



DELINEATION WORKPLAN

MACK ENERGY – KLONDIKE STATE LEASE (Leak Date: 10/15/17)

RP # 2RP-4446
API NO. 30-005-64295

This delineation workplan and remediation proposal addresses the release associated with RP # 2RP-4446.

The following information includes:

1. Scaled digital site map with spill area demarcated and leak point identified along with sample point locations and areas of remediation at appropriate depths.
2. GPS information for sample points and sample methodology
3. Depth to groundwater information (i.e., pdf of OSE search results and/or copy of Chevron groundwater trend map).
4. Laboratory analysis results summary table and original laboratory analysis reports
5. A copy of the initial C-141
6. Potentially other pertinent information as necessary for site specific purposes.

Based on the information included in this package and the NMOCD guidelines, the following remediation is proposed:

Mack Energy will excavate the spill area as depicted on the following site diagram. The area near SP1 – SP5, SP8 – SP10, SP12, and SP13 (yellow shade on diagram) will be excavated to a depth of 1 foot. The area near SP6 and SP11 (purple shade on diagram) will be excavated to a depth of 2 feet. The area near SP7 (blue shade on diagram) will be excavated to a depth of 3 feet.

The entire site will then be backfilled with clean soil and revegetated (if warranted) to the standards of the appropriate regulatory agency or private surface owner.

All excavated materials will be disposed of at an NMOCD-approved disposal facility.

Mack Energy, Klondike State Lease

Chaves County, NIM

Legend

- 2 ft Excavation
- 3 ft Excavation
- Cardinal sample points
- Leak Area 1
- Leak Area 2
- Sample points
- 1 ft Excavation



Mack Energy, Klondike State Lease

Sample points, hand auger/backhoe

SP1, N 32.98606 W-104.09817

SP2, N 32.98616 W-104.09811

SP3, N 32.98629 W-104.09802

SP4, N 32.98642 W-104.09794

SP5, N 32.98654 W-104.09786

SP6, N 32.98667 W-104.09777

SP7, N 32.98679 W-104.09769

SP8, N 32.98655 W-104.09793

SP9, N 32.98632 W-104.09808

SP10, N 32.98620 W-104.09815

SP11, N 32.98609 W-104.09822

SP12, N 32.98613 W-104.09829

SP13, N 32.98634 W-104.09814

N1, N 32.98637 W-104.09820

E1, N 32.98664 W-104.09788

W1, N 32.98601 W-104.09830

S1, N 32.98631 W-104.09806

N2, N 32.98641 W-104.09799

E2, N 32.98693 W-104.09758

W2, N 32.98599 W-104.09822

S2, N 32.98639 W-104.09788



New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

No records found.

UTMNAD83 Radius Search (in meters):

Easting (X): 584061

Northing (Y): 3650003

Radius: 1700

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

10/23/17 12:25 PM

WATER COLUMN/ AVERAGE
DEPTH TO WATER

Public Land Survey System (PLSS)

Q64: Q16: Q4: Sec: Tws: Rng:

State Plane Coordinate System - NAD27

X: ft Y: ft Zone:

State Plane Coordinate System - NAD83

X: ft Y: ft Zone:

Degrees/Minutes/Seconds

Longitude (X): Degrees: ° Minutes: ' Seconds: "

Latitude (Y): Degrees: ° Minutes: ' Seconds: "

UTM - NAD27

Easting (X): mtrs Northing (Y): mtrs Zone:

SUBMIT

All Conversion Results are displayed as NAD 1983 UTM Zone 13

Easting (X): mtrs Northing (Y): mtrs

~~ Please keep screen open to copy UTM values for Reports. ~~

Laboratory Analytical Results Summary
Klondike State Lease

Analyte	Method	Sample ID	SP1 @ 1'	SP1 @ 2'	SP1 @ 3'	SP1 @ 8'	SP1 @ 13'
		Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	BTEX 8021B		<0.050	n/a	n/a	n/a	n/a
Toluene	BTEX 8021B		<0.050	n/a	n/a	n/a	n/a
Ethylbenzene	BTEX 8021B		<0.050	n/a	n/a	n/a	n/a
Total Xylenes	BTEX 8021B		<0.300	n/a	n/a	n/a	n/a
Total BTEX	BTEX 8021B		1960	224	336	112	112
Chloride	SM4500C-B		<10.0	n/a	n/a	n/a	n/a
GRO	TPH 8015M		<10.0	n/a	n/a	n/a	n/a
DRO	TPH 8015M		<10.0	n/a	n/a	n/a	n/a
EXT DRO	TPH 8015M		<10.0	n/a	n/a	n/a	n/a

