

Karrigan, Callie N. (MRO)

From: Heather Patterson <heather.patterson@soudermiller.com>
Sent: Tuesday, December 18, 2018 9:23 AM
To: Pruett, Maria, EMNRD
Cc: Karrigan, Callie N. (MRO)
Subject: [External] RE: Closure Not Approved RE: Marathon Oil Company - 2RP-4956 Closure
Attachments: 6be95575fa7bfeb5425bcb976f25f05fdf.pdf;
7a1b636689fb17512dd914ebf13baa5f65.pdf; Iron Duke figure.pdf

Beware of links/attachments.

RE: Marathon Permian * Iron Duke 2H * 2RP-4956

Ms. Pruett,

Thank you for your prompt response. The depth to groundwater was determined to be greater than 50' based on two 2011 monitoring wells, one located approximately 700' from the release point to the northwest, the other to the south. Both encountered water at greater than 50'. While there are other wells nearby that show depth to water at less than 50', further investigation shows they are predominately artesian wells, many of which have been diverted to the Pecos River Project. USGS data appears to also predominately come from artesian wells also, with only one having a recent reading. That well has data from 2015 showing a depth of 55'.

Attached is an additional figure with well information and the well logs of the two monitoring wells recently drilled nearby.

Thank you,

Heather Patterson
Staff Scientist
(575) 200-5343 (mobile)

**Souder, Miller & Associates**

Engineering ♦ Environmental ♦ Surveying
201 South Halagueno St
Carlsbad, NM 88220
www.soudermiller.com

From: Pruett, Maria, EMNRD <Maria.Pruett@state.nm.us>
Sent: Tuesday, November 20, 2018 4:04 PM
To: Karrigan, Callie N. (MRO) <cnkarrigan@marathonoil.com>; Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>
Cc: Heather Patterson <heather.patterson@soudermiller.com>; Castro, Isaac (MRO) <icastro@marathonoil.com>
Subject: Closure Not Approved RE: Marathon Oil Company - 2RP-4956 Closure

Hello Ms. Karrigan,

OCD has received the closure report for 2RP-4956, thank you. At this time OCD does not approve this closure. It is denied for the following reasons:

1. OCD has determined that DTW is < 50', therefore Table 1 targets are: Chlorides < 600 mg/kg, TPH < 100 mg/kg.
2. Areas CS 1-4 require further delineation and remediation to meet Table 1.
3. All sidewall sample areas require further delineation and remediation to meet Table 1.
4. Was the area inside the containment delineated?
5. GPS tagged photos for closure not included.

Please let me know if you have any questions.

Best Regards,

Maria Pruett

Environmental Specialist
N.M. Oil Conservation Division
District 2
811 S. 1st Street
Artesia, NM 88210
Desk: 575 748-1283 X 101
Cell: 575 840-5963
Fax: 575748-9720

From: Karrigan, Callie N. (MRO) <cnkarrigan@marathonoil.com>
Sent: Monday, October 29, 2018 1:22 PM
To: Pruett, Maria, EMNRD <Maria.Pruett@state.nm.us>; Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>
Cc: Heather Patterson <heather.patterson@soudermiller.com>; Castro, Isaac (MRO) <icastro@marathonoil.com>
Subject: [EXT] Marathon Oil Company - 2RP-4956 Closure

Good afternoon,

Please see the attached closure for 2RP-4956 prepared by SMA.

