R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745
Artesia ▲ Carlsbad ▲ Durango ▲ Midland

April 24, 2015

RECEIVED
By OCD; Dr. Oberding at 12:31 pm, Apr 24, 2015

Dr. Tomas Oberding
NMOCD District 1
1625 French Drive
Hobbs, New Mexico 88240
VIA EMAIL

RE: Caravan BVW State #9H/Caravan BVV State 6H Temporary Pit,
In-place Burial Notice
Unit C, Section 33, T24S, R33E, API #30-025-41641
Unit C, Section 33, T24S, R33E, API #30-025-41610

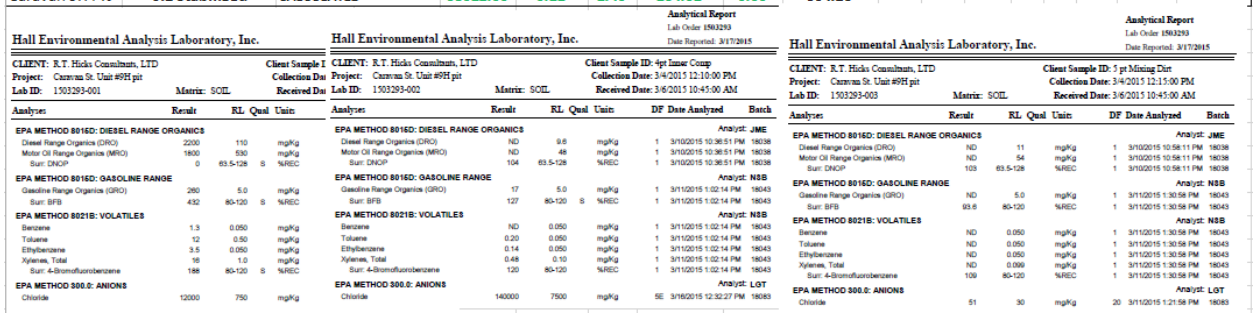
Dr. Oberding:

On behalf of Yates Petroleum Corporation, R. T. Hicks Consultants is provides this notice to NMOCD with a copy to the State Land Office (e-mail, return e-mail receipt) that closure operations at the above- referenced pit will begin on April 28, 2015. The closure process should require about two weeks, depending on the availability of machinery. The rig was released on November 23, 2014.

After hydraulic fracturing and flow-back were completed, 4-point composite samples were collected from the inner horseshoe cell, outer horseshoe cell, and from the clean soil of the berms (beneath the liner) of the pit on March 4, 2015 for laboratory analyses. The table below calculates the concentration for "3:1 stabilized" material to allow comparison with Table II the Pit Rule (Closure Criteria for Burial Trenches and Waste Left in Place in Temporary Pits). The formula use in the table below is:

3:1 Stabilized Solids = ((Outer Composite*0.66) + (0.34*Inner Composite)+(Mixing Dirt*3))

Well Name	Sample Name	Sample Type	Sample Date	Chloride 80,000	Benzene 10	BTEX 50	GRO+DRO 1000	TPH 418.1 2500	GRO+DRO+ DROext	GRO	DRO	MRO	T	E	X	Lab	Report
Caravan 9H Pit	Outer Composite		3/4/2015	12000	1.3	16	1960		4260	260	2200	1800	12	3.5	16	Hall	1
Caravan 9H Pit	Inner Composite		3/4/2015	140000	0	0.48	17		17	17	0	0	0.2	0.1	0.48	Hall	2
Caravan 9H Pit	Mixing Dirt Comp.		3/4/2015	51	0	0	0		0	0	0	0	0	0	0	Hall	2
Caravan 9H Pit	**3:1 Stabilized**	*CALCULATED*		*38012.00*	*0.11*	*1.40*	*164.51*	*0.00*	*354.26*								



Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Project: Caravan St. Unit #9H pit
Lab ID: 1503293-001 Matrix: SOIL
Client Sample I
Collection Dat
Received Dat

Analyses	Result	RL	Qual	Units
EPA METHOD 8015D: DIESEL RANGE ORGANICS				
Diesel Range Organics (DRO)	2200	110		mg/Kg
Motor Oil Range Organics (MRO)	1800	530		mg/Kg
Surr: DNOP	0	63.5-128	S	%REC
EPA METHOD 8015D: GASOLINE RANGE				
Gasoline Range Organics (GRO)	260	5.0		mg/Kg
Surr: BFB	432	80-120	S	%REC
EPA METHOD 8021B: VOLATILES				
Benzene	1.3	0.050		mg/Kg
Toluene	12	0.50		mg/Kg
Ethylbenzene	3.5	0.050		mg/Kg
Xylenes, Total	16	1.0		mg/Kg
Surr: 4-Bromofluorobenzene	188	80-120	S	%REC
EPA METHOD 300.0: ANIONS				
Chloride	12000	750		mg/Kg

