



Hall Environmental Analysis Laboratory  
4901 Hawkins NE  
Albuquerque, NM 87109  
TEL: 505-345-3975 FAX: 505-345-4107  
Website: [www.hallenvironmental.com](http://www.hallenvironmental.com)

July 24, 2018

Matt Buckles

Mack Energy Corp  
11344 Lovington Highway  
Artesia, NM 88210  
TEL: (575) 748-1288  
FAX

RE: Nosler 12 Fed Tank Battery

OrderNo.: 1807A35

Dear Matt Buckles:

Hall Environmental Analysis Laboratory received 4 sample(s) on 7/19/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to [www.hallenvironmental.com](http://www.hallenvironmental.com) or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a white background.

Andy Freeman  
Laboratory Manager  
4901 Hawkins NE  
Albuquerque, NM 87109

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1807A35

Date Reported: 7/24/2018

**CLIENT:** Mack Energy Corp

**Client Sample ID:** SP-2 0-1

**Project:** Nosler 12 Fed Tank Battery

**Collection Date:** 7/16/2018

**Lab ID:** 1807A35-001

**Matrix:** SOIL

**Received Date:** 7/19/2018 8:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	7/20/2018 11:25:49 PM	39312
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	7/20/2018 11:25:49 PM	39312
Surr: DNOP	103	70-130		%Rec	1	7/20/2018 11:25:49 PM	39312
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	7/20/2018 11:58:05 AM	39306
Surr: BFB	95.2	15-316		%Rec	1	7/20/2018 11:58:05 AM	39306
<b>EPA METHOD 8021B: VOLATILES</b>							Analyst: <b>NSB</b>
Benzene	ND	0.024		mg/Kg	1	7/20/2018 11:58:05 AM	39306
Toluene	ND	0.048		mg/Kg	1	7/20/2018 11:58:05 AM	39306
Ethylbenzene	ND	0.048		mg/Kg	1	7/20/2018 11:58:05 AM	39306
Xylenes, Total	ND	0.096		mg/Kg	1	7/20/2018 11:58:05 AM	39306
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	1	7/20/2018 11:58:05 AM	39306

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:		
*	Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E Value above quantitation range
H	Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P Sample pH Not In Range
PQL	Practical Quantitative Limit	RL Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1807A35

Date Reported: 7/24/2018

**CLIENT:** Mack Energy Corp

**Client Sample ID:** SP-4 0-1

**Project:** Nosler 12 Fed Tank Battery

**Collection Date:** 7/16/2018

**Lab ID:** 1807A35-003

**Matrix:** SOIL

**Received Date:** 7/19/2018 8:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	150	9.9		mg/Kg	1	7/23/2018 7:50:36 PM	39312
Motor Oil Range Organics (MRO)	110	50		mg/Kg	1	7/23/2018 7:50:36 PM	39312
Surr: DNOP	103	50.6-138		%Rec	1	7/23/2018 7:50:36 PM	39312
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	7/20/2018 1:08:41 PM	39306
Surr: BFB	96.7	15-316		%Rec	1	7/20/2018 1:08:41 PM	39306
<b>EPA METHOD 8021B: VOLATILES</b>							Analyst: <b>NSB</b>
Benzene	ND	0.025		mg/Kg	1	7/20/2018 1:08:41 PM	39306
Toluene	ND	0.049		mg/Kg	1	7/20/2018 1:08:41 PM	39306
Ethylbenzene	ND	0.049		mg/Kg	1	7/20/2018 1:08:41 PM	39306
Xylenes, Total	ND	0.099		mg/Kg	1	7/20/2018 1:08:41 PM	39306
Surr: 4-Bromofluorobenzene	108	80-120		%Rec	1	7/20/2018 1:08:41 PM	39306

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:			
*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1807A35

