12/23/2016	ND					

Surrogate: 1-Chlorooctane *74.7 %* *35-147*

Surrogate: 1-Chlorooctadecane *92.9 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP - B1 (H602857-09)

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	12/28/2016	ND	1.91	95.7	2.00	2.70	
Toluene*	<0.050	0.050	12/28/2016	ND	2.02	101	2.00	2.11	
Ethylbenzene*	<0.050	0.050	12/28/2016	ND	1.98	98.9	2.00	2.63	
Total Xylenes*	<0.150	0.150	12/28/2016	ND	5.95	99.1	6.00	2.49	
Total BTEX	<0.300	0.300	12/28/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *127 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**6240**	16.0	12/28/2016	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	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	<10.0	10.0	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	<10.0	10.0	12/23/2016	ND					

Surrogate: 1-Chlorooctane *72.0 %* *35-147*

Surrogate: 1-Chlorooctadecane *92.2 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP - B2 (H602857-10)

BTEX 8021B mg/kg Analyzed By: MS S-04

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	**0.080**	0.050	12/28/2016	ND	1.91	95.7	2.00	2.70	
Toluene*	**1.38**	0.050	12/28/2016	ND	2.02	101	2.00	2.11	
Ethylbenzene*	**2.78**	0.050	12/28/2016	ND	1.98	98.9	2.00	2.63	
Total Xylenes*	**4.80**	0.150	12/28/2016	ND	5.95	99.1	6.00	2.49	
Total BTEX	**9.05**	0.300	12/28/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *147 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**6880**	16.0	12/28/2016	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	**57.7**	10.0	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	**717**	10.0	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	**134**	10.0	12/23/2016	ND					

Surrogate: 1-Chlorooctane *99.5 %* *35-147*

Surrogate: 1-Chlorooctadecane *92.3 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP - B3 (H602857-11)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	**34.2**	2.00	12/28/2016	ND	1.91	95.7	2.00	2.70	
Toluene*	**183**	2.00	12/28/2016	ND	2.02	101	2.00	2.11	
Ethylbenzene*	**157**	2.00	12/28/2016	ND	1.98	98.9	2.00	2.63	
Total Xylenes*	**194**	6.00	12/28/2016	ND	5.95	99.1	6.00	2.49	
Total BTEX	**569**	12.0	12/28/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *134 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3760**	16.0	12/28/2016	ND	416	104	400	0.00	

TPH 8015M mg/kg Analyzed By: MS S-06

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	**3290**	100	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	**7440**	100	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	**1230**	100	12/23/2016	ND					

Surrogate: 1-Chlorooctane *270 %* *35-147*

Surrogate: 1-Chlorooctadecane *225 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: ASP - 1 (H602857-12)

BTEX 8021B mg/kg Analyzed By: MS S-04

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	**0.120**	0.100	12/28/2016	ND	1.91	95.7	2.00	2.70	
Toluene*	**1.15**	0.100	12/28/2016	ND	2.02	101	2.00	2.11	
Ethylbenzene*	**5.27**	0.100	12/28/2016	ND	1.98	98.9	2.00	2.63	
Total Xylenes*	**8.98**	0.300	12/28/2016	ND	5.95	99.1	6.00	2.49	
Total BTEX	**15.5**	0.600	12/28/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *153 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**4240**	16.0	12/28/2016	ND	416	104	400	0.00	

TPH 8015M mg/kg Analyzed By: MS S-06

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	**263**	100	12/23/2016	ND	182	90.9	200	14.0	
DRO >C10-C28	**7440**	100	12/23/2016	ND	180	90.2	200	16.3	
EXT DRO >C28-C35	**1470**	100	12/23/2016	ND					

Surrogate: 1-Chlorooctane *141 %* *35-147*

Surrogate: 1-Chlorooctadecane *226 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: ASP - 2 (H602857-13)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<2.00	2.00	12/28/2016	ND	1.91	95.7	2.00	2.70	
Toluene*	<2.00	2.00	12/28/2016	ND	2.02	101	2.00	2.11	
Ethylbenzene*	**29.2**	2.00	12/28/2016	ND	1.98	98.9	2.00	2.63	
Total Xylenes*	**56.5**	6.00	12/28/2016	ND	5.95	99.1	6.00	2.49	
Total BTEX	**85.7**	12.0	12/28/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *132 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**4400**	16.0	12/28/2016	ND	416	104	400	0.00	

TPH 8015M mg/kg Analyzed By: MS S-06

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	**2590**	100	12/27/2016	ND	186	93.0	200	6.66	
DRO >C10-C28	**26100**	100	12/27/2016	ND	189	94.4	200	6.77	
EXT DRO >C28-C35	**4430**	100	12/27/2016	ND					

Surrogate: 1-Chlorooctane *384 %* *35-147*

Surrogate: 1-Chlorooctadecane *1030 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	12/21/2016	Sampling Date:	12/20/2016
Reported:	12/30/2016	Sampling Type:	Soil
Project Name:	MAC-16-003	Sampling Condition:	Cool & Intact
Project Number:	MAC-16-003	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: ASP - 3 (H602857-14)

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	12/28/2016	ND	1.91	95.7	2.00	2.70	
Toluene*	<0.050	0.050	12/28/2016	ND	2.02	101	2.00	2.11	
Ethylbenzene*	<0.050	0.050	12/28/2016	ND	1.98	98.9	2.00	2.63	
Total Xylenes*	<0.150	0.150	12/28/2016	ND	5.95	99.1	6.00	2.49	
Total BTEX	<0.300	0.300	12/28/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *128 %* *73.6-140*

Chloride, SM4500Cl-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	12/28/2016	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	12/27/2016	ND	186	93.0	200	6.66	
DRO >C10-C28	<10.0	10.0	12/27/2016	ND	189	94.4	200	6.77	
EXT DRO >C28-C35	**22.9**	10.0	12/27/2016	ND					

Surrogate: 1-Chlorooctane *90.0 %* *35-147*

Surrogate: 1-Chlorooctadecane *81.9 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

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

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 2

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

Company Name: Safety and Environmental Solutions
Project Manager: Bob Allen
Address: 703 East Clinton, PO Box 1613
City: Hobbs State: NM Zip: 88240
Phone #: 575 397-0510 Fax #: 575 393-4388
Project #: MAC-16-023 Project Owner:
Project Name:
Project Location:
Sampler Name: David Boyer

BILL TO
P.O. #:
Company: Same
Attn:
Address:
City:
State: Zip:
Phone #:
Fax #:

ANALYSIS REQUEST

Lab I.D. (FOR LAB USE ONLY) H602857 / H602856	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE (2016)	TIME	Chlorides	TPH 8015 EXT	BTEX
1	ESW-1, -4.3'	G	1			X					X		12/20	1155	X	X	X
2	ESW-2, -3.4'													1230			
3	ESW-3, -2.3'													1255			
4	WSW-1, -1.3'													1335			
5	WSW-2, -1.6'													1340			
6	WSW-3, -2.4'													1350			
7	S-1, 0-0.7'													1435			
8	BKg-1, 0-0.7'													1440			
9	SP-B1													1405			
10	SP-B-2	G	1			X					X		12/20	1415	X	X	X

Relinquished By: D Z Boyer Date: 12/21/16 Time: 3:00 Received By: Jodi Henson

Relinquished By: Date: Time: Received By:

Delivered By: (Circle One)
Sampler - UPS - Bus - Other: #75 2.3°C

Sample Condition
Cool: ☑ Yes ☐ No
Intact: ☑ Yes ☐ No

CHECKED BY: (Initials) [illegible]

Phone Result: ☐ Yes ☒ No Add'l Phone #:
Fax Result: ☐ Yes ☒ No Add'l Fax #:
REMARKS:

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 2 of 2

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

Company Name:	Safety and Environmental Solutions
Project Manager:	Bob Allen
Address:	703 East Clinton, PO Box 1613
City:	Hobbs State: NM Zip: 88240
Phone #:	575 397-0510 Fax #: 575 393-4388
Project #:	MAS-16-003 Project Owner:
Project Name:	
Project Location:	
Sampler Name:	

BILL TO

P.O. #:	
Company:	Same
Attn:	
Address:	
City:	
State:	Zip:
Phone #:	
Fax #:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING DATE	TIME	Chlorides	TPH (8015 EXT)	BTEX
H602857													2016				
H602857																	
11	SP-B3	G	1			X					X		12/20	1430	X	X	X
12	ASP-1	"	"			"					"		12/20	1515	"	"	"
13	ASP-2	"	"			"					"		12/21	1430	"	"	"
14	ASP-3	G	1			X					X		12/21	1440	X	X	X

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 the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, 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 services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 12/21/16	Received By: Jodi Henson	
Relinquished By:	Time: 9:00	Received By:	
	Date:		
	Time:		

Delivered By: (Circle One)
Sampler - UPS - Bus - Other: #75 2.3°C

Sample Condition: Cool: Yes / No; Intact: Yes / No

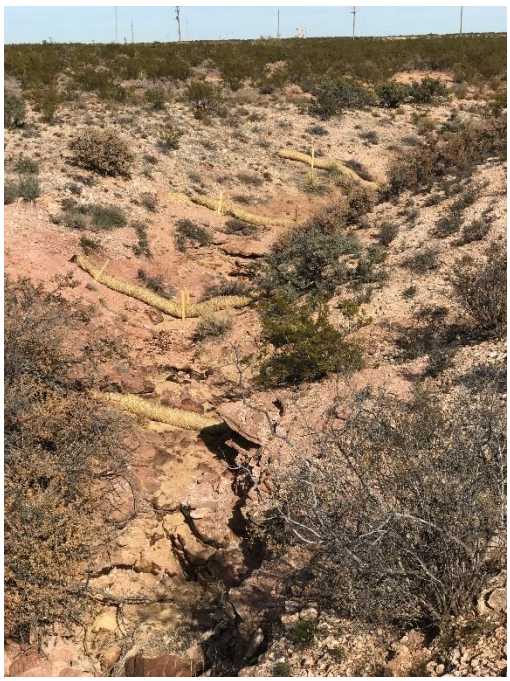
CHECKED BY: (Initials)

