

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

JAN 24 2018

Form C-141
Revised April 3, 2017

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

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☒ Final Report

Name of Company Hilcorp Energy	Contact Clara Cardoza
Address 9a CR 5793	Telephone No. 505-564-0733
Facility Name Ludwick LS 16	Facility Type Well
Surface Owner Federal	Mineral Owner Federal
API No. 30-045-09019	

LOCATION OF RELEASE

Unit Letter G	Section 31	Township 30N	Range 10W	Feet from the 1810	North/South Line North	Feet from the 1750	East/West Line East	County San Juan
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Latitude 36.770649 Longitude -107.9223633 NAD83

NATURE OF RELEASE

Type of Release Hydrocarbon/Produced Water	Volume of Release 2 bbl condensate – 1 bbl produced water	Volume Recovered none
Source of Release Separator	Date and Hour of Occurrence 10/24/2017 03:50 a.m. (estimated using SCADA)	Date and Hour of Discovery 10/31/2017 4:00 p.m.
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Vanessa Fields & Whitney Thompson	
By Whom? Clara Cardoza	Date and Hour 11/01/2017 11:04 a.m. (NMOCD) / 11:07 a.m. (BLM)	
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.*

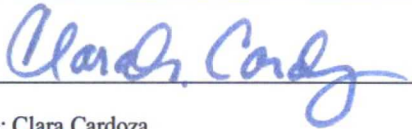

Describe Cause of Problem and Remedial Action Taken.*

The separator on location was found to have catastrophically failed. The contents of the separator misted the location and the gas loss was minimal because well logged off. The exact cause of the failure is under investigation and separators of similar manufacture, manufacture date and producing formation are being inspected. **Failure confirmed cause was corrosion.**

Describe Area Affected and Cleanup Action Taken.*

An area approximately 75' in diameter was impacted with overspray/mist. A hydrovac truck will clean up any impacted soil and gravel. **Analytical results were below the regulatory standards – no further action required. The soil sampling report is attached for review. Please note the second set of analytical results collected on 01/04/2018 were taken per the request of NMOCD/BLM due to material left behind from the clean-up.**

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: 	OIL CONSERVATION DIVISION	
Printed Name: Clara Cardoza	Approved by Environmental Specialist 	
Title: Environmental Specialist	Approval Date: <u>1/26/18</u>	Expiration Date:
E-mail Address: ccardoza@hilcorp.com	Conditions of Approval:	Attached <input type="checkbox"/>
Date: 01/19/2018	Phone: 505-564-0733	

* Attach Additional Sheets If Necessary

NVF 1730640894

18



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

December 06, 2017

Clara Cardoza
HILCORP ENERGY
PO Box 4700
Farmington, NM 87499
TEL: (505) 564-0733
FAX

RE: Ludwick LS 16 Confirmation

OrderNo.: 1711E58

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 3 sample(s) on 11/30/2017 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 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 #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1711E58

Date Reported: 12/6/2017

CLIENT: HILCORP ENERGY

Client Sample ID: Ludwick LS 16-W

Project: Ludwick LS 16 Confirmation

Collection Date: 11/29/2017 9:25:00 AM

Lab ID: 1711E58-001

Matrix: SOIL

Received Date: 11/30/2017 7:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: TOM
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	12/5/2017 11:09:21 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/5/2017 11:09:21 AM
Surr: DNOP	95.4	70-130		%Rec	1	12/5/2017 11:09:21 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/4/2017 8:20:43 PM
Surr: BFB	85.7	15-316		%Rec	1	12/4/2017 8:20:43 PM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Methyl tert-butyl ether (MTBE)	ND	0.097		mg/Kg	1	12/4/2017 8:20:43 PM
Benzene	ND	0.024		mg/Kg	1	12/4/2017 8:20:43 PM
Toluene	ND	0.048		mg/Kg	1	12/4/2017 8:20:43 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/4/2017 8:20:43 PM
Xylenes, Total	ND	0.097		mg/Kg	1	12/4/2017 8:20:43 PM
Surr: 4-Bromofluorobenzene	79.2	80-120	S	%Rec	1	12/4/2017 8:20:43 PM