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order 1503293
Date Reported: 3/17/2015

CLIENT: R.T. Hicks Consultants, LTD
Project: Caravan St. Unit #9H pit
Lab ID: 1503293-002 Matrix: SOIL
Client Sample ID: 4pt Inner Comp
Collection Date: 3/4/2015 12:10:00 PM
Received Date: 3/6/2015 10:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: JME	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	3/10/2015 10:36:51 PM	18038
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	3/10/2015 10:36:51 PM	18038
Surr: DNOP	104	63.5-128		%REC	1	3/10/2015 10:36:51 PM	18038
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB	
Gasoline Range Organics (GRO)	17	5.0		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Surr: BFB	127	80-120	S	%REC	1	3/11/2015 1:02:14 PM	18043
EPA METHOD 8021B: VOLATILES						Analyst: NSB	
Benzene	ND	0.050		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Toluene	0.20	0.050		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Ethylbenzene	0.14	0.050		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Xylenes, Total	0.48	0.10		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Surr: 4-Bromofluorobenzene	120	80-120		%REC	1	3/11/2015 1:02:14 PM	18043
EPA METHOD 300.0: ANIONS						Analyst: LGT	
Chloride	140000	7500		mg/Kg	5E	3/16/2015 12:32:27 PM	18083

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order 1503293
Date Reported: 3/17/2015

CLIENT: R.T. Hicks Consultants, LTD
Project: Caravan St. Unit #9H pit
Lab ID: 1503293-003 Matrix: SOIL
Client Sample ID: 5 pt Mixing Dirt
Collection Date: 3/4/2015 12:15:00 PM
Received Date: 3/6/2015 10:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: JME	
Diesel Range Organics (DRO)	ND	11		mg/Kg	1	3/10/2015 10:58:11 PM	18038
Motor Oil Range Organics (MRO)	ND	54		mg/Kg	1	3/10/2015 10:58:11 PM	18038
Surr: DNOP	103	63.5-128		%REC	1	3/10/2015 10:58:11 PM	18038
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Surr: BFB	93.6	80-120		%REC	1	3/11/2015 1:30:58 PM	18043
EPA METHOD 8021B: VOLATILES						Analyst: NSB	
Benzene	ND	0.050		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Toluene	ND	0.050		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Ethylbenzene	ND	0.050		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Xylenes, Total	ND	0.099		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Surr: 4-Bromofluorobenzene	109	80-120		%REC	1	3/11/2015 1:30:58 PM	18043
EPA METHOD 300.0: ANIONS						Analyst: LGT	
Chloride	51	30		mg/Kg	20	3/11/2015 1:21:58 PM	18083

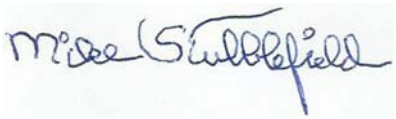
The inner composite and outer composite ratio in the formula approximates the solids volume generated during drilling. The solids placed in the outer shoe are derived from drilling the surface casing string and production string. The inner shoe contains solids from drilling intermediate casing string.

Laboratory analyses of the component samples (attached) and the calculation of stabilized cuttings "demonstrate that, after the waste is solidified or stabilized with soil or other non-waste material at a ratio of no more than 3:1 soil or other non-waste material to waste, the concentration of any contaminant in the stabilized waste is not higher than the parameters listed in Table II of 19.15.17.13 NMAC."

On December 31, 2014, Hicks Consultants submitted a variance request to your office proposing replacement of certified US Mail notification to the State Land Office with e-mail notification plus a "read request". This variance applies only to the notice of on-site closure of temporary pits on State surface. This same variance request is attached to this letter for the above-referenced temporary pit on State surface.

I will follow up this notice with a phone call to determine if email notification to the SLO may be employed in lieu of US Mail notification. I will also call you the day before closure begins.