Analyte	Method	Sample ID	SP2 @ 1'	SP2 @ 2'	SP2 @ 3'	SP2 @ 8'	SP2 @ 13'
		Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chloride	SM4500C-B		8530	256	336	128	112

Analyte	Method	Sample ID	SP3 @ 1'	SP3 @ 2'	SP3 @ 3'	SP3 @ 8'	SP3 @ 13'
		Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chloride	SM4500C-B		12500	224	160	144	192

Analyte	Method	Sample ID	SP4 @ 1'	SP4 @ 2'	SP4 @ 7'	SP4 @ 12'
		Date	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Toluene	BTEX 8021B		<0.050	n/a	n/a	n/a
Ethylbenzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Total Xylenes	BTEX 8021B		<0.150	n/a	n/a	n/a
Total BTEX	BTEX 8021B		<0.300	n/a	n/a	n/a
Chloride	SM4500C-B		8930	64	96	96
GRO	TPH 8015M		<10.0	n/a	n/a	n/a
DRO	TPH 8015M		<10.0	n/a	n/a	n/a
EXT DRO	TPH 8015M		<10.0	n/a	n/a	n/a

Analyte	Method	Sample ID	SP5 @ 1'	SP5 @ 2'	SP5 @ 7'	SP5 @ 12'
		Date	mg/kg	mg/kg	mg/kg	mg/kg
Chloride	SM4500C-B		6000	64	96	32

Analyte	Method	Sample ID	SP6 @ 1'	SP6 @ 2'	SP6 @ 3'	SP6 @ 8'	SP6 @ 13'
		Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chloride	SM4500C-B		8400	2160	16	32	16

Analyte	Method	Sample ID	SP7 @ 1'	SP7 @ 2'	SP7 @ 3'	SP7 @ 4'	SP7 @ 9'	SP7 @ 14'
		Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	BTEX 8021B		<0.050	n/a	n/a	n/a	n/a	n/a
Toluene	BTEX 8021B		<0.050	n/a	n/a	n/a	n/a	n/a
Ethylbenzene	BTEX 8021B		<0.050	n/a	n/a	n/a	n/a	n/a
Total Xylenes	BTEX 8021B		<0.150	n/a	n/a	n/a	n/a	n/a
Total BTEX	BTEX 8021B		<0.300	n/a	n/a	n/a	n/a	n/a
Chloride	SM4500C-B		8660	2360	1800	80	32	16
GRO	TPH 8015M		<10.0	n/a	n/a	n/a	n/a	n/a
DRO	TPH 8015M		<10.0	n/a	n/a	n/a	n/a	n/a
EXT DRO	TPH 8015M		<10.0	n/a	n/a	n/a	n/a	n/a

Analyte	Method	Sample ID	SP8 @ 1'	SP8 @ 2'	SP8 @ 7'	SP8 @ 12'
		Date	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Toluene	BTEX 8021B		<0.050	n/a	n/a	n/a
Ethylbenzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Total Xylenes	BTEX 8021B		<0.300	n/a	n/a	n/a
Total BTEX	BTEX 8021B		7730	32	48	48
Chloride	SM4500C-B		<10.0	n/a	n/a	n/a
GRO	TPH 8015M		<10.0	n/a	n/a	n/a
DRO	TPH 8015M		<10.0	n/a	n/a	n/a
EXT DRO	TPH 8015M		<10.0	n/a	n/a	n/a

Analyte	Method	Sample ID	SP9 @ 1'	SP9 @ 2'	SP9 @ 7'	SP9 @ 12'
		Date	mg/kg	mg/kg	mg/kg	mg/kg
Chloride	SM4500C-B		8400	160	48	48

Analyte	Method	Sample ID	SP10 @ 1'	SP10 @ 2'	SP10 @ 7'	SP10 @ 12'
		Date	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Toluene	BTEX 8021B		<0.050	n/a	n/a	n/a
Ethylbenzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Total Xylenes	BTEX 8021B		<0.150	n/a	n/a	n/a
Total BTEX	BTEX 8021B		<0.300	n/a	n/a	n/a
Chloride	SM4500C-B		11200	16	32	32
GRO	TPH 8015M		<10.0	n/a	n/a	n/a
DRO	TPH 8015M		<10.0	n/a	n/a	n/a
EXT DRO	TPH 8015M		<10.0	n/a	n/a	n/a