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

Analytical Report

Lab Order 1711E58

Date Reported: 12/6/2017

Hall Environmental Analysis Laboratory, Inc.**CLIENT:** HILCORP ENERGY**Client Sample ID:** Ludwick LS 16-E**Project:** Ludwick LS 16 Confirmation**Collection Date:** 11/29/2017 9:30:00 AM**Lab ID:** 1711E58-002**Matrix:** SOIL**Received Date:** 11/30/2017 7:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: TOM
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	12/5/2017 11:31:17 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/5/2017 11:31:17 AM
Surr: DNOP	94.5	70-130		%Rec	1	12/5/2017 11:31:17 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/4/2017 8:43:53 PM
Surr: BFB	87.0	15-316		%Rec	1	12/4/2017 8:43:53 PM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Methyl tert-butyl ether (MTBE)	ND	0.095		mg/Kg	1	12/4/2017 8:43:53 PM
Benzene	ND	0.024		mg/Kg	1	12/4/2017 8:43:53 PM
Toluene	ND	0.047		mg/Kg	1	12/4/2017 8:43:53 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/4/2017 8:43:53 PM
Xylenes, Total	ND	0.095		mg/Kg	1	12/4/2017 8:43:53 PM
Surr: 4-Bromofluorobenzene	83.3	80-120		%Rec	1	12/4/2017 8:43:53 PM

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	Page 2 of 6
	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 1711E58

Date Reported: 12/6/2017

CLIENT: HILCORP ENERGY

Client Sample ID: Ludwick LS 16- Bank

Project: Ludwick LS 16 Confirmation

Collection Date: 11/29/2017 9:33:00 AM

Lab ID: 1711E58-003

Matrix: SOIL

Received Date: 11/30/2017 7:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: TOM
Diesel Range Organics (DRO)	19	9.8		mg/Kg	1	12/5/2017 11:53:28 AM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/5/2017 11:53:28 AM
Surr: DNOP	84.3	70-130		%Rec	1	12/5/2017 11:53:28 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/4/2017 9:07:02 PM
Surr: BFB	85.7	15-316		%Rec	1	12/4/2017 9:07:02 PM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Methyl tert-butyl ether (MTBE)	ND	0.096		mg/Kg	1	12/4/2017 9:07:02 PM
Benzene	ND	0.024		mg/Kg	1	12/4/2017 9:07:02 PM
Toluene	ND	0.048		mg/Kg	1	12/4/2017 9:07:02 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/4/2017 9:07:02 PM
Xylenes, Total	ND	0.096		mg/Kg	1	12/4/2017 9:07:02 PM
Surr: 4-Bromofluorobenzene	79.5	80-120	S	%Rec	1	12/4/2017 9:07:02 PM

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#: 1711E58

06-Dec-17

Client: HILCORP ENERGY
Project: Ludwick LS 16 Confirmation

Sample ID	LCS-35273	SampType:	LCS	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	LCSS	Batch ID:	35273	RunNo:	47491					
Prep Date:	12/1/2017	Analysis Date:	12/5/2017	SeqNo:	1517262	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	10	50.00	0	90.7	73.2	114			
Surr: DNOP	4.2		5.000		84.5	70	130			

Sample ID	MB-35273	SampType:	MBLK	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	PBS	Batch ID:	35273	RunNo:	47491					
Prep Date:	12/1/2017	Analysis Date:	12/5/2017	SeqNo:	1517264	Units:	mg/Kg			
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	9.4		10.00		93.9	70	130			

Sample ID	LCS-35318	SampType:	LCS	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	LCSS	Batch ID:	35318	RunNo:	47518					
Prep Date:	12/5/2017	Analysis Date:	12/5/2017	SeqNo:	1517359	Units:	%Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.7		5.000		93.1	70	130			

Sample ID	MB-35318	SampType:	MBLK	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	PBS	Batch ID:	35318	RunNo:	47518					
Prep Date:	12/5/2017	Analysis Date:	12/5/2017	SeqNo:	1517361	Units:	%Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	9.8		10.00		98.0	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#: 1711E58