Phone Result: ☐ Yes ☒ No Add'l Phone #:
Fax Result: ☐ Yes ☒ No Add'l Fax #:
REMARKS:

Appendix D
Photo Documentation

Calgary #2

Photo Page



From:	Matt Buckles
To:	Bratcher, Mike, EMNRD
Cc:	Davis, Harley (hcdavis@blm.gov) (hcdavis@blm.gov); Weaver, Crystal, EMNRD; K.freeman@aspengrow.us; Jerry Sherrell; Lee Livingston
Subject:	Calgary Work Plan
Date:	Wednesday, March 22, 2017 3:58:44 PM
Attachments:	Calgary Work Plan Aspen Grow.pdf Calgary Federal #2 MACK OIL CO. -7C03012 PBELSTD_NELAC_COC_PDF_NEW.rev1 %281%29 FINAL 03 17 17 1334 (2).pdf

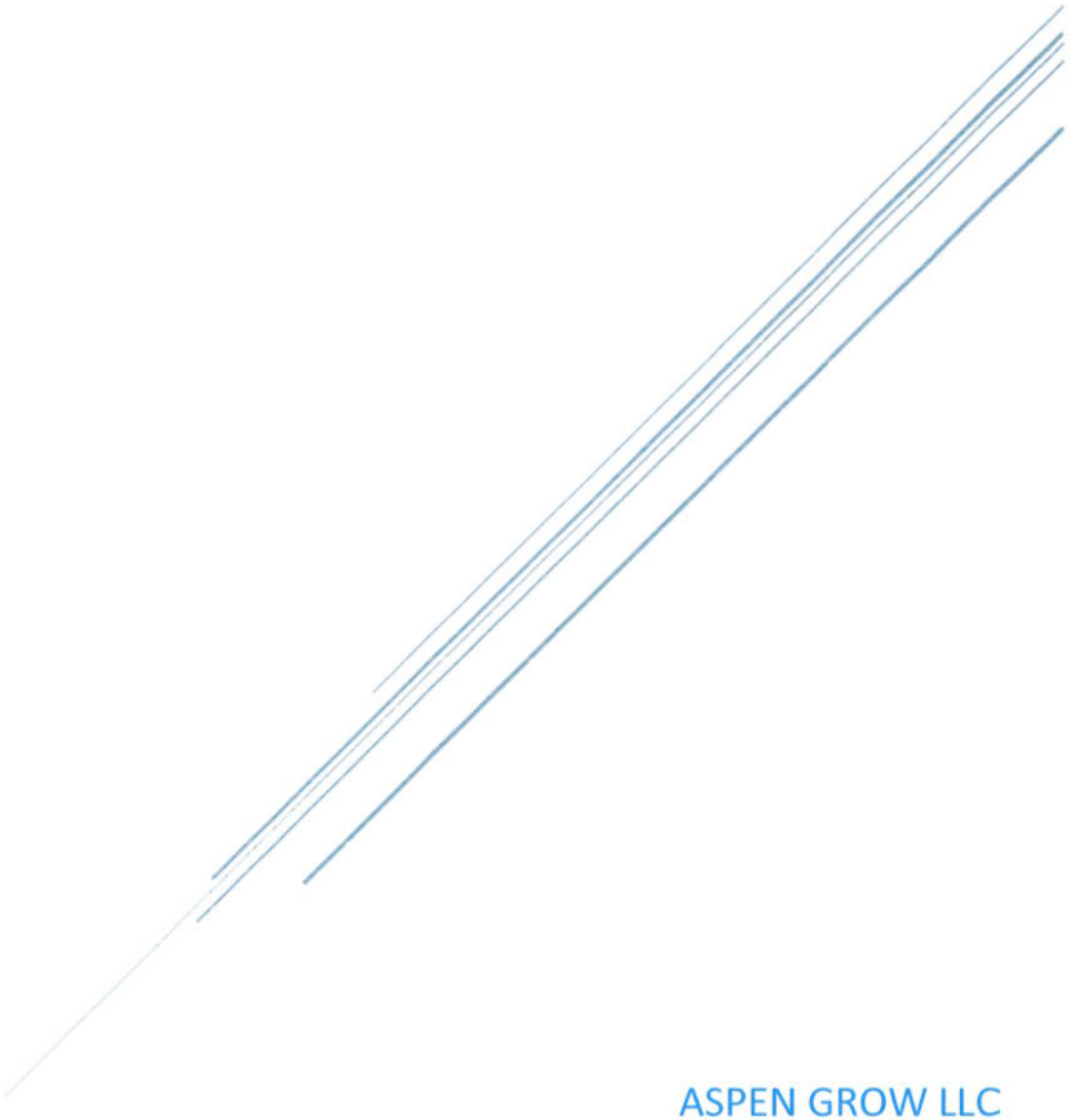
Attached is the work plan Aspen Grow and Mack Energy have worked on to remediate the flowline spill at the Calgary. Also attached are the samples taken at the site. Let me know if you have any questions or need anything else.

Thanks,

Matt Buckles
Mack Energy Corporation
11344 Lovington Highway
Artesia NM 88210
575-748-1288 Office
575-703-1958 Mobile
575-746-5508 Fax
Email:mattbuckles@mec.com
http://www.mec.com

MACK ENERGY CORPORATION

Calgary Federal #2 Spill Report



ASPEN GROW LLC
REMEDEATION PLAN

To: Mr. Davis, March 22, 2017

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

Re: **Mack Energy Corporation**
Calgary Federal #2 Spill.
API No. 30-005-64100
Sec 25 Township 15S Range 28E Unit A

PLAN TO REMEDIATE:

Aspen Grow is working with Mack Energy Corporation regarding the spill at the Calgary Federal #2 Spill Site located in Sec 25, Township 15 S, Range 28E Loco Hills New Mexico.
Aspen Grow's approach is to remediate and restore the contaminated soils to a healthy productive condition by rebuilding the biological health of the soil. This can be accomplished through the application of products that contain bio stimulants, organic acids, biologically produced enzymes and chelating agents which stimulate the natural beneficial microorganisms. By restoring the population and proper ratio of beneficial micro and macro-organisms, soils can be revitalized back to being healthy and productive. To achieve this goal, Aspen Grow will plan on a gradual process of application to the contaminated sites to minimize the erosion and runoff of the product. This application process with contain the spill to the current area to prevent any expansion to the spill area. The site will be treated for ten (10) weeks with fresh water and bio-products that will nourish the soil system by suppling special humic acids, minerals and nutrients that promote the growth of natural aerobic microbes while improving the soil's structure and natural fertility. Aspen Grow will re-test the site after the initial application period to get analysis of the condition of the soil and to see if any additional application is needed. Our goal is to return the soil to as near original condition as possible with minimal erosion or damage to the top soil.

Mack Energy Corporation and Aspen Grow will forward our final lab analysis to the OCD and BLM office upon reaching our intended goal. The initial lab test results with the sketch map showing the contaminated areas that each location of contamination that will need to be addressed.

Location: NE Sec 25, Township 15S, Range 28E Loco Hills, New Mexico

Work Preformed:

Aspen Grow LLC met with Mack Oil Energy Corporation representative at the Calgary Federal #2 spill site to assess the spill area. A review of the C-141 indicated that a flow line (2 7/8" steel pipeline) developed a leak with an estimated release of 40 bbl of oil and 120 bbl of produced water. Barriers were already placed to prevent any additional runoff of the contaminated spill. Aspen Grow sent a crew to the spill site location of the Calgary Federal #2 to measure the entire spill site and to mark the contaminated areas with marker flags. The spill site was sketched (enclosed) to show the area of the contaminated site.

On March 2, 2017, Aspen Grow representatives took soil samples both inside the spill (12 locations inside the spill area) contaminated site and four samples outside the contaminated area, one each side, North, South, East and West of the spill site (4 sample locations). The samples were taken in Chain of Custody (COC) jars and placed on ice. Contaminated Soil Samples and outside locations samples were taken to the Permian Basin Lab in Midland Texas on March 3, 2017.
Lab results were released by the Permian Basin Lab (PBL) on March 17, 2017. A copy of the results is enclosed for review. Soil Samples were taken at the ASP-3, ASP-2 and ASP-1 on 12/28/16 indicating contamination levels (enclosed).