Sincerely,
R.T. Hicks Consultants



Mike Stubblefield
Project Manager

Copy: Yates Petroleum Corporation
Ed Martin
New Mexico State Land Office
PO Box 1148
Santa Fe, NM 87504-1148
E-mail read receipt requested

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

December 16, 2014

Dr. Tomáš J. Oberding
NMOCD District 1
1625 French Drive
Hobbs, New Mexico 88240
VIA EMAIL

RE: Variance Request
Murchison Oil and Gas, Inc., Jackson Unit #17H temporary pit
API# 30-025-41087, Pit Permit #P1-05981

Dear Dr. Oberding:

The "In-place Burial" closure plan for the above referenced pit was submitted with the C-144 pit application on January 6, 2014 and approved on January 16, 2014. The rig was released from this well on April 14, 2014. Following the well completion of the Jackson Unit #17H well, NMOCD granted a variance to allow cuttings from a nearby well on a different lease, Brininstool 4 St. #4H, to be deposited into the #17H pit during the closed loop drilling. The last cuttings were deposited into the pit in September 2014. NMOCD recently approved a 3-month extension, created a new closure deadline of January 14, 2015.

Hicks Consultants requests a variance to allow TPH by Method 8015M (GRO+DRO+MRO) to substitute for the required method of TPH by 418.1 (2,500 mg/kg) when determining compliance with Table II Standards for in-place closure.

R.T. Hicks Consultants

Kristin Pope
Project Geologist

Enclosure: Variance Request

Copy: Murchison Oil and Gas, Inc.

New Mexico State Land Office, Ed Martin
PO Box 1148
Santa Fe, NM 87504-1148

Statement Explaining Why the Applicant Seeks a Variance

The prescriptive mandates of the Rule that are the subject of this variance request are the following subsections of 19.15.17.13.D:

(5) The operator shall collect, at a minimum, a five point composite of the contents of the temporary pit or drying pad/tank associated with a closed-loop system to demonstrate that, after the waste is solidified or stabilized with soil or other non-waste material at a ratio of no more than 3:1 soil or other non-waste material to waste, the concentration of any contaminant in the stabilized waste is not higher than the parameters listed in Table II of 19.15.17.13 NMAC.

Table II
Closure Criteria for Burial Trenches and Waste Left in Place in Temporary Pits

Depth below bottom of pit to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
25-50 feet	Chloride	EPA Method 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 418.1	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B	10 mg/kg

		or 8015M	
51-100 feet	Chloride	EPA Method 300.0	40,000 mg/kg
	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
> 100 feet	Chloride	EPA Method 300.0	80,000 mg/kg
	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

*Or other test methods approved by the division
**Numerical limits or natural background level, whichever is greater
[19.15.17.13 NMAC - Rp, 19.15.17.13 NMAC, 6/28/13]

On October 28, 2014 composite samples were recovered from the Jackson Unit #17H pit, one from the inner and one from the outer cells, as well as a composite sample of available mixing dirt from the berms of the pit below the liner. These three composites were submitted for individual analyses for parameters listed in Table II of 19.15.17.13 NMAC. As approved previously by OCD, an accurate demonstration that "after the waste is solidified or stabilized with soil or other non-waste material at a ratio of no more than 3:1 soil or other non-waste material to waste, the concentration of any contaminant in the stabilized waste is not higher than

the parameters listed in Table II of 19.15.17.13 NMAC" may be derived by mathematically mixing the laboratory results. First, we calculated "pit composite" concentration based on the volume of cuttings of each cell (3.5 parts outer, 1 part inner cell) and the individual laboratory results. Next we mathematically mixed the composite pit concentration with the mixing dirt concentrations at a ratio of 3 parts mixing dirt to 1 part pit contents. When compared to Table II closure criteria, TPH (418.1) target concentrations were not met, as shown in the table below. TPH (418.1) is approximately 17% over the Pit Rule standard while TPH by 8015 (GRO+DRO+MRO) is 29% of the 2,500-mg/kg limit. All other constituents meet the in-place burial limits of the Rule.