06-Dec-17

Client: HILCORP ENERGY
Project: Ludwick LS 16 Confirmation

Sample ID	MB-35265	SampType:	MBLK	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	PBS	Batch ID:	35265	RunNo:	47501					
Prep Date:	12/1/2017	Analysis Date:	12/4/2017	SeqNo:	1517086	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	880		1000		88.2	15	316			

Sample ID	LCS-35265	SampType:	LCS	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	LCSS	Batch ID:	35265	RunNo:	47501					
Prep Date:	12/1/2017	Analysis Date:	12/4/2017	SeqNo:	1517087	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	95.2	75.9	131			
Surr: BFB	1000		1000		101	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#: 1711E58

06-Dec-17

Client: HILCORP ENERGY

Project: Ludwick LS 16 Confirmation

Sample ID	MB-35265	SampType:	MBLK	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	PBS	Batch ID:	35265	RunNo:	47501					
Prep Date:	12/1/2017	Analysis Date:	12/4/2017	SeqNo:	1517123	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	0.10								
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.82		1.000		82.2	80	120			

Sample ID	LCS-35265	SampType:	LCS	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	LCSS	Batch ID:	35265	RunNo:	47501					
Prep Date:	12/1/2017	Analysis Date:	12/4/2017	SeqNo:	1517124	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	0.87	0.10	1.000	0	86.7	70.1	121			
Benzene	0.93	0.025	1.000	0	93.4	77.3	128			
Toluene	0.93	0.050	1.000	0	92.7	79.2	125			
Ethylbenzene	0.92	0.050	1.000	0	91.8	80.7	127			
Xylenes, Total	2.8	0.10	3.000	0	92.4	81.6	129			
Surr: 4-Bromofluorobenzene	0.91		1.000		91.3	80	120			

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
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: HILCORP ENERGY FAR

Work Order Number: 1711E58

RcptNo: 1

Received By: Anne Thorne 11/30/2017 7:40:00 AM

Completed By: Erin Melendrez 11/30/2017 3:45:28 PM

Reviewed By: DDS/ENM 11/30/17

Anne Thorne
Erin Melendrez

Chain of Custody

1. Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒
2. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
3. How was the sample delivered? Courier

Log In

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

of preserved
bottles checked
for pH: _____
(<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

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

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.3	Good	Yes			

Chain-of-Custody Record		Turn-Around Time:
Client: Hilcorp Energy		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush
Mailing Address: PO Box 4700		Project Name:
Farmington NM 87499		Ludwick LS 16 - confirmation
Phone #: 505-564-0733		Project #:
email or Fax#: ccardoza@hilcorp.com		Project Manager:
QA/QC Package:		Clara Cardoza
<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Level 4 (Full Validation)		
Accreditation:		Sampler: Ccardoza
<input type="checkbox"/> NELAP <input type="checkbox"/> Other _____		On Ice: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> EDD (Type) _____		Sample Temperature: 13





www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

	X	X	X	BTEX + MTBE + TMB's (8021)
				BTEX + MTBE + TPH (Gas only)
	X	X	X	TPH Method 8015B (Gas/Diesel))
				TPH (Method 418.1)
				EDB (Method 504.1)
				8310 (PNA or PAH)
				RCRA 9 Metals
				Anions (F,Cl,NO ₃ ,NO ₂ ,PO ₄ ,SO ₄)
				8081 Pesticides / 8082 PCB's
				8260B (VOA)
				8270 (Semi-VOA)
				Air Bubbles (Y or N)

Date: #/29/17	Time: 1609	Relinquished by: 	Received by: 	Date 11/29/17	Time 1609
Date: 11/29/17	Time: 2016	Relinquished by: 	Received by: 	Date 11/30/17	Time 0746

Remarks: Billing Info: ATTN CLARA CARDOZA

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.