Analyte	Method	Sample ID	SP11 @ 1'	SP11 @ 2'	SP11 @ 3'	SP11 @ 8'	SP11 @ 13'
		Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chloride	SM4500C-B		10600	1140	192	32	32

Analyte	Method	Sample ID	SP12 @ 1'	SP12 @ 2'	SP12 @ 7'	SP12 @ 12'
		Date	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Toluene	BTEX 8021B		<0.050	n/a	n/a	n/a
Ethylbenzene	BTEX 8021B		<0.050	n/a	n/a	n/a
Total Xylenes	BTEX 8021B		<0.150	n/a	n/a	n/a
Total BTEX	BTEX 8021B		<0.300	n/a	n/a	n/a
Chloride	SM4500C-B		9000	16	<16.0	<16.0
GRO	TPH 8015M		<10.0	n/a	n/a	n/a
DRO	TPH 8015M		<10.0	n/a	n/a	n/a
EXT DRO	TPH 8015M		<10.0	n/a	n/a	n/a

Laboratory Analytical Results Summary
Klondike State Lease

Analyte	Method	Sample ID	SP13 @ 1'	SP13 @ 2'	SP13 @ 7'	SP13 @ 12'
			10/18/17	10/25/17	10/25/17	10/25/17
			mg/kg	mg/kg	mg/kg	mg/kg
Chloride	SM4500C-B		13600	112	192	176

Analyte	Method	Sample ID	NT @ Surface
			10/18/17
			mg/kg
Benzene	BTEX 8021B		<0.050
Toluene	BTEX 8021B		<0.050
Ethylbenzene	BTEX 8021B		<0.050
Total Xylenes	BTEX 8021B		<0.150
Total BTEX	BTEX 8021B		<0.300
Chloride	SM4500C-B		64
GRO	TPH 8015M		<10.0
DRO	TPH 8015M		<10.0
EXT DRO	TPH 8015M		<10.0

Analyte	Method	Sample ID	E1 @ Surface
			10/18/17
			mg/kg
Chloride	SM4500C-B		80

Analyte	Method	Sample ID	W1 @ Surface
			10/18/17
			mg/kg
Chloride	SM4500C-B		208

Analyte	Method	Sample ID	S1 @ Surface
			10/18/17
			mg/kg
Benzene	BTEX 8021B		<0.050
Toluene	BTEX 8021B		<0.050
Ethylbenzene	BTEX 8021B		<0.050
Total Xylenes	BTEX 8021B		<0.150
Total BTEX	BTEX 8021B		<0.300
Chloride	SM4500C-B		208
GRO	TPH 8015M		<10.0
DRO	TPH 8015M		<10.0
EXT DRO	TPH 8015M		<10.0

Analyte	Method	Sample ID	N2 @ Surface
			10/18/17
			mg/kg
Benzene	BTEX 8021B		<0.050
Toluene	BTEX 8021B		<0.050
Ethylbenz	BTEX 8021B		<0.050
Total Xyle	BTEX 8021B		<0.150
Total BTE	BTEX 8021B		<0.300
Chloride	SM4500C-B		80
GRO	TPH 8015M		<10.0
DRO	TPH 8015M		<10.0
EXT DRO	TPH 8015M		<10.0

Analyte	Method	Sample ID	E2 @ Surface
			10/18/17
			mg/kg
Chloride	SM4500C-B		64

Analyte	Method	Sample ID	W2 @ Surface
			10/18/17
			mg/kg
Chloride	SM4500C-B		160

Analyte	Method	Sample ID	S2 @ Surface
			10/18/17
			mg/kg
Benzene	BTEX 8021B		<0.050
Toluene	BTEX 8021B		<0.050
Ethylbenz	BTEX 8021B		<0.050
Total Xyle	BTEX 8021B		<0.150
Total BTE	BTEX 8021B		<0.300
Chloride	SM4500C-B		208
GRO	TPH 8015M		<10.0
DRO	TPH 8015M		<10.0
EXT DRO	TPH 8015M		<10.0

November 02, 2017

Cliff Brunson

BBC International, Inc.