Upon approval of the Plan of Action from the OCD and the BLM office, Mack Energy Corporation and Aspen Grow will proceed with the application of pro-biotics product to start the process of re-mediation. Please respond with any question, concerns or comments to either or both parties below:

Mack Energy Corporation
Matt Buckles
11344 Lovington Highway
Artesia, New Mexico 88210
575-748-1288 office
575-703-1958 mobile
575-746-5508 fax
mattbuckles@mec.com
http://www.mec.com

Aspen Grow LLC
Kevin Freeman
3001 W Loop 250 N.
Ste. C-105-166
Midland, Texas 79705
210-213-0397 mobile
k.freeman@aspengrow.us

MACK ENERGY CORPORATION
P.O. BOX 960
11344 LOVINGTON HIGHWAY
ARTESIA, NEW MEXICO 88211-960

Location: **CALGARY FEDERAL #2**

Page: 2

Table 1 - Analytical Results

Date	Sample ID	Depth	Chloride	TPH - GRO	TPH - DRO	TPH-Total	Benzene	Toluene	Ethylbenzene	Xylene	BTEX
3/2/2017	7C03012-13	0-1	5.65								0
3/2/2017	7C03012-14	0-1	ND								0
3/2/2017	7C03012-15	0-1	1430								0
3/2/2017	7C03012-16	0-1	984			27900	0.191	5.62	41.5	64.6	111.911
3/2/2017	7C03012-17	0-1	3150								0
3/2/2017	7C03012-18	0-1	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-19	0-1	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-20	0-1	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-21	1-2	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-22	2-3	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-23	0-1	ND			OUTSIDE SPILL					0
12/28/2016	H602857-12	0-1	263	7440	1470	9173	0.12	1.15	5.27	8.98	15.52
12/28/2016	H602857-13	0-1	2590	26100	4430	33120			29.2	56.5	85.7
12/28/2016	H602857-14	0-1	10	10	22.9	42.9	0.05	0.05	0.05	0.15	0.3

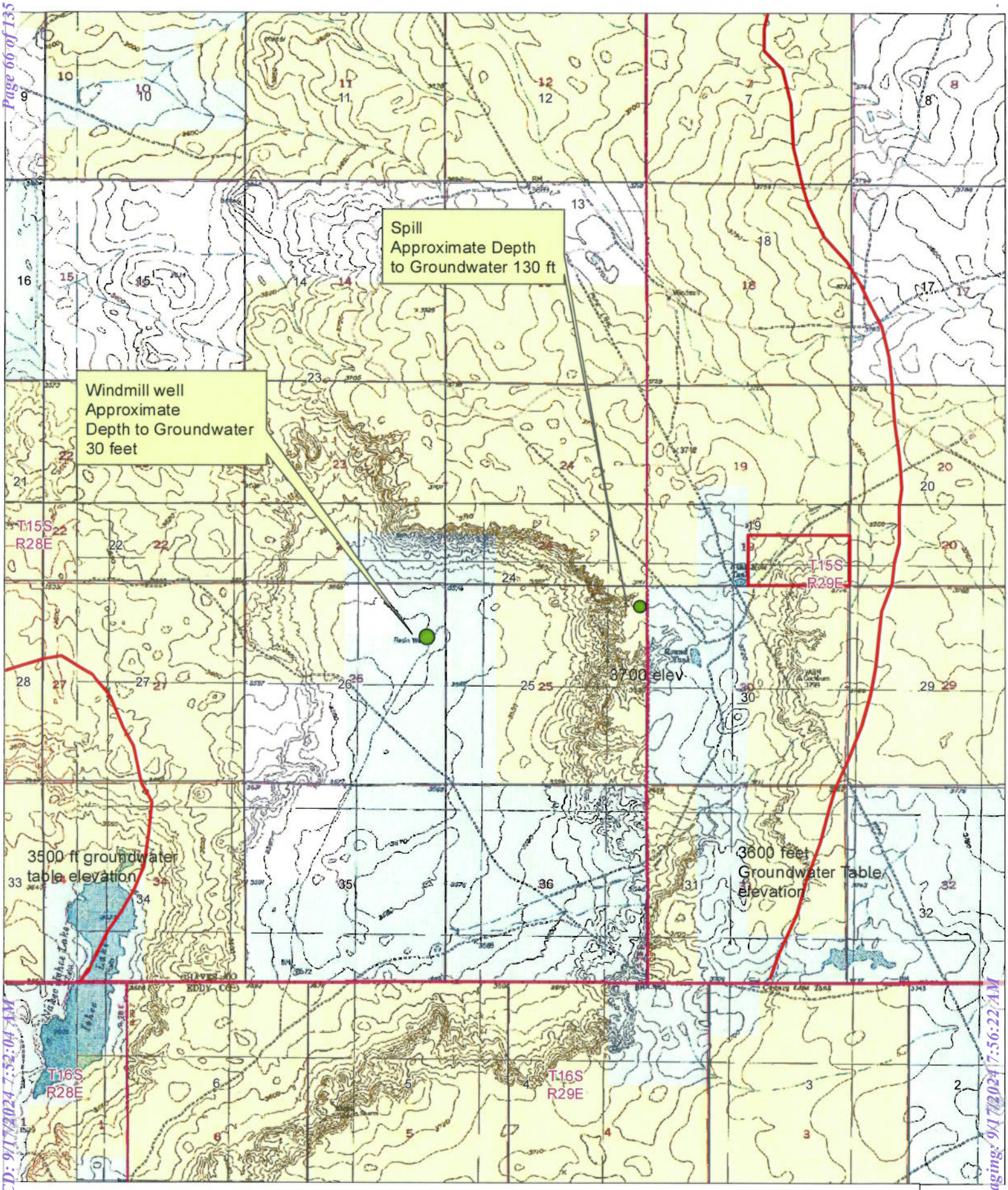
MACK ENERGY
CORPORATION P.O. BOX
960 11344 LOVINGTON
HIGHWAY.
ARTESIA , NEW MEXICO
88211-0960

Location: CALGARY FEDERAL #2

Page: 1

Table 1 - Analytical Results

Date	Sample ID	Depth	Chloride	TPH - GRO	TPH - DRO	TPH-Total	Benzene	Toluene	Ethylbenzene	Xylene p/m-x	BTEX
3/2/2017	7C03012-01	0-1	2420			47100	0.187	0.671	8.21	15.75	24.818
3/2/2017	7C03012-02	0-1	4970			4820	0.062	0.745	6.68	10.72	18.207
3/2/2017	7C03012-03	0-1	2890			13400	7.85	78.7	60.5	75.4	222.45
3/2/2017	7C03012-04	0-2	4890			11900	14.2	116	102	129	361.2
3/2/2017	7C03012-05	2-3	6320			2440	0.0679	2.16	3.15	3.78	9.1579
3/2/2017	7C03012-06	3-4	6190								0
3/2/2017	7C03012-07	0-1	11800								0
3/2/2017	7C03012-08	0-1	21.7								0
3/2/2017	7C03012-09	2-Jan	ND								0
3/2/2017	7C03012-10	0-1	3890								0
3/2/2017	7C03012-11	0-1	6430			7930	ND	0.503	5.08	9.22	14.803
3/2/2017	7C03012-12	0-1	1650								0



Depth to Water for Spill (Geohydrology Groundwater Table Map)

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

0 0.175 0.35 0.7 1.05 1.4 Miles

N W E S

MACK ENERGY CORPORATION P.O. BOX 960 11344 LOVINGTON HIGHWAY. ARTESIA , NEW MEXICO 88211-0960

Location: CALGARY FEDERAL #2

Table 1 - Analytical Results

Date	Sample ID	Depth	Chloride	TPH - GRO	TPH - DRO	TPH-Total	Benzene	Toluene	Ethylbenzene	(ylene p/m-(	BTEX
3/2/2017	7C03012-01	0-1	2420			47100	0.187	0.671	8.21	15.75	24.818
3/2/2017	7C03012-02	0-1	4970			4820	0.062	0.745	6.68	10.72	18.207
3/2/2017	7C03012-03	0-1	2890			13400	7.85	78.7	60.5	75.4	222.45
3/2/2017	7C03012-04	0-2	4890			11900	14.2	116	102	129	361.2
3/2/2017	7C03012-05	2-3	6320			2440	0.0679	2.16	3.15	3.78	9.1579
3/2/2017	7C03012-06	3-4	6190								0
3/2/2017	7C03012-07	0-1	11800								0
3/2/2017	7C03012-08	0-1	21.7								0
3/2/2017	7C03012-09	2-Jan	ND								0
3/2/2017	7C03012-10	0-1	3890								0
3/2/2017	7C03012-11	0-1	6430			7930	ND	0.503	5.08	9.22	14.803
3/2/2017	7C03012-12	0-1	1650								0

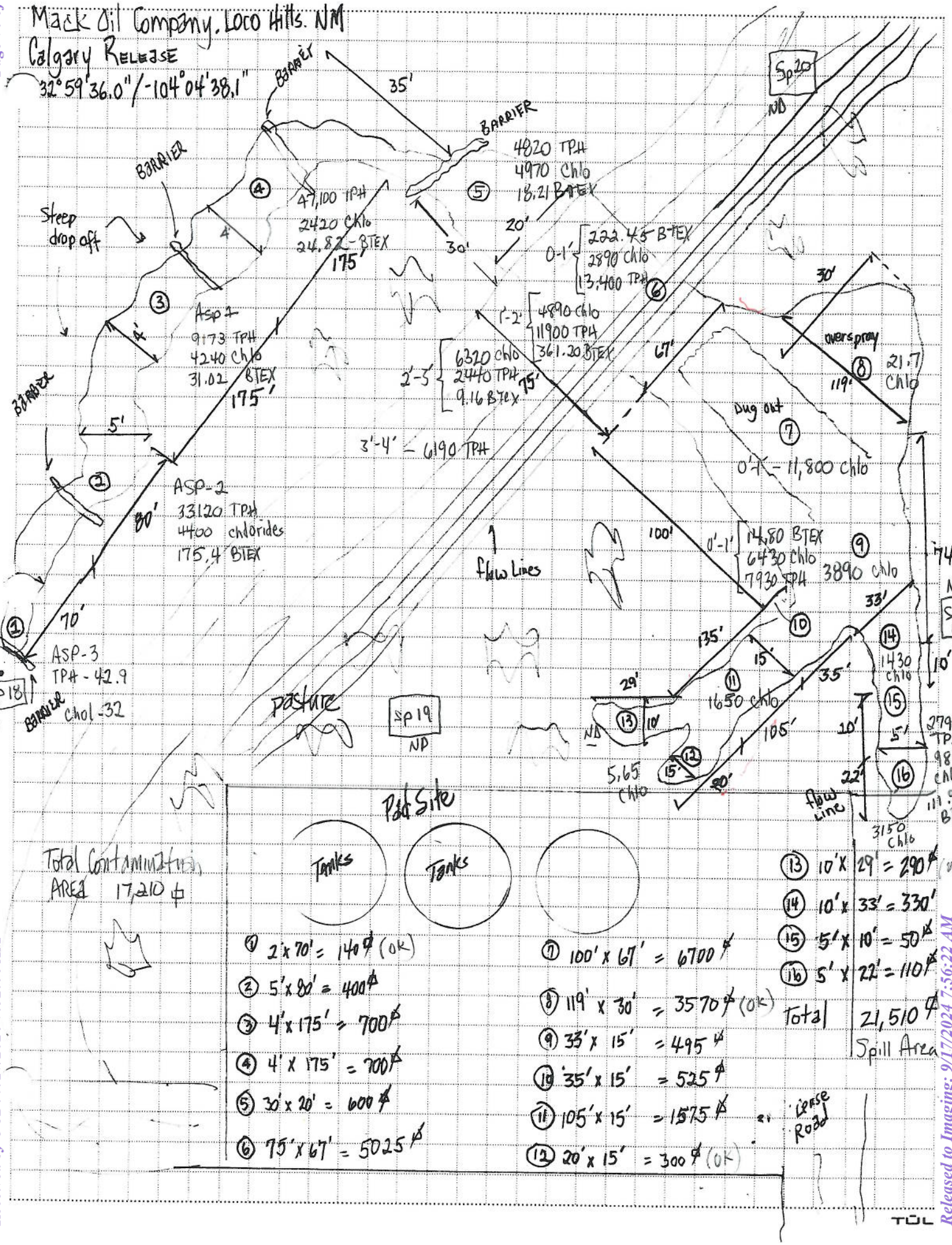
MACK ENERGY CORPORATION
P.O. BOX 960
11344 LOVINGTON HIGHWAY
ARTESIA, NEW MEXICO 88211-960