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

January 10, 2018

Clara Cardoza
Hilcorp Energy
PO Box 61529
Houston, TX 77208-1529
TEL: (337) 276-7676
FAX

RE: Ludwick LS 16 confirmation Samples

OrderNo.: 1801245

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 2 sample(s) on 1/5/2018 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 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 #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801245

Date Reported: 1/10/2018

CLIENT: Hilcorp Energy

Client Sample ID: Dirt/Gravel Pile

Project: Ludwick LS 16 confirmation Samples

Collection Date: 1/4/2018 1:48:00 PM

Lab ID: 1801245-001

Matrix: SOIL

Received Date: 1/5/2018 7:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	10	9.7		mg/Kg	1	1/9/2018 6:11:39 PM	35913
Surr: DNOP	96.9	70-130		%Rec	1	1/9/2018 6:11:39 PM	35913
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	1/9/2018 4:28:13 PM	35880
Surr: BFB	87.5	15-316		%Rec	1	1/9/2018 4:28:13 PM	35880
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	1/9/2018 4:28:13 PM	35880
Toluene	ND	0.048		mg/Kg	1	1/9/2018 4:28:13 PM	35880
Ethylbenzene	ND	0.048		mg/Kg	1	1/9/2018 4:28:13 PM	35880
Xylenes, Total	ND	0.097		mg/Kg	1	1/9/2018 4:28:13 PM	35880
Surr: 4-Bromofluorobenzene	99.0	80-120		%Rec	1	1/9/2018 4:28:13 PM	35880

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 1801245

Date Reported: 1/10/2018

CLIENT: Hilcorp Energy**Client Sample ID:** Debris Pile**Project:** Ludwick LS 16 confirmation Samples**Collection Date:** 1/4/2018 1:52:00 PM**Lab ID:** 1801245-002**Matrix:** SOIL**Received Date:** 1/5/2018 7:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	1/9/2018 1:40:05 PM	35913
Surr: DNOP	95.6	70-130		%Rec	1	1/9/2018 1:40:05 PM	35913
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	1/9/2018 5:40:23 PM	35880
Surr: BFB	84.1	15-316		%Rec	1	1/9/2018 5:40:23 PM	35880
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.023		mg/Kg	1	1/9/2018 5:40:23 PM	35880
Toluene	ND	0.046		mg/Kg	1	1/9/2018 5:40:23 PM	35880
Ethylbenzene	ND	0.046		mg/Kg	1	1/9/2018 5:40:23 PM	35880
Xylenes, Total	ND	0.093		mg/Kg	1	1/9/2018 5:40:23 PM	35880
Surr: 4-Bromofluorobenzene	93.6	80-120		%Rec	1	1/9/2018 5:40:23 PM	35880

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#: 1801245

10-Jan-18

Client: Hilcorp Energy

Project: Ludwick LS 16 confirmation Samples

Sample ID	LCS-35913		SampType: LCS			TestCode: EPA Method 8015M/D: Diesel Range Organics				
Client ID:	LCSS		Batch ID: 35913			RunNo: 48293				
Prep Date:	1/8/2018		Analysis Date: 1/9/2018			SeqNo: 1550988		Units: mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	10	50.00	0	90.8	70	130			
Surr: DNOP	4.4		5.000		87.2	70	130			

Sample ID	MB-35913		SampType: MBLK			TestCode: EPA Method 8015M/D: Diesel Range Organics				
Client ID:	PBS		Batch ID: 35913			RunNo: 48293				
Prep Date:	1/8/2018		Analysis Date: 1/9/2018			SeqNo: 1550989		Units: mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Surr: DNOP	9.2		10.00		91.6	70	130			

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1801245

10-Jan-18

Client: Hilcorp Energy

Project: Ludwick LS 16 confirmation Samples

Sample ID	MB-35880	SampType:	MBLK	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	PBS	Batch ID:	35880	RunNo:	48331					
Prep Date:	1/5/2018	Analysis Date:	1/9/2018	SeqNo:	1552377	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	860		1000		86.1	15	316			

Sample ID	LCS-35880	SampType:	LCS	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	LCSS	Batch ID:	35880	RunNo:	48331					
Prep Date:	1/5/2018	Analysis Date:	1/9/2018	SeqNo:	1552378	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	109	75.9	131			
Surr: BFB	970		1000		96.7	15	316			