P.O. Box 805

Hobbs, NM 88241

RE: KLONDIKE STATE LEASE

Enclosed are the results of analyses for samples received by the laboratory on 10/26/17 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 accredited through the State of Colorado Department of Public Health and Environment for:

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

Accreditation applies to public drinking water matrices.

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

Sincerely,



Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

 BBC International, Inc.
 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 1 @ 1' (H702951-01)

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	10/30/2017	ND	1.98	99.1	2.00	1.64	
Toluene*	<0.050	0.050	10/30/2017	ND	2.00	100	2.00	0.412	
Ethylbenzene*	<0.050	0.050	10/30/2017	ND	2.06	103	2.00	0.883	
Total Xylenes*	<0.150	0.150	10/30/2017	ND	6.26	104	6.00	1.13	
Total BTEX	<0.300	0.300	10/30/2017	ND					

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

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1960	16.0	10/31/2017	ND	448	112	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	10/29/2017	ND	188	93.8	200	3.24	
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92	
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND					

Surrogate: 1-Chlorooctane 83.8 % 28.3-164
Surrogate: 1-Chlorooctadecane 86.9 % 34.7-157

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Celey D. Keene, Lab Director/Quality Manager

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Received:	10/26/2017	Sampling Date:	10/24/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 1 @ 2' (H702951-02)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	224	16.0	10/31/2017	ND	448	112	400	0.00	

Sample ID: SP 1 @ 3' (H702951-03)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	336	16.0	10/31/2017	ND	448	112	400	0.00	

Sample ID: SP 1 @ 8' (H702951-04)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	112	16.0	10/31/2017	ND	448	112	400	0.00	

Sample ID: SP 1 @ 13' (H702951-05)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	112	16.0	10/31/2017	ND	448	112	400	0.00	

Sample ID: SP 2 @ 1' (H702951-06)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	8530	16.0	10/31/2017	ND	448	112	400	0.00	

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Received:	10/26/2017	Sampling Date:	10/24/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 2 @ 2' (H702951-07)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	256	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 2 @ 3' (H702951-08)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	336	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 2 @ 8' (H702951-09)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	128	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 2 @ 13' (H702951-10)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	112	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 3 @ 1' (H702951-11)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	12500	16.0	10/31/2017	ND	432	108	400	7.69	

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Received:	10/26/2017	Sampling Date:	10/24/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 3 @ 2' (H702951-12)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	224	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 3 @ 3' (H702951-13)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	160	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 3 @ 8' (H702951-14)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	144	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 3 @ 13' (H702951-15)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	10/31/2017	ND	432	108	400	7.69	

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Analytical Results For:

 BBC International, Inc.
 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 4 @ 1' (H702951-16)

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	10/30/2017	ND	1.98	99.1	2.00	1.64	
Toluene*	<0.050	0.050	10/30/2017	ND	2.00	100	2.00	0.412	
Ethylbenzene*	<0.050	0.050	10/30/2017	ND	2.06	103	2.00	0.883	
Total Xylenes*	<0.150	0.150	10/30/2017	ND	6.26	104	6.00	1.13	
Total BTEX	<0.300	0.300	10/30/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.5 % 72-148

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	8930	16.0	10/31/2017	ND	432	108	400	7.69	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/29/2017	ND	188	93.8	200	3.24	
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92	
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND					

Surrogate: 1-Chlorooctane 87.0 % 28.3-164

Surrogate: 1-Chlorooctadecane 91.5 % 34.7-157

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/24/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 4 @ 2' (H702951-17)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 4 @ 7' (H702951-18)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	96.0	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 4 @ 12' (H702951-19)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	96.0	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 5 @ 1' (H702951-20)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	6000	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 5 @ 2' (H702951-21)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	10/31/2017	ND	432	108	400	7.69	

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/24/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 5 @ 7' (H702951-22)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	96.0	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 5 @ 12' (H702951-23)

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	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 6 @ 1' (H702951-24)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	8400	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 6 @ 2' (H702951-25)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2160	16.0	10/31/2017	ND	432	108	400	7.69	

Sample ID: SP 6 @ 3' (H702951-26)

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	10/31/2017	ND	432	108	400	7.69	

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/24/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 6 @ 8' (H702951-27)

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	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 6 @ 13' (H702951-28)

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	11/01/2017	ND	416	104	400	3.77	

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 P.O. Box 805
 Hobbs NM, 88241
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Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 7 @ 1' (H702951-29)