Jackson Unit #17H	3:1 STABILIZED CUTTINGS CALCULATIONS	
Constituent	Table II Limit (GW>100')	10/28/2014 Samples*
Chloride	80,000 mg/kg	7302
TPH	2,500 mg/kg	**2927**
GRO+DRO	1,000 mg/kg	612
BTEX	50 mg/kg	3.15
Benzene	10 mg/kg	0.25
GRO+DRO+MRO		***735***

*Concentrations of stabilized cuttings determined using component concentrations inserted into the follow formula:

$$\text{3:1 Stabilized Cuttings} = \frac{[\text{inner pit cell} + (3.5 * \text{outer pit cell})/4.5] + (\text{mixing dirt} * 3)}{4}$$

EPA Method 418.1 measures carbon-hydrogen bonds (hydrocarbons) and is not specific to petroleum-based material. Several analytical laboratories have informed us that many non-petroleum organic additives used during drilling (e.g. cellulose, pine pulp, vegetable oils, cottonseed hulls, nut shells) will be captured by the 418.1 analytical method. Method 418.1 can also capture other naturally-occurring material in a sample such as dry grass and humic material in topsoil. For example, TPH concentrations of grass (14,000 mg/kg), pine needles (16,000 mg/kg), and oak leaves (18,000 mg/kg) [1] would not meet the Table II concentration limits and the Commission did not intend that the in-place burial limit for TPH include hydrocarbons associated with leaves or pine pulp.

We conclude that TPH by 418.1 captures a broader spectrum of hydrocarbons than was envisioned by the Commission when evaluating the burial standards for drilling solids. In contrast, TPH by 8015M (GRO+DRO+MRO) appears to better reflect the intent of the Commission as reflected in the Findings of Fact, which state (emphasis added):

> P. The Commission finds that constituents reflected in Tables I and II (other than chloride), benzene, and toluene, ethylbenzene and xylene (a compound commonly referred to as BTEX), as well as the *gasoline range organics ("GRO") and diesel range organics ("DRO"), which are compounds in the total petroleum hydrocarbons ("TPH"), are light aromatics.* While they are soluble and are able to travel to groundwater, they are slower than chlorides in unsaturated flow, which is why chlorides are used as the outer boundary marker for contaminates. Moreover, the light aromatics are volatile, particularly benzene, which is highly volatile. The resident time for light aromatics is very short, and they will evaporate quickly and degrade in the soil. This is

[1] "Frequently Asked Questions About TPH Analytical Methods for Crude Oil" see http://www.api.org/environment-health-and-safety/environmental-performance/~/~/media/cd8032db1be74914a6b3c816bab33786.ashx

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

March 17, 2015

Mike Stubblefield

R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX (505) 266-0745

RE: Caravan St. Unit #9H pit OrderNo.: 1503293

Dear Mike Stubblefield:

Hall Environmental Analysis Laboratory received 3 sample(s) on 3/6/2015 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 qualifers 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,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1503293**
Date Reported: **3/17/2015**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: 4pt Outer Comp
Project: Caravan St. Unit #9H pit
Collection Date: 3/4/2015 11:45:00 AM
Lab ID: 1503293-001 **Matrix:** SOIL **Received Date:** 3/6/2015 10:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	2200	110		mg/Kg	10	3/10/2015 10:15:20 PM	18038
Motor Oil Range Organics (MRO)	1800	530		mg/Kg	10	3/10/2015 10:15:20 PM	18038
Surr: DNOP	0	63.5-128	S	%REC	10	3/10/2015 10:15:20 PM	18038
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	260	5.0		mg/Kg	1	3/11/2015 12:33:30 PM	18043
Surr: BFB	432	80-120	S	%REC	1	3/11/2015 12:33:30 PM	18043
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	1.3	0.050		mg/Kg	1	3/11/2015 12:33:30 PM	18043
Toluene	12	0.50		mg/Kg	10	3/12/2015 2:54:27 AM	18043
Ethylbenzene	3.5	0.050		mg/Kg	1	3/11/2015 12:33:30 PM	18043
Xylenes, Total	16	1.0		mg/Kg	10	3/12/2015 2:54:27 AM	18043
Surr: 4-Bromofluorobenzene	188	80-120	S	%REC	1	3/11/2015 12:33:30 PM	18043
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	12000	750		mg/Kg	500	3/11/2015 12:44:44 PM	18083

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
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
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: 4pt Inner Comp
Project: Caravan St. Unit #9H pit
Collection Date: 3/4/2015 12:10:00 PM
Lab ID: 1503293-002 **Matrix:** SOIL **Received Date:** 3/6/2015 10:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	3/10/2015 10:36:51 PM	18038
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	3/10/2015 10:36:51 PM	18038
Surr: DNOP	104	63.5-128		%REC	1	3/10/2015 10:36:51 PM	18038
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	17	5.0		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Surr: BFB	127	80-120	S	%REC	1	3/11/2015 1:02:14 PM	18043
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.050		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Toluene	0.20	0.050		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Ethylbenzene	0.14	0.050		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Xylenes, Total	0.48	0.10		mg/Kg	1	3/11/2015 1:02:14 PM	18043
Surr: 4-Bromofluorobenzene	120	80-120		%REC	1	3/11/2015 1:02:14 PM	18043
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	140000	7500		mg/Kg	5E	3/16/2015 12:32:27 PM	18083