Sample ID	1801245-002AMS	SampType:	MS	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	Debris Pile	Batch ID:	35880	RunNo:	48331					
Prep Date:	1/5/2018	Analysis Date:	1/9/2018	SeqNo:	1552383	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	4.8	23.81	0	108	77.8	128			
Surr: BFB	900		952.4		94.0	15	316			

Sample ID	1801245-002AMSD	SampType:	MSD	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	Debris Pile	Batch ID:	35880	RunNo:	48331					
Prep Date:	1/5/2018	Analysis Date:	1/9/2018	SeqNo:	1552384	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.8	24.20	0	105	77.8	128	0.701	20	
Surr: BFB	920		968.1		95.0	15	316	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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1801245

10-Jan-18

Client: Hilcorp Energy

Project: Ludwick LS 16 confirmation Samples

Sample ID	MB-35880		SampType:	MBLK		TestCode:	EPA Method 8021B: Volatiles			
Client ID:	PBS		Batch ID:	35880		RunNo:	48331			
Prep Date:	1/5/2018		Analysis Date:	1/9/2018		SeqNo:	1552422		Units: mg/Kg	
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	0.96		1.000		96.2	80	120			

Sample ID	LCS-35880		SampType:	LCS		TestCode:	EPA Method 8021B: Volatiles			
Client ID:	LCSS		Batch ID:	35880		RunNo:	48331			
Prep Date:	1/5/2018		Analysis Date:	1/9/2018		SeqNo:	1552423		Units: mg/Kg	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.95	0.025	1.000	0	94.6	77.3	128			
Toluene	0.96	0.050	1.000	0	95.6	79.2	125			
Ethylbenzene	0.95	0.050	1.000	0	95.4	80.7	127			
Xylenes, Total	2.9	0.10	3.000	0	97.2	81.6	129			
Surr: 4-Bromofluorobenzene	0.99		1.000		99.4	80	120			

Sample ID	1801245-001AMS		SampType:	MS		TestCode:	EPA Method 8021B: Volatiles			
Client ID:	Dirt/Gravel Pile		Batch ID:	35880		RunNo:	48331			
Prep Date:	1/5/2018		Analysis Date:	1/9/2018		SeqNo:	1552425		Units: mg/Kg	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.87	0.023	0.9372	0.009855	91.4	80.9	132			
Toluene	0.90	0.047	0.9372	0.01488	94.0	79.8	136			
Ethylbenzene	0.89	0.047	0.9372	0.01005	94.1	79.4	140			
Xylenes, Total	2.7	0.094	2.812	0.02802	95.2	78.5	142			
Surr: 4-Bromofluorobenzene	0.91		0.9372		96.8	80	120			

Sample ID	1801245-001AMSD		SampType:	MSD		TestCode:	EPA Method 8021B: Volatiles			
Client ID:	Dirt/Gravel Pile		Batch ID:	35880		RunNo:	48331			
Prep Date:	1/5/2018		Analysis Date:	1/9/2018		SeqNo:	1552426		Units: mg/Kg	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.025	0.9804	0.009855	91.9	80.9	132	5.02	20	
Toluene	0.94	0.049	0.9804	0.01488	94.8	79.8	136	5.23	20	
Ethylbenzene	0.94	0.049	0.9804	0.01005	95.0	79.4	140	5.41	20	
Xylenes, Total	2.9	0.098	2.941	0.02802	97.2	78.5	142	6.57	20	
Surr: 4-Bromofluorobenzene	0.97		0.9804		99.2	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

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

Sample Log-In Check List

Client Name: HILCORP ENERGY

Work Order Number: 1801245

RcptNo: 1

Received By: Erin Melendrez 1/5/2018 7:30:00 AM

Completed By: Ashley Gallegos 1/5/2018 9:54:22 AM

Reviewed By: SRE 01/05/18

Handwritten initials and signature.

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 $>0^{\circ}\text{C}$ 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 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

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

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

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.1	Good	Yes			