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	10/31/2017	ND	1.91	95.4	2.00	2.78	QR-03
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31	
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92	
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13	
Total BTEX	<0.300	0.300	10/31/2017	ND					

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

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	8660	16.0	11/01/2017	ND	416	104	400	3.77	

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	10/29/2017	ND	188	93.8	200	3.24	
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92	
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND					

Surrogate: 1-Chlorooctane 79.6 % 28.3-164
Surrogate: 1-Chlorooctadecane 83.6 % 34.7-157

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 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/24/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 7 @ 2' (H702951-30)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2360	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 7 @ 3' (H702951-31)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1800	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 7 @ 4' (H702951-32)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	80.0	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 7 @ 9' (H702951-33)

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	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 7 @ 14' (H702951-34)

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	11/01/2017	ND	416	104	400	3.77	

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
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Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 8 @ 1' (H702951-35)

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	10/31/2017	ND	1.91	95.4	2.00	2.78	
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31	
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92	
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13	
Total BTEX	<0.300	0.300	10/31/2017	ND					

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

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	7730	16.0	11/01/2017	ND	416	104	400	3.77	

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	10/29/2017	ND	188	93.8	200	3.24	
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92	
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND					

Surrogate: 1-Chlorooctane 88.7 % 28.3-164

Surrogate: 1-Chlorooctadecane 91.9 % 34.7-157

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/25/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 8 @ 2' (H702951-36)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 8 @ 7' (H702951-37)

Chloride, SM4500CI-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	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 8 @ 12' (H702951-38)

Chloride, SM4500CI-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	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 9 @ 1' (H702951-39)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	8400	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 9 @ 2' (H702951-40)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	160	16.0	11/01/2017	ND	416	104	400	3.77	

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Analytical Results For:

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/25/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 9 @ 7' (H702951-41)

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	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 9 @ 12' (H702951-42)

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	11/01/2017	ND	416	104	400	3.77	

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 10 @ 1' (H702951-43)

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	10/31/2017	ND	1.91	95.4	2.00	2.78		
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31		
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92		
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13		
Total BTEX	<0.300	0.300	10/31/2017	ND						

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

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	11200	16.0	11/01/2017	ND	416	104	400	3.77		

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	10/29/2017	ND	188	93.8	200	3.24		
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92		
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND						

Surrogate: 1-Chlorooctane 92.0 % 28.3-164
Surrogate: 1-Chlorooctadecane 93.6 % 34.7-157

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Analytical Results For:

 BBC International, Inc.
 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/25/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 10 @ 2' (H702951-44)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 10 @ 7' (H702951-45)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 10 @ 12' (H702951-46)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	11/01/2017	ND	416	104	400	3.77	

Sample ID: SP 11 @ 1' (H702951-47)

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	10600	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 11 @ 2' (H702951-48)

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1140	16.0	11/01/2017	ND	432	108	400	0.00	QM-07

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/25/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 11 @ 3' (H702951-49)

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 11 @ 8' (H702951-50)

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 11 @ 13' (H702951-51)

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	11/01/2017	ND	432	108	400	0.00	

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Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 12 @ 1' (H702951-52)

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	10/31/2017	ND	1.91	95.4	2.00	2.78	
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31	
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92	
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13	
Total BTEX	<0.300	0.300	10/31/2017	ND					

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

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	9000	16.0	11/01/2017	ND	432	108	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	10/29/2017	ND	188	93.8	200	3.24	
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92	
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND					

Surrogate: 1-Chlorooctane 90.5 % 28.3-164

Surrogate: 1-Chlorooctadecane 96.1 % 34.7-157

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 Cliff Brunson
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 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/25/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 12 @ 2' (H702951-53)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 12 @ 7' (H702951-54)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 12 @ 12' (H702951-55)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 13 @ 1' (H702951-56)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	13600	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 13 @ 2' (H702951-57)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	112	16.0	11/01/2017	ND	432	108	400	0.00	

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Received:	10/26/2017	Sampling Date:	10/25/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: SP 13 @ 7' (H702951-58)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: SP 13 @ 12' (H702951-59)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	176	16.0	11/01/2017	ND	432	108	400	0.00	

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 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: N1 @ SURFACE (H702951-60)

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	10/31/2017	ND	1.91	95.4	2.00	2.78	
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31	
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92	
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13	
Total BTEX	<0.300	0.300	10/31/2017	ND					