Location: CALGARY FEDERAL #2

Table 1 - Analytical Results

Date	Sample ID	Depth	Chloride	TPH - GRO	TPH - DRO	TPH-Total	Benzene	Toluene	Ethylbenzene	Xylene	BTEX
3/2/2017	7C03012-13	0-1	5.65								0
3/2/2017	7C03012-14	0-1	ND								0
3/2/2017	7C03012-15	0-1	1430								0
3/2/2017	7C03012-16	0-1	984			27900	0.191	5.62	41.5	64.6	111.911
3/2/2017	7C03012-17	0-1	3150								0
3/2/2017	7C03012-18	0-1	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-19	0-1	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-20	0-1	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-21	1-2	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-22	2-3	ND			OUTSIDE SPILL					0
3/2/2017	7C03012-23	0-1	ND			OUTSIDE SPILL					0
12/28/2016	H602857-12	0-1	263	7440	1470	9173	0.12	1.15	5.27	8.98	15.52
12/28/2016	H602857-13	0-1	2590	26100	4430	33120			29.2	56.5	85.7
12/28/2016	H602857-14	0-1	10	10	22.9	42.9	0.05	0.05	0.05	0.15	0.3

Mack Oil Company, Loco Hills, NM
Calgary Release
32°59'36.0"/-104°04'38.1"



Pad Site

Tanks Tanks

Total Contaminated AREA 17,210 ft

① 2' x 70' = 140 ft (OK)
② 5' x 80' = 400 ft
③ 4' x 175' = 700 ft
④ 4' x 175' = 700 ft
⑤ 30' x 20' = 600 ft
⑥ 75' x 67' = 5025 ft
⑦ 100' x 67' = 6700 ft
⑧ 119' x 30' = 3570 ft (OK)
⑨ 33' x 15' = 495 ft
⑩ 35' x 15' = 525 ft
⑪ 105' x 15' = 1575 ft
⑫ 20' x 15' = 300 ft (OK)
⑬ 10' x 29' = 290 ft (OK)
⑭ 10' x 33' = 330'
⑮ 5' x 10' = 50 ft
⑯ 5' x 22' = 110 ft

Total 21,510 ft
Spill Area

Lease Road

TOL

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
1400 Rankin Hwy
Midland, TX 79701

PBELAB

Analytical Report

Prepared for:

Matt Buckles

Mack Energy

PO Box 960/ 11344 Lovington Highway

Artesia, NM 88211

Project: Calgary Release

Project Number: [none]

Location: Loco Hills NM

Lab Order Number: 7C03012

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704156-16-6

Report Date: 03/17/17

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SP4 0-1.0	7C03012-01	Soil	03/02/17 00:00	03-03-2017 11:50
SP5 0-1.0	7C03012-02	Soil	03/02/17 00:00	03-03-2017 11:50
SP6 0-1.0	7C03012-03	Soil	03/02/17 00:00	03-03-2017 11:50
SP6 1-2.0	7C03012-04	Soil	03/02/17 00:00	03-03-2017 11:50
SP6 2-3.0	7C03012-05	Soil	03/02/17 00:00	03-03-2017 11:50
SP6 3-4.0	7C03012-06	Soil	03/02/17 00:00	03-03-2017 11:50
SP7-0-1.0	7C03012-07	Soil	03/02/17 00:00	03-03-2017 11:50
SP8 0-1.0	7C03012-08	Soil	03/02/17 00:00	03-03-2017 11:50
SP8 1-2.0	7C03012-09	Soil	03/02/17 00:00	03-03-2017 11:50
SP9 0-1.0	7C03012-10	Soil	03/02/17 00:00	03-03-2017 11:50
SP10 0-1.0	7C03012-11	Soil	03/02/17 00:00	03-03-2017 11:50
SP11 0-1.0	7C03012-12	Soil	03/02/17 00:00	03-03-2017 11:50
SP12 0-1.0	7C03012-13	Soil	03/02/17 00:00	03-03-2017 11:50
SP13 0-1.0	7C03012-14	Soil	03/02/17 00:00	03-03-2017 11:50
SP14 0-1.0	7C03012-15	Soil	03/02/17 00:00	03-03-2017 11:50
SP15 0-1.0	7C03012-16	Soil	03/02/17 00:00	03-03-2017 11:50
SP16 0-1.0	7C03012-17	Soil	03/02/17 00:00	03-03-2017 11:50
SP17 0-1.0	7C03012-18	Soil	03/02/17 00:00	03-03-2017 11:50
SP18 0-1.0	7C03012-19	Soil	03/02/17 00:00	03-03-2017 11:50
SP19 0-1.0	7C03012-20	Soil	03/02/17 00:00	03-03-2017 11:50
SP19 1-2.0	7C03012-21	Soil	03/02/17 00:00	03-03-2017 11:50
SP19 2-3.0	7C03012-22	Soil	03/02/17 00:00	03-03-2017 11:50
SP20 0-1.0	7C03012-23	Soil	03/02/17 00:00	03-03-2017 11:50

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP4 0-1.0

7C03012-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	**0.187**	0.111	mg/kg dry	100	P7C0812	03/08/17	03/08/17	EPA 8021B	
Toluene	**0.671**	0.222	mg/kg dry	100	P7C0812	03/08/17	03/08/17	EPA 8021B	
Ethylbenzene	**8.21**	0.111	mg/kg dry	100	P7C0812	03/08/17	03/08/17	EPA 8021B	
Xylene (p/m)	**10.3**	0.222	mg/kg dry	100	P7C0812	03/08/17	03/08/17	EPA 8021B	
Xylene (o)	**5.45**	0.111	mg/kg dry	100	P7C0812	03/08/17	03/08/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*89.4 %*	*75-125*		*P7C0812*	*03/08/17*	*03/08/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*97.5 %*	*75-125*		*P7C0812*	*03/08/17*	*03/08/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**2420**	11.1	mg/kg dry	10	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**5260**	278	mg/kg dry	10	P7C0807	03/07/17	03/08/17	TPH 8015M	
>C12-C28	**35500**	278	mg/kg dry	10	P7C0807	03/07/17	03/08/17	TPH 8015M	
>C28-C35	**6290**	278	mg/kg dry	10	P7C0807	03/07/17	03/08/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*89.7 %*	*70-130*		*P7C0807*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*94.8 %*	*70-130*		*P7C0807*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**47100**	278	mg/kg dry	10	[CALC]	03/07/17	03/08/17	calc	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP5 0-1.0

7C03012-02 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	**0.0620**	0.0225	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Toluene	**0.745**	0.0449	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Ethylbenzene	**6.68**	0.0225	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (p/m)	**7.08**	0.0449	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (o)	**3.64**	0.0225	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*92.7 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*77.9 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**4970**	28.1	mg/kg dry	25	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**905**	140	mg/kg dry	5	P7C0807	03/07/17	03/08/17	TPH 8015M	
>C12-C28	**3270**	140	mg/kg dry	5	P7C0807	03/07/17	03/08/17	TPH 8015M	
>C28-C35	**639**	140	mg/kg dry	5	P7C0807	03/07/17	03/08/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*100 %*	*70-130*		*P7C0807*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*103 %*	*70-130*		*P7C0807*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**4820**	140	mg/kg dry	5	[CALC]	03/07/17	03/08/17	calc	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP6 0-1.0

7C03012-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	**7.85**	0.222	mg/kg dry	200	P7C0812	03/08/17	03/09/17	EPA 8021B	
Toluene	**78.7**	0.444	mg/kg dry	200	P7C0812	03/08/17	03/09/17	EPA 8021B	
Ethylbenzene	**60.5**	0.222	mg/kg dry	200	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (p/m)	**51.6**	0.444	mg/kg dry	200	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (o)	**23.8**	0.222	mg/kg dry	200	P7C0812	03/08/17	03/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*84.0 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*91.6 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**2890**	27.8	mg/kg dry	25	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**3550**	278	mg/kg dry	10	P7C0807	03/07/17	03/08/17	TPH 8015M	
>C12-C28	**8320**	278	mg/kg dry	10	P7C0807	03/07/17	03/08/17	TPH 8015M	
>C28-C35	**1570**	278	mg/kg dry	10	P7C0807	03/07/17	03/08/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*105 %*	*70-130*		*P7C0807*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*111 %*	*70-130*		*P7C0807*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**13400**	278	mg/kg dry	10	[CALC]	03/07/17	03/08/17	calc	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP6 1-2.0