24-Jul-18

**Client:** Mack Energy Corp  
**Project:** Nosler 12 Fed Tank Battery

Sample ID	<b>LCS-39312</b>	SampType:	<b>LCS</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>LCSS</b>	Batch ID:	<b>39312</b>	RunNo:	<b>52847</b>					
Prep Date:	<b>7/19/2018</b>	Analysis Date:	<b>7/20/2018</b>	SeqNo:	<b>1738036</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	46	10	50.00	0	91.8	70	130			
Surr: DNOP	4.1		5.000		82.5	70	130			

Sample ID	<b>MB-39312</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>PBS</b>	Batch ID:	<b>39312</b>	RunNo:	<b>52847</b>					
Prep Date:	<b>7/19/2018</b>	Analysis Date:	<b>7/20/2018</b>	SeqNo:	<b>1738037</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.5		10.00		95.4	70	130			

Sample ID	<b>LCS-39336</b>	SampType:	<b>LCS</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>LCSS</b>	Batch ID:	<b>39336</b>	RunNo:	<b>52903</b>					
Prep Date:	<b>7/23/2018</b>	Analysis Date:	<b>7/23/2018</b>	SeqNo:	<b>1738189</b>	Units:	<b>%Rec</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.3		5.000		86.2	70	130			

Sample ID	<b>MB-39336</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>PBS</b>	Batch ID:	<b>39336</b>	RunNo:	<b>52903</b>					
Prep Date:	<b>7/23/2018</b>	Analysis Date:	<b>7/23/2018</b>	SeqNo:	<b>1738190</b>	Units:	<b>%Rec</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	8.8		10.00		88.0	70	130			

**Qualifiers:**

- |   |   |
|---|---|
| * Value exceeds Maximum Contaminant Level.              | B Analyte detected in the associated Method Blank           |
| D Sample Diluted Due to Matrix                          | E Value above quantitation range                            |
| H Holding times for preparation or analysis exceeded    | J Analyte detected below quantitation limits                |
| ND Not Detected at the Reporting Limit                  | P Sample pH Not In Range                                    |
| PQL Practical Quantitative Limit                        | RL Reporting Detection Limit                                |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1807A35

24-Jul-18

**Client:** Mack Energy Corp  
**Project:** Nosler 12 Fed Tank Battery

Sample ID <b>MB-39306</b>	SampType: <b>MBLK</b>		TestCode: <b>EPA Method 8015D: Gasoline Range</b>							
Client ID: <b>PBS</b>	Batch ID: <b>39306</b>		RunNo: <b>52899</b>							
Prep Date: <b>7/19/2018</b>	Analysis Date: <b>7/20/2018</b>		SeqNo: <b>1737983</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	950		1000		94.8	15	316			

Sample ID <b>LCS-39306</b>	SampType: <b>LCS</b>		TestCode: <b>EPA Method 8015D: Gasoline Range</b>							
Client ID: <b>LCSS</b>	Batch ID: <b>39306</b>		RunNo: <b>52899</b>							
Prep Date: <b>7/19/2018</b>	Analysis Date: <b>7/20/2018</b>		SeqNo: <b>1737984</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	113	75.9	131			
Surr: BFB	1000		1000		104	15	316			

**Qualifiers:**

- |   |   |
|---|---|
| * Value exceeds Maximum Contaminant Level.              | B Analyte detected in the associated Method Blank           |
| D Sample Diluted Due to Matrix                          | E Value above quantitation range                            |
| H Holding times for preparation or analysis exceeded    | J Analyte detected below quantitation limits                |
| ND Not Detected at the Reporting Limit                  | P Sample pH Not In Range                                    |
| PQL Practical Quantitative Limit                        | RL Reporting Detection Limit                                |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1807A35

24-Jul-18

**Client:** Mack Energy Corp  
**Project:** Nosler 12 Fed Tank Battery

Sample ID <b>MB-39306</b>	SampType: <b>MBLK</b>		TestCode: <b>EPA Method 8021B: Volatiles</b>							
Client ID: <b>PBS</b>	Batch ID: <b>39306</b>		RunNo: <b>52899</b>							
Prep Date: <b>7/19/2018</b>	Analysis Date: <b>7/20/2018</b>		SeqNo: <b>1737999</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.1		1.000		106	80	120			