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

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	11/01/2017	ND	432	108	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	10/29/2017	ND	188	93.8	200	3.24	
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92	
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND					

Surrogate: 1-Chlorooctane 86.0 % 28.3-164

Surrogate: 1-Chlorooctadecane 87.6 % 34.7-157

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 Hobbs NM, 88241
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Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: E1 @ SURFACE (H702951-61)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	80.0	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: W1 @ SURFACE (H702951-62)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	208	16.0	11/01/2017	ND	432	108	400	0.00	

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Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: S1 @ SURFACE (H702951-63)

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	10/31/2017	ND	1.91	95.4	2.00	2.78		
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31		
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92		
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13		
Total BTEX	<0.300	0.300	10/31/2017	ND						

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

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	208	16.0	11/01/2017	ND	432	108	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	10/29/2017	ND	188	93.8	200	3.24		
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92		
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND						

Surrogate: 1-Chlorooctane 82.1 % 28.3-164

Surrogate: 1-Chlorooctadecane 91.3 % 34.7-157

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 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: N2 @ SURFACE (H702951-64)

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	10/31/2017	ND	1.91	95.4	2.00	2.78	
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31	
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92	
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13	
Total BTEX	<0.300	0.300	10/31/2017	ND					

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

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	80.0	16.0	11/01/2017	ND	432	108	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	10/29/2017	ND	188	93.8	200	3.24	
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92	
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND					

Surrogate: 1-Chlorooctane 83.0 % 28.3-164

Surrogate: 1-Chlorooctadecane 87.8 % 34.7-157

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 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: E2 @ SURFACE (H702951-65)

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	11/01/2017	ND	432	108	400	0.00	

Sample ID: W2 @ SURFACE (H702951-66)

Chloride, SM4500CI-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	160	16.0	11/01/2017	ND	432	108	400	0.00	

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 BBC International, Inc.
 Cliff Brunson
 P.O. Box 805
 Hobbs NM, 88241
 Fax To: (575) 397-0397

Received:	10/26/2017	Sampling Date:	10/18/2017
Reported:	11/02/2017	Sampling Type:	Soil
Project Name:	KLONDIKE STATE LEASE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	MACK ENERGY - CHAVES CO NM		

Sample ID: S2 @ SURFACE (H702951-67)

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	10/31/2017	ND	1.91	95.4	2.00	2.78		
Toluene*	<0.050	0.050	10/31/2017	ND	1.92	95.9	2.00	1.31		
Ethylbenzene*	<0.050	0.050	10/31/2017	ND	1.94	96.9	2.00	1.92		
Total Xylenes*	<0.150	0.150	10/31/2017	ND	6.18	103	6.00	2.13		
Total BTEX	<0.300	0.300	10/31/2017	ND						

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

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	208	16.0	10/28/2017	ND	416	104	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	10/29/2017	ND	188	93.8	200	3.24		
DRO >C10-C28	<10.0	10.0	10/29/2017	ND	200	100	200	5.92		
EXT DRO >C28-C36	<10.0	10.0	10/29/2017	ND						

Surrogate: 1-Chlorooctane 84.2 % 28.3-164

Surrogate: 1-Chlorooctadecane 89.1 % 34.7-157

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

- QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- ** Samples not received at proper temperature of 6°C or below.
- *** Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES
 101 East Marland, Hobbs, NM 88240
 (505) 393-2326 FAX (505) 393-2476

↓

BILL TO		ANALYSIS REQUEST																			
Company Name: BBC International, Inc.		P.O. #:																			
Project Manager: Cliff Brunson		Company: BBC																			
Address: P.O. Box 805		Attn:																			
City: Hobbs		Address:																			
Phone #: 575-397-6388		City:																			
State: NM Zip: 88241		State:																			
Fax #: 575-397-0397		Phone #:																			
Project #: [Blank]		Project Owner: MacEnergy																			
Project Name: Klondike State Lease																					
Project Location: Chaves County, NM																					
Sampler Name: Jeff Ornelas																					
FOR LAB USE ONLY																					
Lab I.D.	Sample I.D.	(G) RAB OR (COMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	PRESERV	SAMPLING	DATE	TIME					
H402951	SP1 @ 1'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/18/17	9:45 AM	✓					
1	SP1 @ 2'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	9:33 AM	✓					
2	SP1 @ 3'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	9:45 AM	✓					
3	SP1 @ 8'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	10:15 AM	✓					
4	SP1 @ 13'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	10:35 AM	✓					
5	SP2 @ 1'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/18/17	10:25 AM	✓					
6	SP2 @ 2'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	10:42 AM	✓					
7	SP2 @ 3'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	10:55 AM	✓					
8	SP2 @ 8'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	11:11 AM	✓					
9	SP2 @ 8'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	11:30 AM	✓					
10	SP2 @ 13'	G	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10/24/17	11:30 AM	✓					