7C03012-04 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	**14.2**	1.14	mg/kg dry	1000	P7C0812	03/08/17	03/10/17	EPA 8021B	
Toluene	**116**	2.27	mg/kg dry	1000	P7C0812	03/08/17	03/10/17	EPA 8021B	
Ethylbenzene	**102**	1.14	mg/kg dry	1000	P7C0812	03/08/17	03/10/17	EPA 8021B	
Xylene (p/m)	**93.9**	2.27	mg/kg dry	1000	P7C0812	03/08/17	03/10/17	EPA 8021B	
Xylene (o)	**35.1**	1.14	mg/kg dry	1000	P7C0812	03/08/17	03/10/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*102 %*	*75-125*		*P7C0812*	*03/08/17*	*03/10/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*90.2 %*	*75-125*		*P7C0812*	*03/08/17*	*03/10/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**4890**	28.4	mg/kg dry	25	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**5040**	142	mg/kg dry	5	P7C1014	03/09/17	03/10/17	TPH 8015M	
>C12-C28	**5910**	142	mg/kg dry	5	P7C1014	03/09/17	03/10/17	TPH 8015M	
>C28-C35	**940**	142	mg/kg dry	5	P7C1014	03/09/17	03/10/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*104 %*	*70-130*		*P7C1014*	*03/09/17*	*03/10/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*101 %*	*70-130*		*P7C1014*	*03/09/17*	*03/10/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**11900**	142	mg/kg dry	5	[CALC]	03/09/17	03/10/17	calc	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP6 2-3.0

7C03012-05 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	**0.0679**	0.0225	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Toluene	**2.16**	0.0449	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Ethylbenzene	**3.15**	0.0225	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (p/m)	**2.55**	0.0449	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (o)	**1.23**	0.0225	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*95.2 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*94.8 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**6320**	28.1	mg/kg dry	25	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**550**	28.1	mg/kg dry	1	P7C1014	03/09/17	03/10/17	TPH 8015M	
>C12-C28	**1650**	28.1	mg/kg dry	1	P7C1014	03/09/17	03/10/17	TPH 8015M	
>C28-C35	**243**	28.1	mg/kg dry	1	P7C1014	03/09/17	03/10/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*78.9 %*	*70-130*		*P7C1014*	*03/09/17*	*03/10/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*77.7 %*	*70-130*		*P7C1014*	*03/09/17*	*03/10/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**2440**	28.1	mg/kg dry	1	[CALC]	03/09/17	03/10/17	calc	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP6 3-4.0

7C03012-06 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**6190**	28.4	mg/kg dry	25	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP7-0-1.0

7C03012-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**11800**	56.2	mg/kg dry	50	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**11.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP8 0-1.0

7C03012-08 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**21.7**	1.05	mg/kg dry	1	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP8 1-2.0

7C03012-09 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.05	mg/kg dry	1	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP9 0-1.0

7C03012-10 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**3890**	28.4	mg/kg dry	25	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP10 0-1.0

7C03012-11 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.0220	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Toluene	**0.503**	0.0440	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Ethylbenzene	**5.08**	0.0220	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (p/m)	**6.45**	0.0440	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (o)	**2.77**	0.0220	mg/kg dry	20	P7C0812	03/08/17	03/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*97.2 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*96.2 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**6430**	27.5	mg/kg dry	25	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**1250**	137	mg/kg dry	5	P7C1012	03/07/17	03/08/17	TPH 8015M	
>C12-C28	**5710**	137	mg/kg dry	5	P7C1012	03/07/17	03/08/17	TPH 8015M	
>C28-C35	**965**	137	mg/kg dry	5	P7C1012	03/07/17	03/08/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*100 %*	*70-130*		*P7C1012*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*106 %*	*70-130*		*P7C1012*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**7930**	137	mg/kg dry	5	[CALC]	03/07/17	03/08/17	calc	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP11 0-1.0

7C03012-12 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1650**	5.32	mg/kg dry	5	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP12 0-1.0

7C03012-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**5.65**	1.05	mg/kg dry	1	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP13 0-1.0

7C03012-14 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.09	mg/kg dry	1	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP14 0-1.0

7C03012-15 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**1430**	5.21	mg/kg dry	5	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP15 0-1.0

7C03012-16 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	**0.191**	0.104	mg/kg dry	100	P7C0812	03/08/17	03/09/17	EPA 8021B	
Toluene	**5.62**	0.208	mg/kg dry	100	P7C0812	03/08/17	03/09/17	EPA 8021B	
Ethylbenzene	**41.5**	0.104	mg/kg dry	100	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (p/m)	**43.5**	0.208	mg/kg dry	100	P7C0812	03/08/17	03/09/17	EPA 8021B	
Xylene (o)	**21.1**	0.104	mg/kg dry	100	P7C0812	03/08/17	03/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*69.2 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
Surrogate: 1,4-Difluorobenzene		*93.2 %*	*75-125*		*P7C0812*	*03/08/17*	*03/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**984**	1.04	mg/kg dry	1	P7C1006	03/10/17	03/14/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**4040**	260	mg/kg dry	10	P7C1012	03/07/17	03/08/17	TPH 8015M	
>C12-C28	**20000**	260	mg/kg dry	10	P7C1012	03/07/17	03/08/17	TPH 8015M	
>C28-C35	**3850**	260	mg/kg dry	10	P7C1012	03/07/17	03/08/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*122 %*	*70-130*		*P7C1012*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*122 %*	*70-130*		*P7C1012*	*03/07/17*	*03/08/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**27900**	260	mg/kg dry	10	[CALC]	03/07/17	03/08/17	calc	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP16 0-1.0

7C03012-17 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**3150**	11.0	mg/kg dry	10	P7C1007	03/10/17	03/15/17	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP17 0-1.0

7C03012-18 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.06	mg/kg dry	1	P7C1007	03/10/17	03/15/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP18 0-1.0

7C03012-19 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.02	mg/kg dry	1	P7C1007	03/10/17	03/15/17	EPA 300.0	
% Moisture	**2.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP19 0-1.0

7C03012-20 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.05	mg/kg dry	1	P7C1007	03/10/17	03/15/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP19 1-2.0

7C03012-21 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.04	mg/kg dry	1	P7C1007	03/10/17	03/15/17	EPA 300.0	
% Moisture	**4.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP19 2-3.0

7C03012-22 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.05	mg/kg dry	1	P7C1007	03/10/17	03/15/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

SP20 0-1.0

7C03012-23 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	ND	1.05	mg/kg dry	1	P7C1007	03/10/17	03/15/17	EPA 300.0	
% Moisture	**5.0**	0.1	%	1	P7C0604	03/06/17	03/06/17	% calculation	

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

Organics by GC - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C0812 - General Preparation (GC)										
Blank (P7C0812-BLK1)				Prepared & Analyzed: 03/08/17						
Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 1,4-Difluorobenzene	*0.0607*		*"*	*0.0600*		*101*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0616*		*"*	*0.0600*		*103*	*75-125*			
LCS (P7C0812-BS1)				Prepared & Analyzed: 03/08/17						
Benzene	0.0840	0.00100	mg/kg wet	0.100		84.0	70-130			
Toluene	0.0859	0.00200	"	0.100		85.9	70-130			
Ethylbenzene	0.100	0.00100	"	0.100		100	70-130			
Xylene (p/m)	0.187	0.00200	"	0.200		93.3	70-130			
Xylene (o)	0.0922	0.00100	"	0.100		92.2	70-130			
Surrogate: 1,4-Difluorobenzene	*0.0610*		*"*	*0.0600*		*102*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0644*		*"*	*0.0600*		*107*	*75-125*			
LCS Dup (P7C0812-BSD1)				Prepared & Analyzed: 03/08/17						
Benzene	0.0863	0.00100	mg/kg wet	0.100		86.3	70-130	2.71	20	
Toluene	0.0925	0.00200	"	0.100		92.5	70-130	7.48	20	
Ethylbenzene	0.110	0.00100	"	0.100		110	70-130	9.16	20	
Xylene (p/m)	0.198	0.00200	"	0.200		99.1	70-130	6.06	20	
Xylene (o)	0.0990	0.00100	"	0.100		99.0	70-130	7.09	20	
Surrogate: 1,4-Difluorobenzene	*0.0645*		*"*	*0.0600*		*108*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0681*		*"*	*0.0600*		*114*	*75-125*			
Matrix Spike (P7C0812-MS1)	**Source: 7C03011-39**			Prepared & Analyzed: 03/08/17						
Benzene	0.0812	0.00111	mg/kg dry	0.111	ND	73.1	80-120			QM-07
Toluene	0.0626	0.00222	"	0.111	0.000611	55.8	80-120			QM-07
Ethylbenzene	0.0447	0.00111	"	0.111	ND	40.2	80-120			QM-07
Xylene (p/m)	0.0814	0.00222	"	0.222	0.00103	36.2	80-120			QM-07
Xylene (o)	0.0403	0.00111	"	0.111	ND	36.3	80-120			QM-07
Surrogate: 1,4-Difluorobenzene	*0.0676*		*"*	*0.0667*		*101*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0724*		*"*	*0.0667*		*109*	*75-125*			