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
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
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: 5 pt Mixing Dirt
Project: Caravan St. Unit #9H pit
Collection Date: 3/4/2015 12:15:00 PM
Lab ID: 1503293-003 **Matrix:** SOIL **Received Date:** 3/6/2015 10:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	11		mg/Kg	1	3/10/2015 10:58:11 PM	18038
Motor Oil Range Organics (MRO)	ND	54		mg/Kg	1	3/10/2015 10:58:11 PM	18038
Surr: DNOP	103	63.5-128		%REC	1	3/10/2015 10:58:11 PM	18038
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Surr: BFB	93.6	80-120		%REC	1	3/11/2015 1:30:58 PM	18043
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.050		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Toluene	ND	0.050		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Ethylbenzene	ND	0.050		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Xylenes, Total	ND	0.099		mg/Kg	1	3/11/2015 1:30:58 PM	18043
Surr: 4-Bromofluorobenzene	109	80-120		%REC	1	3/11/2015 1:30:58 PM	18043
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	51	30		mg/Kg	20	3/11/2015 1:21:58 PM	18083

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
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
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1503293**

17-Mar-15

Client: R.T. Hicks Consultants, LTD

Project: Caravan St. Unit #9H pit

Sample ID	**MB-18083**	SampType:	**MBLK**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBS**	Batch ID:	**18083**	RunNo:	**24785**					
Prep Date:	**3/11/2015**	Analysis Date:	**3/11/2015**	SeqNo:	**730064**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-18083**	SampType:	**LCS**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSS**	Batch ID:	**18083**	RunNo:	**24785**					
Prep Date:	**3/11/2015**	Analysis Date:	**3/11/2015**	SeqNo:	**730065**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.0	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
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
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1503293**

17-Mar-15

Client: R.T. Hicks Consultants, LTD

Project: Caravan St. Unit #9H pit

Sample ID **MB-18038**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **18038**	RunNo: **24711**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728323** 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	8.4		10.00		84.2	63.5	128			

Sample ID **LCS-18038**	SampType: **LCS**	TestCode: **EPA Method 8015D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **18038**	RunNo: **24711**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728325** 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	90.9	67.8	130			
Surr: DNOP	4.5		5.000		89.3	63.5	128			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
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
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1503293**

17-Mar-15

Client: R.T. Hicks Consultants, LTD

Project: Caravan St. Unit #9H pit

Sample ID **MB-18044**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **18044**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728732** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	900		1000		89.5	80	120			

Sample ID **LCS-18044**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **18044**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728733** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		108	80	120			

Sample ID **MB-18043**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **18043**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728754** 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	910		1000		90.8	80	120			

Sample ID **LCS-18043**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **18043**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728755** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	105	64	130			
Surr: BFB	980		1000		97.5	80	120			

Sample ID **LCSD-18043**	SampType: **LCSD**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS02**	Batch ID: **18043**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728756** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	990							0	0	

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1503293**

17-Mar-15

Client: R.T. Hicks Consultants, LTD

Project: Caravan St. Unit #9H pit

Sample ID **MB-18044**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **18044**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728766** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		1.000		102	80	120			

Sample ID **LCS-18044**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **18044**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728767** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		1.000		112	80	120			

Sample ID **MB-18043**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **18043**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728781** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		103	80	120			

Sample ID **LCS-18043**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **18043**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728782** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.050	1.000	0	111	76.6	128			
Toluene	1.1	0.050	1.000	0	109	75	124			
Ethylbenzene	1.1	0.050	1.000	0	109	79.5	126			
Xylenes, Total	3.2	0.10	3.000	0	108	78.8	124			
Surr: 4-Bromofluorobenzene	1.1		1.000		112	80	120			

Sample ID **LCSD-18043**	SampType: **LCSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS02**	Batch ID: **18043**	RunNo: **24730**
Prep Date: **3/9/2015**	Analysis Date: **3/10/2015**	SeqNo: **728783** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.050	1.000	0	107	76.6	128	3.68	20	
Toluene	1.1	0.050	1.000	0	105	75	124	3.09	20	
Ethylbenzene	1.1	0.050	1.000	0	107	79.5	126	2.53	20	
Xylenes, Total	3.2	0.10	3.000	0	106	78.8	124	1.71	20	