TRH EXT
 BTEX
 CI

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Relinquished By: Jeff Ornelas
 Date: 10/25/17
 Time: 5:00pm

Received By: Tamara Oldenby
 Date: [Blank]
 Time: [Blank]

Relinquished By: [Blank]
 Date: [Blank]
 Time: [Blank]

Delivered By: (Circle One) 0.32
 Sampler - UPS - Bus - Other: Permitted 0.5SE

Sample Condition: Cool Intact
 Yes No

Checked By: (Initials) TO-#15

REMARKS: Has head space in several jars

Phone Result: Yes No
 Add'l Phone #: [Blank]
 Fax Result: Yes No
 Add'l Fax #: [Blank]

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476



CARDINAL LABORATORIES
 101 East Marland, Hobbs, NM 88240
 (505) 393-2326 FAX (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

BILL TO ANALYSIS REQUEST

Company Name: BBC International, Inc.
 Project Manager: Cliff Brunson
 Address: P.O. Box 805
 City: Hobbs State: NM Zip: 88241
 Phone #: 575-397-6388 Fax #: 575-397-0397
 Project #: Project Owner: Mack Energy
 Project Name: Klondike State Lease
 Project Location: Chaves County, NM
 Sampler Name: Jeff Ornelas

Lab I.D.	Sample I.D.	# CONTAINERS	MATRIX					PRESERV	SAMPLING	DATE	TIME	CHECKED BY (Initials)
			GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE					
H102951	SP5 @ 2'	1							10/24/17	1:30 PM	✓	
21	SP5 @ 7'	1							10/24/17	1:45 PM	✓	
22	SP5 @ 12'	1							10/24/17	2:15 PM	✓	
23	SP6 @ 1'	1							10/18/17	12:12 PM	✓	
24	SP6 @ 2'	1							10/24/17	2:16 PM	✓	
25	SP6 @ 3'	1							10/24/17	2:22 PM	✓	
26	SP6 @ 8'	1							10/24/17	2:30 PM	✓	
27	SP6 @ 13'	1							10/24/17	2:50 PM	✓	
28	SP7 @ 1'	1							10/18/17	1:11 PM	✓	
29	SP7 @ 2'	1							10/24/17	2:55 PM	✓	
30	SP7 @ 2'	1							10/24/17	2:55 PM	✓	

CI
 BTEX
 TPH EXT

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: *Jeff Ornelas* Date: 10/24/17
 Received By: *Jessica Ornelas*
 Relinquished By: *Jeff Ornelas* Date: 5:00pm
 Received By: *Jessica Ornelas*
 Delivered By: (Circle One) *0.3c*
 Sampler - UPS - Bus - Other: *Corrected 0.55c*
 Sample Condition: Cool Intact
 Checked By: *TR #75*

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES
 101 East Marland, Hobbs, NM 88240
 (505) 393-2326 FAX (505) 393-2476

BILL TO		ANALYSIS REQUEST																			
Company Name: BBC International, Inc.		P.O. #:		Company: BBC		Attn:		Address:		City:		State:		Zip:		Phone #:		Fax #:			
Project Manager: Cliff Brunson		State: NM		Zip: 88241		Address: 575-397-6388		Fax #: 575-397-0397		Project Owner: Mack Energy		Project #:		Project Name: Klondike State Lease		Project Location: Chaves County, NM		Sampler Name: Jeff Ornelas			
FOR LAB USE ONLY		Lab I.D.		Sample I.D.		# CONTAINERS		MATRIX		PRESERV		SAMPLING		DATE		TIME		OTHER:			
		E1 @ SURFACE		W1 @ SURFACE		S1 @ SURFACE		N2 @ SURFACE		E2 @ SURFACE		W2 @ SURFACE		S2 @ SURFACE		10/18/17		3:05 PM		✓	
		61		62		63		64		65		66		67		10/18/17		3:08 PM		✓	
		68		69		70		71		72		73		74		10/18/17		3:11 PM		✓	
		75		76		77		78		79		80		81		10/18/17		3:15 PM		✓	
		82		83		84		85		86		87		88		10/18/17		3:18 PM		✓	
		89		90		91		92		93		94		95		10/18/17		3:21 PM		✓	
		96		97		98		99		100		101		102		10/18/17		3:25 PM		✓	
		103		104		105		106		107		108		109							
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		488		489		490		491		492		493		494							
		495		496		497		498		499		500		501							
		502		503		504		505		506		507		508							
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		705		706		707		708		709		710		711							
		712		713																	