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

Organics by GC - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C0812 - General Preparation (GC)										
Matrix Spike Dup (P7C0812-MSD1)		**Source: 7C03011-39**		Prepared & Analyzed: 03/08/17						
Benzene	0.121	0.00111	mg/kg dry	0.111	ND	109	80-120	39.2	20	R3
Toluene	0.116	0.00222	"	0.111	0.000611	104	80-120	60.0	20	R3
Ethylbenzene	0.113	0.00111	"	0.111	ND	102	80-120	86.9	20	R3
Xylene (p/m)	0.206	0.00222	"	0.222	0.00103	92.5	80-120	87.6	20	R3
Xylene (o)	0.104	0.00111	"	0.111	ND	93.6	80-120	88.2	20	R3
Surrogate: 4-Bromofluorobenzene	*0.0814*		*"*	*0.0667*		*122*	*75-125*			
Surrogate: 1,4-Difluorobenzene	*0.0766*		*"*	*0.0667*		*115*	*75-125*			

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C0604 - * DEFAULT PREP *** **										
Blank (P7C0604-BLK1)				Prepared & Analyzed: 03/06/17						
% Moisture	ND	0.1	%							
Blank (P7C0604-BLK2)				Prepared & Analyzed: 03/06/17						
% Moisture	ND	0.1	%							
Blank (P7C0604-BLK3)				Prepared & Analyzed: 03/06/17						
% Moisture	ND	0.1	%							
Duplicate (P7C0604-DUP1)		**Source: 7C03007-01**		Prepared & Analyzed: 03/06/17						
% Moisture	3.0	0.1	%		3.0			0.00	20	
Duplicate (P7C0604-DUP2)		**Source: 7C03009-23**		Prepared & Analyzed: 03/06/17						
% Moisture	11.0	0.1	%		11.0			0.00	20	
Duplicate (P7C0604-DUP3)		**Source: 7C03010-05**		Prepared & Analyzed: 03/06/17						
% Moisture	10.0	0.1	%		11.0			9.52	20	
Duplicate (P7C0604-DUP4)		**Source: 7C03011-13**		Prepared & Analyzed: 03/06/17						
% Moisture	10.0	0.1	%		10.0			0.00	20	
Duplicate (P7C0604-DUP5)		**Source: 7C03011-38**		Prepared & Analyzed: 03/06/17						
% Moisture	5.0	0.1	%		5.0			0.00	20	
Duplicate (P7C0604-DUP6)		**Source: 7C03012-16**		Prepared & Analyzed: 03/06/17						
% Moisture	5.0	0.1	%		4.0			22.2	20	R3
Duplicate (P7C0604-DUP7)		**Source: 7C03014-08**		Prepared & Analyzed: 03/06/17						
% Moisture	4.0	0.1	%		8.0			66.7	20	R3

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C0604 - * DEFAULT PREP *** **										
Duplicate (P7C0604-DUP8)	**Source: 7C03016-06**			Prepared & Analyzed: 03/06/17						
% Moisture	16.0	0.1	%		17.0			6.06	20	
Duplicate (P7C0604-DUP9)	**Source: 7C03016-13**			Prepared & Analyzed: 03/06/17						
% Moisture	11.0	0.1	%		12.0			8.70	20	
Batch P7C1006 - * DEFAULT PREP *** **										
Blank (P7C1006-BLK1)				Prepared: 03/10/17 Analyzed: 03/14/17						
Chloride	ND	1.00	mg/kg wet							
LCS (P7C1006-BS1)				Prepared: 03/10/17 Analyzed: 03/13/17						
Chloride	407	1.00	mg/kg wet	400		102	80-120			
LCS Dup (P7C1006-BSD1)				Prepared: 03/10/17 Analyzed: 03/13/17						
Chloride	406	1.00	mg/kg wet	400		102	80-120	0.0615	20	
Duplicate (P7C1006-DUP1)	**Source: 7C03011-45**			Prepared: 03/10/17 Analyzed: 03/14/17						
Chloride	3490	27.2	mg/kg dry		3570			2.34	20	
Duplicate (P7C1006-DUP2)	**Source: 7C03012-07**			Prepared: 03/10/17 Analyzed: 03/14/17						
Chloride	11900	56.2	mg/kg dry		11800			0.826	20	
Matrix Spike (P7C1006-MS1)	**Source: 7C03011-45**			Prepared: 03/10/17 Analyzed: 03/14/17						
Chloride	5810	27.2	mg/kg dry	2720	3570	82.2	80-120			
Batch P7C1007 - * DEFAULT PREP *** **										
Blank (P7C1007-BLK1)				Prepared: 03/10/17 Analyzed: 03/15/17						
Chloride	ND	1.00	mg/kg wet							

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C1007 - * DEFAULT PREP *** **										
LCS (P7C1007-BS1)				Prepared: 03/10/17 Analyzed: 03/15/17						
Chloride	405	1.00	mg/kg wet	400		101	80-120			
LCS Dup (P7C1007-BSD1)				Prepared: 03/10/17 Analyzed: 03/15/17						
Chloride	404	1.00	mg/kg wet	400		101	80-120	0.212	20	
Duplicate (P7C1007-DUP1)		**Source: 7C03012-17**		Prepared: 03/10/17 Analyzed: 03/15/17						
Chloride	3140	11.0	mg/kg dry		3150			0.0943	20	
Duplicate (P7C1007-DUP2)		**Source: 7C06003-02**		Prepared: 03/10/17 Analyzed: 03/15/17						
Chloride	1600	28.1	mg/kg dry		1660			3.68	20	
Matrix Spike (P7C1007-MS1)		**Source: 7C03012-17**		Prepared: 03/10/17 Analyzed: 03/15/17						
Chloride	4450	11.0	mg/kg dry	1100	3150	119	80-120			

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C0807 - TX 1005										
Blank (P7C0807-BLK1)				Prepared & Analyzed: 03/07/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*89.0*		*"*	*100*		*89.0*	*70-130*			
Surrogate: o-Terphenyl	*48.0*		*"*	*50.0*		*96.0*	*70-130*			
LCS (P7C0807-BS1)				Prepared & Analyzed: 03/07/17						
C6-C12	745	25.0	mg/kg wet	750		99.4	75-125			
>C12-C28	816	25.0	"	750		109	75-125			
Surrogate: 1-Chlorooctane	*93.6*		*"*	*100*		*93.6*	*70-130*			
Surrogate: o-Terphenyl	*44.9*		*"*	*50.0*		*89.8*	*70-130*			
LCS Dup (P7C0807-BSD1)				Prepared & Analyzed: 03/07/17						
C6-C12	810	25.0	mg/kg wet	750		108	75-125	8.27	20	
>C12-C28	929	25.0	"	750		124	75-125	13.0	20	
Surrogate: 1-Chlorooctane	*85.2*		*"*	*100*		*85.2*	*70-130*			
Surrogate: o-Terphenyl	*40.9*		*"*	*50.0*		*81.8*	*70-130*			
Matrix Spike (P7C0807-MS1)	**Source: 7C03011-44**			Prepared: 03/07/17 Analyzed: 03/08/17						
C6-C12	1040	29.4	mg/kg dry	1180	33.6	85.7	75-125			
>C12-C28	1120	29.4	"	1180	13.7	93.6	75-125			
Surrogate: 1-Chlorooctane	*107*		*"*	*118*		*90.7*	*70-130*			
Surrogate: o-Terphenyl	*51.7*		*"*	*58.8*		*87.9*	*70-130*			
Matrix Spike Dup (P7C0807-MSD1)	**Source: 7C03011-44**			Prepared: 03/07/17 Analyzed: 03/08/17						
C6-C12	1030	29.4	mg/kg dry	1180	33.6	84.5	75-125	1.41	20	
>C12-C28	1100	29.4	"	1180	13.7	92.3	75-125	1.41	20	
Surrogate: 1-Chlorooctane	*106*		*"*	*118*		*90.3*	*70-130*			
Surrogate: o-Terphenyl	*51.0*		*"*	*58.8*		*86.6*	*70-130*			

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C1012 - TX 1005										
Blank (P7C1012-BLK1)				Prepared: 03/07/17 Analyzed: 03/08/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*95.5*		*"*	*100*		*95.5*	*70-130*			
Surrogate: o-Terphenyl	*51.8*		*"*	*50.0*		*104*	*70-130*			
LCS (P7C1012-BS1)				Prepared: 03/07/17 Analyzed: 03/08/17						
C6-C12	870	25.0	mg/kg wet	1000		87.0	75-125			
>C12-C28	972	25.0	"	1000		97.2	75-125			
Surrogate: 1-Chlorooctane	*108*		*"*	*100*		*108*	*70-130*			
Surrogate: o-Terphenyl	*54.6*		*"*	*50.0*		*109*	*70-130*			
LCS Dup (P7C1012-BSD1)				Prepared: 03/07/17 Analyzed: 03/08/17						
C6-C12	797	25.0	mg/kg wet	1000		79.7	75-125	8.74	20	
>C12-C28	859	25.0	"	1000		85.9	75-125	12.3	20	
Surrogate: 1-Chlorooctane	*95.7*		*"*	*100*		*95.7*	*70-130*			
Surrogate: o-Terphenyl	*46.8*		*"*	*50.0*		*93.6*	*70-130*			
Batch P7C1014 - TX 1005										
Blank (P7C1014-BLK1)				Prepared & Analyzed: 03/09/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*67.0*		*"*	*100*		*67.0*	*70-130*			*S-GC*
Surrogate: o-Terphenyl	*40.4*		*"*	*50.0*		*80.8*	*70-130*			