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1503293**

17-Mar-15

Client: R.T. Hicks Consultants, LTD

Project: Caravan St. Unit #9H pit

Sample ID	**LCSD-18043**	SampType:	**LCSD**	TestCode:	**EPA Method 8021B: Volatiles**
Client ID:	**LCSS02**	Batch ID:	**18043**	RunNo:	**24730**
Prep Date:	**3/9/2015**	Analysis Date:	**3/10/2015**	SeqNo:	**728783** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		1.000		111	80	120	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
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
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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: RT HICKS | Work Order Number: 1503293 | RcptNo: 1

Received by/date: AT 03/06/15

Logged By: **Anne Thorne** 3/6/2015 10:45:00 AM

Completed By: **Anne Thorne** 3/9/2015

Reviewed By: 03/09/15

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?	Client		

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: ☐ eMail ☐ Phone ☐ Fax ☐ 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	1.2	Good	Not Present			

Chain-of-Custody Record

Client: R.T. Hicks Consultants
901 Rio Grande Blvd NW
Mailing Address: Suite F-142
Albuquerque, NM 87104
Phone #: (505) 266-5004
email or Fax#: R@rthicksconsult.com
QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: Caravan St. Unit #9H pit
Project #:
Project Manager: Mike Stubblefield
Sampler: M. Stubblefield
On Ice: ☑ Yes ☐ No
Sample Temperature: 1.2

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1503293	BTEX + MTBE + TMB's (8021) (BTEX)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F^-, Cl^-, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)		100 grams			Air Bubbles (Y or N)
4/15	1145	soil	4-pt Outer Comp.	1 glass	ice	-001	X		X					X					X			
"	1210	"	4-pt. Inner Comp.	"	"	-002	X		X					X					X			
"	1215	"	5-pt. Mixing Dirt	"	"	-003	X		X					X								

Date: 4/15 Time: Relinquished by: Mike Stubblefield
Received by: Date: 4/15 Time: 1100
Date: 4/15 Time: 1045 Relinquished by:
Received by: Date: 03/06/15 Time: 1045

Remarks: Email to Mike@rthicksconsult.com, R@"

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.

particularly true during closure and mixing. The benzene level that is reflected in Tables I and II, is lower than the levels recommended by the American Petroleum Institute, and GRO and DRO, while they could affect the odor and taste of water, are not a matter of concern with respect to toxicity. *The other compounds in TPH, the oil range organics and asphaltenes, are made up of large molecules and are not sufficiently mobile to pose a concern for human health or fresh water.*

Demonstration that the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The modified Method 8015 uses solvent extraction followed by gas chromatography and is more widely used in the regulation of the petroleum industry than the 418.1. The evaluation of TPH using method 8015M (GRO+DRO+MRO) provide a more accurate representation of the *petroleum* hydrocarbons without interference from organic, biodegradable, drilling additives such as vegetable/pine oils, cottonseed hulls, and nuts shells, which we believe are not intended for regulation. Our analyses of drilling pit solids demonstrates how "total" TPH results from 418.1 do not contribute to the protection of fresh water relative to SPLP (synthetic precipitation leaching procedure) TPH analysis by 418.1 with respect to the potential of the hydrocarbon to migrate into the underlying groundwater via leaching or into the root zone via wicking upward.

Reviewing the analyses of seven sample sets from five Murchison pits in 2014, the percentage of TPH by SPLP relative to "total" TPH ranges from 0% to 1.42%. This is likely because nearly all of the TPH in the stabilized cutting samples at this site are from the insoluble (or nearly insoluble) matter. The TPH analysis using the SPLP sample preparation method provides a better understanding of the actual risks to human health and the environment than the "total" TPH analysis, but currently there are no regulatory standard concentrations established for samples prepared by SPLP.

GRO+DRO+MRO analysis by 8015M offers greater characterization of leacheability by reporting actual petroleum hydrocarbon concentrations by their known chromatograph fingerprints. TPH using Method 418.1 is not the best indicator for risk to human health or the environment and we do not believe it was the intent of the Pit Rule to preclude in-place closure of a temporary pit due to non-petroleum organic matter, either naturally-occurring or in drilling additives. We believe that the approval of a variance allowing the use of TPH by method 8015M (GRO+DRO+MRO) in place of TPH by method 418.1 for comparison to the existing TPH standard (2,500 mg/kg) will provide equal or better protection of fresh water, public health, and the environment.