NM OIL CONSERVATION
ARTESIA DISTRICT

OCT 17 2017

Form C-141
Revised April 3, 2017

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

RECEIVED appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

DAB1729158101

OPERATOR

Initial Report Final Report

Name of Company Mack Energy	<i>13837</i>	Contact Matt Buckles
Address PO Box 960		Telephone No. 575-748-1288
Facility Name Klondike State Lease		Facility Type Well

Surface Owner NMSLO	Mineral Owner NMSLO	API No. 30-005-64295
---------------------	---------------------	----------------------

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
I	26	15S	28E	2350	South	1330	East	Chaves

Latitude 32.986131 Longitude -104.098172 NAD83

NATURE OF RELEASE

Type of Release Produced Water	Volume of Release 200 Bbls	Volume Recovered 0
Source of Release Transfer Line	Date and Hour of Occurrence 10/15/17 @ 5pm	Date and Hour of Discovery 10/16/17 @ 7:30am
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Mike Bratcher, Crystal Weaver, Amber Groves	
By Whom? Matt Buckles	Date and Hour 10/16/17 4pm	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

A leak occurred in a transfer line, will begin remediation by removing contaminated soil.

Describe Area Affected and Cleanup Action Taken.*

The release occurred on the road. The produced water gathered on both sides of the road and pooled up in a low spot. The area is approximately 4,000 square feet surface area. We will fully delineate and discuss remediation plans.

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: <i>Mike Bratcher</i> Approved by Environmental Specialist:	
Title: Environmental	Approval Date: <i>10/18/17</i>	Expiration Date: <i>NIA</i>
E-mail Address: mattbuckles@mec.com	Conditions of Approval: <i>See attached</i>	Attached <input type="checkbox"/> <i>2RP-4446</i>
Date: 10/16/2017	Phone: 575-748-1288	

* Attach Additional Sheets If Necessary

Operator/Responsible Party,

The OCD has received the form C-141 you provided on 10/17/2017 regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number 200-4446 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 2 office in ARTESIA on or before 11/17/2017 if and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

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

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

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

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

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

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

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

Jim Griswold

OCD Environmental Bureau Chief

1220 South St. Francis Drive

Santa Fe, New Mexico 87505

505-476-3465

jim.griswold@state.nm.us

Bratcher, Mike, EMNRD

From: Matt Buckles <mattbuckles@mec.com>
Sent: Tuesday, October 17, 2017 4:52 PM
To: Bratcher, Mike, EMNRD; Weaver, Crystal, EMNRD; agroves@slo.state.nm.us
Cc: Lee Livingston; Jerry Sherrell
Subject: RE: C-141 on the Klondike Release
Attachments: Klondike Lease.pdf

From: Matt Buckles
Sent: Tuesday, October 17, 2017 4:51 PM
To: 'Bratcher, Mike, EMNRD'; Crystal.Weaver@state.nm.us; 'agroves@slo.state.nm.us'
Cc: Lee Livingston; Jerry Sherrell
Subject: C-141 on the Klondike Release

Here is the completed C-141. Let me know if you have any questions or concerns.

Thanks,

Matt Buckles

From: Matt Buckles
Sent: Monday, October 16, 2017 3:51 PM
To: 'Bratcher, Mike, EMNRD'; Crystal.Weaver@state.nm.us; 'agroves@slo.state.nm.us'
Cc: Lee Livingston; Jerry Sherrell
Subject: Immediate Notice on the Klondike Release

Good Afternoon,

Mack Energy had a release on the Klondike State Lease in Chaves County of approximately 200 Bbls of produced water. The release was discovered this morning 10/16/2017 at approximately 7:30am. We will be submitting a C-141 shortly.

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>