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7C1014 - TX 1005										
LCS (P7C1014-BS1)				Prepared & Analyzed: 03/09/17						
C6-C12	1080	25.0	mg/kg wet	1000		108	75-125			
>C12-C28	1060	25.0	"	1000		106	75-125			
Surrogate: 1-Chlorooctane	*79.7*		*"*	*100*		*79.7*	*70-130*			
Surrogate: o-Terphenyl	*37.2*		*"*	*50.0*		*74.5*	*70-130*			
LCS Dup (P7C1014-BSD1)				Prepared & Analyzed: 03/09/17						
C6-C12	1070	25.0	mg/kg wet	1000		107	75-125	0.812	20	
>C12-C28	1050	25.0	"	1000		105	75-125	1.09	20	
Surrogate: 1-Chlorooctane	*78.2*		*"*	*100*		*78.2*	*70-130*			
Surrogate: o-Terphenyl	*37.2*		*"*	*50.0*		*74.4*	*70-130*			
Matrix Spike (P7C1014-MS1)	**Source: 7C08014-04**			Prepared: 03/09/17 Analyzed: 03/10/17						
C6-C12	1270	29.1	mg/kg dry	1160	23.5	107	75-125			
>C12-C28	1220	29.1	"	1160	ND	105	75-125			
Surrogate: 1-Chlorooctane	*95.9*		*"*	*116*		*82.5*	*70-130*			
Surrogate: o-Terphenyl	*43.2*		*"*	*58.1*		*74.3*	*70-130*			
Matrix Spike Dup (P7C1014-MSD1)	**Source: 7C08014-04**			Prepared: 03/09/17 Analyzed: 03/10/17						
C6-C12	1310	29.1	mg/kg dry	1160	23.5	111	75-125	3.37	20	
>C12-C28	1230	29.1	"	1160	ND	106	75-125	0.548	20	
Surrogate: 1-Chlorooctane	*91.8*		*"*	*116*		*78.9*	*70-130*			
Surrogate: o-Terphenyl	*43.7*		*"*	*58.1*		*75.2*	*70-130*			

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

Notes and Definitions

S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
R3	The RPD exceeded the acceptance limit due to sample matrix effects.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
BULK	Samples received in Bulk soil containers
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By:  Date: 3/17/2017

Brent Barron, Laboratory Director/Technical Director

Mack Energy	Project: Calgary Release	Fax:
PO Box 960/ 11344 Lovington Highway	Project Number: [none]	
Artesia NM, 88211	Project Manager: Matt Buckles	

PBELAB

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Permian Basin Environmental Lab, LP
1400 Rankin Hwy
Midland, Texas 79701

Phone: 432-686-7235

Project Manager: Matt Buckles

Company Name: Mack Energy

Company Address: P.O. Box 960 / 11344 Lovington Highway

City/State/Zip: Artesia, New Mexico 88211-0960

Telephone No: (575) 748-1288 Fax No:

Sampler Signature:

e-mail: mattbuckles@mec.com, d.holt@aspengrow.us, k.freeman@aspengrow.us, nesg@cox.net

Project Name: Calgary Release

Project #:

Project Loc: LOCO HILLS, NM

PO #:

Report Format: X Standard ☐ TRRP ☐ NPDES

(lab use only) ORDER #: 1C03012

LAB # (lab use only)	FIELD CODE	Beginning Depth	Ending Depth	Date Sampled	Time Sampled	Field Filtered	Total # of Containers	Preservation & # of Containers: HNO_3 250 ml Poly	HCl	H_2SO_4	NaOH	$Na_2S_2O_3$	None 1L Poly	NaOH/ZnAc	Matrix: DW=Drinking Water SL=Sludge GW = Groundwater S=Soil/Solid NP=Non-Potable Specify Other	Analyze For: TPH by TX 1005 8015B 8015M	Chloride	BTEX by 8021B	Rush 24 48 72 (Please call)	Standard
1	SP4	0	1.0	03/02/17			1								S	X	X	X		
2	SP5	0	1.0	03/02/17			1								S	X	X	X		
3	SP6	0	1.0	03/02/17			1								S	X	X	X		
4	SP6	1	2.0	03/02/17			1								S		X			
5	SP6	2	3.0	03/02/17			1								S		X			
6	SP6	3	4.0	03/02/17			1								S		X			
7	SP7	0	1.0	03/02/17			1								S		X			
8	SP8	0	1.0	03/02/17			1								S		X			
9	SP8	1	2.0	03/02/17			1								S		X			
10	SP9	0	1.0	03/02/17			1								S		X			

Special I

If total TPH exceeds 5,000 mg/kg, run deeper sample. If requested and total BTEX exceeds 50 mg/kg -run deeper sample
If requested test and total Benzene exceeds 10 mg/kg -run deeper sample

Relinquished by:	Date 3/3/17	Time 11:45	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date 3-4-17	Time 11:50

Laboratory Comments:

Sample Containers Intact?	Y N
VOCs Free of Headspace?	Y N
Labels on container(s)	Y N
Custody seals on container(s)	Y N
Custody seals on cooler(s)	Y N
Sample Hand Delivered by Sampler/Client Rep. ?	Y N
by Courier? UPS DHL FedEx Lone Star	

Temperature Upon Receipt:
Received: 2.0 °C
Adjusted: °C Factor

PBELAB

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Permian Basin Environmental Lab, LP
1400 Rankin Hwy
Midland, Texas 79701

Phone: 432-686-7235

Project Manager: Matt Buckles

Project Name: Calgary Release

Company Name: Mack Energy

Project #:

Company Address: P.O. Box 960 / 11344 Lovington Highway

Project Loc: LOCO HILLS, NM

City/State/Zip: Artesia, New Mexico 88211-0960

PO #:

Telephone No: (575) 748-1288

Fax No:

Report Format: X Standard ☐ TRRP ☐ NPDES

Sampler Signature:

e-mail: mattbuckles@mec.com, d.holt@aspengrow.us, k.freeman@aspengrow.us, nesq@cox.net

(lab use only) ORDER #: 1C03012

LAB # (lab use only)	FIELD CODE	Beginning Depth	Ending Depth	Date Sampled	Time Sampled	Field Filtered	Total # of Containers	Preservation & # of Containers: HNO_3 250 ml Poly	HCl	H_2SO_4	NaOH	$Na_2S_2O_2$	None 1L Poly	NaOH/ZnAc	Matrix: DW=Drinking Water SL=Sludge; GW = Groundwater S=Soil/Solid; NP=Non-Potable Specify Other	Analyze For: TPH by TX 1005 8015B 8015M	Chloride	BTEX by 8021B	Rush 24 48 72 (Please call)	Standard
11	SP10	0	1.0	03/02/17			1								S	X	X	X		X
12	SP11	0	1.0	03/02/17			1								S		X			
13	SP12	0	1.0	03/02/17			1								S		X			
14	SP13	0	1.0	03/02/17			1								S		X			
15	SP14	0	1.0	03/02/17			1								S		X			
16	SP15	0	1.0	03/02/17			1								S	X	X	X		
17	SP16	0	1.0	03/02/17			1								S		X			
18	SP17	0	1.0	03/02/17			1								S		X			
19	SP18	0	1.0	03/02/17			1								S		X			
20	SP19	0	1.0	03/02/17			1								S		X			

Special I

If total TPH exceeds 5,000 mg/kg, run deeper sample. If requested and total BTEX exceeds 50 mg/kg -run deeper sample
If requested test and total Benzene exceeds 10 mg/kg -run deeper sample

Relinquished by:	Date	Time		Received by:	Date	Time
Relinquished by:	Date	Time		Received by:	Date	Time
Relinquished by:	Date	Time		Received by:	Date 9/5/17	Time 1120

Laboratory Comments:

Sample Containers Intact?	Y	N
VOCs Free of Headspace?	Y	N
Labels on container(s)	Y	N
Custody seals on container(s)	Y	N
Custody seals on cooler(s)	Y	N
Sample Hand Delivered	NC	N
by Sampler/Client Rep. ?	Y	N

by Courier? UPS DHL FedEx Lone Star

Temperature Upon Receipt:
Received: 3.0 °C
Adjusted: °C Factor

PBELAB

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Permian Basin Environmental Lab, LP
1400 Rankin Hwy
Midland, Texas 79701

Phone: 432-686-7235

Project Manager: Matt Buckles

Project Name: Calgary Release

Company Name: Mack Energy

Project #:

Company Address: P.O. Box 960 / 11344 Lovington Highway

Project Loc: LOCO HILLS, NM

City/State/Zip: Artesia, New Mexico 88211-0960

PO #:

Telephone No: (575) 748-1288

Fax No:

Report Format: X Standard ☐ TRRP ☐ NPDES

Sampler Signature:

e-mail: mattbuckles@mec.com, d.holt@aspengrow.us, k.freeman@aspengrow.us, nesg@cox.net

(lab use only) ORDER #: 1603012

LAB # (lab use only)	FIELD CODE	Beginning Depth	Ending Depth	Date Sampled	Time Sampled	Field Filtered	Total # of Containers	Preservation & # of Containers: HNO_3 250 ml Poly	HCl	H_2SO_4	NaOH	$Na_2S_2O_3$	None 1L Poly	NaOH/ZnAc	Matrix: DW=Drinking Water SL=Sludge	GW = Groundwater S=Soil/Solid	NP=Non-Potable Specify Other	Analyze For: TPH by TX 1005 8015B 8015M	Chloride	BTEX by 8021B	Rush 24 48 72 (Please call)	Standard
1	SP19	1	2.0	03/02/17			1									S			X			
2	SP19	2	3.0	03/02/17			1									S			X			
3	SP20	0	1.0	03/02/17			1									S			X			
							1									S						
							1									S						
							1									S						
							1									S						
							1									S						
							1									S						
							1									S						
							1									S						

Special I

If total TPH exceeds 5,000 mg/kg, run deeper sample. If requested and total BTEX exceeds 50 mg/kg -run deeper sample
If requested test and total Benzene exceeds 10 mg/kg -run deeper sample

Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
				9.21.17	1150

Laboratory Comments:

Sample Containers Intact?	Y	N
VOCs Free of Headspace?	Y	N
Labels on container(s)	Y	N
Custody seals on container(s)	Y	N
Custody seals on cooler(s)	Y	N
Sample Hand Delivered	Y	N
by Sampler/Client Rep. ?	Y	N
by Courier? UPS DHL FedEx Lone Star		

Temperature Upon Receipt:
Received: 2.0 °C
Adjusted: 2.0 °C Factor

From: k.freeman@aspengrow.us
To: Weaver, Crystal, EMNRD
Cc: Matt Buckles; Don Holt
Subject: Calgary Federal Spill - Mack Oil Company
Date: Wednesday, April 12, 2017 4:38:14 PM
Attachments: image001.png
Calgary Federal Spill - Loco Hills NM - Mack Oil Company.kmz

Crystal,
My apology, I mis-labeled the pictures and kmz flie as Creek in the previous email. It should have been the Calgary Federal Spill. I have corrected the pictures and kmz file to reflect the change.

thanks,

Kevin Freeman
Aspen Grow LLC.
3001 West Loop 250 N.
Ste. C 105-166
Midland, Texas 79705
210-213-0397 (c)

From: Flores, Rick
To: Weaver, Crystal, EMNRD
Subject: Re: Calgary Work Plan
Date: Wednesday, April 19, 2017 2:50:26 PM

BLM's NRS should be there on the 28th, if not we will let you know.