Sample ID <b>LCS-39306</b>	SampType: <b>LCS</b>		TestCode: <b>EPA Method 8021B: Volatiles</b>							
Client ID: <b>LCSS</b>	Batch ID: <b>39306</b>		RunNo: <b>52899</b>							
Prep Date: <b>7/19/2018</b>	Analysis Date: <b>7/20/2018</b>		SeqNo: <b>1738000</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.95	0.025	1.000	0	94.8	77.3	128			
Toluene	0.98	0.050	1.000	0	98.4	79.2	125			
Ethylbenzene	0.95	0.050	1.000	0	95.4	80.7	127			
Xylenes, Total	3.0	0.10	3.000	0	99.0	81.6	129			
Surr: 4-Bromofluorobenzene	1.1		1.000		107	80	120			

Sample ID <b>1807A35-001AMS</b>	SampType: <b>MS</b>		TestCode: <b>EPA Method 8021B: Volatiles</b>							
Client ID: <b>SP-2 0-1</b>	Batch ID: <b>39306</b>		RunNo: <b>52899</b>							
Prep Date: <b>7/19/2018</b>	Analysis Date: <b>7/20/2018</b>		SeqNo: <b>1738005</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.024	0.9747	0	98.1	68.5	133			
Toluene	1.0	0.049	0.9747	0	103	75	130			
Ethylbenzene	0.99	0.049	0.9747	0	102	79.4	128			
Xylenes, Total	3.1	0.097	2.924	0	105	77.3	131			
Surr: 4-Bromofluorobenzene	1.0		0.9747		105	80	120			

Sample ID <b>1807A35-001AMSD</b>	SampType: <b>MSD</b>		TestCode: <b>EPA Method 8021B: Volatiles</b>							
Client ID: <b>SP-2 0-1</b>	Batch ID: <b>39306</b>		RunNo: <b>52899</b>							
Prep Date: <b>7/19/2018</b>	Analysis Date: <b>7/20/2018</b>		SeqNo: <b>1738006</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.024	0.9560	0	102	68.5	133	2.49	20	
Toluene	1.0	0.048	0.9560	0	108	75	130	3.18	20	
Ethylbenzene	1.0	0.048	0.9560	0	105	79.4	128	1.51	20	
Xylenes, Total	3.1	0.096	2.868	0	108	77.3	131	1.08	20	
Surr: 4-Bromofluorobenzene	1.0		0.9560		108	80	120	0	0	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

**Sample Log-In Check List**

Client Name: **MACK ENERGY CORP**

Work Order Number: **1807A35**

RcptNo: **1**

Received By: **Erin Melendrez** 7/19/2018 8:45:00 AM

*EM*

Completed By: **Isaiah Ortiz** 7/19/2018 10:10:38 AM

*IO*

Reviewed By: *JMS 07/19/18*

*LB: MW 7/19/18*

**Chain of Custody**

1. Is Chain of Custody complete? Yes  No  Not Present
2. How was the sample delivered? Courier

**Log In**

3. Was an attempt made to cool the samples? Yes  No  NA
4. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA
5. Sample(s) in proper container(s)? Yes  No
6. Sufficient sample volume for indicated test(s)? Yes  No
7. Are samples (except VOA and ONG) properly preserved? Yes  No
8. Was preservative added to bottles? Yes  No  NA
9. VOA vials have zero headspace? Yes  No  No VOA Vials
10. Were any sample containers received broken? Yes  No
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes  No
12. Are matrices correctly identified on Chain of Custody? Yes  No
13. Is it clear what analyses were requested? Yes  No
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes  No

# of preserved bottles checked for pH: 2 (2 or 2 unless noted)

Adjusted?

Checked by: *MW 7/19/18*

**Special Handling (if applicable)**

15. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

16. Additional remarks:

**17. Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.4	Good	Yes			