On Tue, Apr 18, 2017 at 8:53 AM, Weaver, Crystal, EMNRD <Crystal.Weaver@state.nm.us> wrote:

> Ok so update –
>
> It is sounding like we are good with Friday April 28th at 10am (BLM, I hope the 10am part is good for you all). Matt offered to have the meeting at the Chase building instead of our office because it is more accommodating. So we are good with that.
>
> Other than that if anyone has any thoughts or questions feel free to share.
>
> Thank you all,
>
> **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: Weaver, Crystal, EMNRD
Sent: Friday, April 14, 2017 11:48 AM
To: 'Matt Buckles' <mattbuckles@mec.com>; Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Cc: 'Davis, Harley (hcdavis@blm.gov) (hcdavis@blm.gov)' <hcdavis@blm.gov>; 'K.freeman@aspengrow.us' <K.freeman@aspengrow.us>; 'Jerry Sherrell' <jerrys@mec.com>; 'Lee Livingston' <leel@mec.com>; 'Flores, Rick' <rflores@blm.gov>

Subject: RE: Calgary Work Plan

Hey all,

So I got an update from Bradford, our Hydrologist, and he said it would be best for him if we could all meet up in the morning on April 28th, Friday. Matt I heard you might have some schedule issues so I hope this helps you out.

What time is good, 9 or 10am?

Let me know what you all think.

Thanks guys,

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: Weaver, Crystal, EMNRD
Sent: Tuesday, April 11, 2017 3:27 PM
To: 'Matt Buckles' <mattbuckles@mec.com>; Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Cc: Davis, Harley (hcdavis@blm.gov) (hcdavis@blm.gov) <hcdavis@blm.gov>; K.freeman@aspengrow.us; Jerry Sherrell <jerrys@mec.com>; Lee Livingston <leel@mec.com>
Subject: RE: Calgary Work Plan

Hello Matt,

As I mentioned, on the phone, OCD wanted to meet with you and the Aspen Grow guys and hopefully the BLM fellas as well to discuss how we can move this item forward. Our Hydrologist, Bradford Billings, out of Santa Fe, had requested to attend. He will be here April 27th so we are hoping that would work as a doable day for you all to meet at our office and discuss this.

Please let me know if that works or not.

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: Matt Buckles [mailto:mattbuckles@mec.com]
Sent: Wednesday, March 22, 2017 3:58 PM
To: Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>
Cc: Davis, Harley (hcdavis@blm.gov) (hcdavis@blm.gov) <hcdavis@blm.gov>; Weaver, Crystal, EMNRD <Crystal.Weaver@state.nm.us>; K.freeman@aspengrow.us; Jerry Sherrell <jerrys@mec.com>; Lee Livingston <leel@mec.com>
Subject: Calgary Work Plan

Attached is the work plan Aspen Grow and Mack Energy have worked on to remediate the flowline spill at the Calgary. Also attached are the samples taken at the site. Let me know if you have any questions or need anything else.

Thanks,

Matt Buckles

Mack Energy Corporation

11344 Lovington Highway

Artesia NM 88210

575-748-1288 Office

575-703-1958 Mobile

575-746-5508 Fax

Email:mattbuckles@mec.com

> http://www.mec.com

--

Rick Flores

Natural Resource Specialist

U.S Department of the Interior

Bureau of Land Management

Roswell Field Office

Ph# 575-627-0339

From: Matt Buckles
To: Davis, Harley (hcdavis@blm.gov) (hcdavis@blm.gov)
Cc: Weaver, Crystal, EMNRD; Jerry Sherrell
Subject: Calgary Release
Date: Tuesday, May 9, 2017 8:26:40 AM

Harley,

We were finally able to schedule a rig for Wednesday 5/10/2017 to find the bottom of the release and take two sampling points below in 5' intervals. We will sample as close to the release point as possible.

Let me know if you have any questions or concerns

Thanks,

Matt Buckles
Mack Energy Corporation
11344 Lovington Highway
Artesia NM 88210
575-748-1288 Office
575-703-1958 Mobile
575-746-5508 Fax
Email:mattbuckles@mec.com
http://www.mec.com


Date & Time: Tue Apr 11 14:34:08 MDT 2017
Position: +032°59'36.2" / -104°04'40.3"
Altitude: 3668ft
Datum: WGS-84
Azimuth/Bearing: 206° S26W 3662mils (True)
Elevation Angle: -53.2°
Horizon Angle: -01.3°
Zoom: 1X
Federal Release Mack Oil '4'

Date & Time: Tue Apr 11 14:35:11 MDT 2017
Position: +032°59'36.6" / -104°04'38.9"
Altitude: 3683ft
Datum: WGS-84
Azimuth/Bearing: 058° N58E 1031mils (True)
Elevation Angle: -39.2°
Horizon Angle: -01.0°
Zoom: 1X
Federal Release Mack Oil '5'


11 14:35:46 MDT 2017
Position: +032°59'36.6" / -104°04'38.1"
Altitude: 3685ft
Datum: WGS-84
Azimuth/Bearing: 064° N64E 1138mils (True)
Elevation Angle: -26.6°
Horizon Angle: -01.6°
Zoom: 1X
Federal Release Mack Oil '6'

Date & Time: Tue Apr 11 14:36:58 MDT 2017
Position: +032°59'35.5" / -104°04'37.0"
Altitude: 3684ft
Datum: WGS-84
Azimuth/Bearing: 087° N87E 1547mils (True)
Elevation Angle: -45.5°
Horizon Angle: -04.6°
Zoom: 1X
Federal Release Mack Oil "8"

Date & Time: Tue Apr 11 14:38:30 MDT 2017
Position: +032°59'35.1" / -104°04'37.2"
Altitude: 3684ft
Datum: WGS-84
Azimuth/Bearing: 196° S16W 3484mils (True)
Elevation Angle: -39.5°
Horizon Angle: +00.5°
Zoom: 1X
Federal Release Mack Oil '9'

Date & Time: Tue Apr 11 14:39:29 MDT 2017
Position: +032°59'34.0" / -104°04'37.3"
Altitude: 3685ft
Datum: WGS-84
Azimuth/Bearing: 258° S78W 4587mils (True)
Elevation Angle: -37.3°
Horizon Angle: +00.0°
Zoom: 1X
Federal Release Mack Oil '10'

Date & Time: Tue Apr 11 14:40.36 MDT 2017
Position: +032°59'32.4" / -104°04'38.1"
Altitude: 3682ft
Datum: WGS-84
Azimuth/Bearing: 251° S71W 4462mils (True)
Elevation Angle: -40.1°
Horizon Angle: +03.7°
Zoom: 1X
Federal Release Mack Oil '12'

Date & Time: Tue Apr 11 14:40:59 MDT 2017
Position: +032°59'32.6" / -104°04'38.4"
Altitude: 3681ft
Datum: WGS-84
Azimuth/Bearing: 101° S79E 1796mils (True)
Elevation Angle: -39.6°
Horizon Angle: -06.7°
Zoom: 1X
Federal Release Mack Oil "13"

Date & Time: Tue Apr 11 14:42.33 MDT 2017
Position: +032°59'33.7" / -104°04'36.8"
Altitude: 3689ft
Datum: WGS-84
Azimuth/Bearing: 164° S16E 2916mils (True)
Elevation Angle: -36.2°
Horizon Angle: +02.2°
Zoom: 1X
Federal Release Mack Oil '14'

Date & Time: Tue Apr 11 14:45:41 MDT 2017
Position: +032°59'32.9" / -104°04'36.1"
Altitude: 3689ft
Datum: WGS-84
Azimuth/Bearing: 212° S32W 3769mils (True)
Elevation Angle: -45.2°
Horizon Angle: +01.9°
Zoom: 1X
Federal Release Mack Oil '15'

Date & Time: Tue Apr 11 14:23:05 MDT 2017
Position: +032°59'34.2" / -104°04'44.1"
Altitude: 3624ft
Datum: WGS-84
Azimuth/Bearing: 080° N80E 1422mils (True)
Elevation Angle: -27.9°
Horizon Angle: +00.9°
Zoom: 1X
Federal Release Mack Oil 'w'

Date & Time: Tue Apr 11 14:53:41 MDT 2017
Position: +032°59'36.0" / -104°04'37.1"
Altitude: 3684ft
Datum: WGS-84
Azimuth/Bearing: 081° N81E 1440mils (True)
Elevation Angle: -30.7°
Horizon Angle: -02.8°
Zoom: 1X
Federal Release Mack Oil "19"

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 384149

CONDITIONS

Operator: MACK ENERGY CORP P.O. Box 960 Artesia, NM 882110960	OGRID: 13837
	Action Number: 384149
	Action Type: [IM-SD] Incident File Support Doc (ENV) (IM-BNF)

CONDITIONS

Created By	Condition	Condition Date
amaxwell	Historical document upload.	9/17/2024