Thank you,

Callie



WELL RECORD & LOG

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1. GENERAL AND WELL LOCATION	POD NUMBER (WELL NUMBER) POD3				OSE FILE NUMBER(S) RA-11682					
	WELL OWNER NAME(S) Lakeside Dairy				PHONE (OPTIONAL)					
	WELL OWNER MAILING ADDRESS 49 E. Atoka Road				CITY Artesia		STATE NM		ZIP 88210	
	WELL LOCATION (FROM GPS)	DEGREES LATITUDE	MINUTES 32	SECONDS 45	45.30 N	* ACCURACY REQUIRED: ONE TENTH OF A SECOND * DATUM REQUIRED: WGS 84				
	LONGITUDE	104	22	53.34 W						
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS Monitoring Well MW-9, on dairy property at address and Lat. Long above.										
2. OPTIONAL	(2.5 ACRE) ¼	(10 ACRE) ¼	(40 ACRE) ¼	(160 ACRE) ¼	SECTION		TOWNSHIP <input type="checkbox"/> NORTH <input type="checkbox"/> SOUTH		RANGE <input type="checkbox"/> EAST <input type="checkbox"/> WEST	
	SUBDIVISION NAME				LOT NUMBER		BLOCK NUMBER		UNIT/TRACT	
	HYDROGRAPHIC SURVEY						MAP NUMBER		TRACT NUMBER	
3. DRILLING INFORMATION	LICENSE NUMBER WD-1311		NAME OF LICENSED DRILLER Lee Gebbert				NAME OF WELL DRILLING COMPANY Geoprojects International, Inc.			
	DRILLING STARTED 6-5-2011		DRILLING ENDED 6-7-2011		DEPTH OF COMPLETED WELL (FT) 70		BORE HOLE DEPTH (FT) 74		DEPTH WATER FIRST ENCOUNTERED (FT) ~57	
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input type="checkbox"/> DRY HOLE <input checked="" type="checkbox"/> SHALLOW (UNCONFINED)						STATIC WATER LEVEL IN COMPLETED WELL (FT) 54.16			
	DRILLING FLUID: <input type="checkbox"/> AIR <input type="checkbox"/> MUD <input type="checkbox"/> ADDITIVES - SPECIFY: None									
	DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: Hollow Stem Auger									
	DEPTH (FT)		BORE HOLE DIA. (IN)	CASING MATERIAL	CONNECTION TYPE (CASING)	INSIDE DIA. CASING (IN)	CASING WALL THICKNESS (IN)	SLOT SIZE (IN)		
	FROM	TO								
	0	50	8.5	PVC	Threaded	2		Blank		
	50	70	8.5	PVC	Threaded	2		0.01		
4. WATER BEARING STRATA	DEPTH (FT)		THICKNESS (FT)	FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)				YIELD (GPM)		
	FROM	TO								
	57	68	11	Sandy silt, 10% gravel, tan/brown				2		
METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA Estimated while hand bailing						TOTAL ESTIMATED WELL YIELD (GPM) 280				

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 2011 AUG - 8 AM

FOR OSE INTERNAL USE

WELL RECORD & LOG (Version 6/9/08)

FILE NUMBER RA-11682	POD NUMBER 3	TRN NUMBER 472997
LOCATION 185.26E.09 243	PAGE 1 OF 2	

5. SEAL AND PUMP	TYPE OF PUMP: <input type="checkbox"/> SUBMERSIBLE <input type="checkbox"/> JET <input checked="" type="checkbox"/> NO PUMP - WELL NOT EQUIPPED						
	<input type="checkbox"/> TURBINE <input type="checkbox"/> CYLINDER <input type="checkbox"/> OTHER - SPECIFY:						
	ANNULAR SEAL AND GRAVEL PACK	DEPTH (FT)		BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHOD OF PLACEMENT
		FROM	TO				
2		44	8.5	Cement/Bentonite (6%)		Tremie	
	44	48	8.5	Bentonite Pellets		Pour inside auger	
	48	71	8.5	10/20 Silica Sand		Pour inside auger	

6. GEOLOGIC LOG OF WELL	DEPTH (FT)		THICKNESS (FT)	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)	WATER BEARING?
	FROM	TO			
	0	4	34	Sand, 25% fines, Brown	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	4	34	30	Silt, clayey, trace gravels, brown/tan/red	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	34	37	7	Gravel, 30% fines, gray/tan	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	37	41	4	Silty clay, very fine - fine sand, gray/green	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	41	48	7	Sand, fine - medium, rounded gravel, tan/gray	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	48	52	4	Gravel, 30% fines, semi cemented, gray	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	52	57	5	Silty Clay, 20% fine sand, brown	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	57	68	11	Sandy Silt, 10% gravel, tan.brown	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
	68	70	2	Sand, medium - coarse, tan/brown	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
	70	74	4	Gravel, 25% sand, tan/gray	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
				<input type="checkbox"/> YES <input type="checkbox"/> NO	
				<input type="checkbox"/> YES <input type="checkbox"/> NO	
				<input type="checkbox"/> YES <input type="checkbox"/> NO	
				<input type="checkbox"/> YES <input type="checkbox"/> NO	

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL

7. TEST & ADDITIONAL INFO	WELL TEST	METHOD: <input type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/> AIR LIFT <input checked="" type="checkbox"/> OTHER - SPECIFY: Monitoring Well - No test
		TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.
		ADDITIONAL STATEMENTS OR EXPLANATIONS: This well is a monitoring well for the purpose of groundwater monitoring only.

STATE ENGINEER OF NEW MEXICO
 ROSWELL, NEW MEXICO
 2011 AUG - 8 A 11:00

8. SIGNATURE	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:	
	 _____ SIGNATURE OF DRILLER	<u>7-13-11</u> _____ DATE

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)	
FILE NUMBER	RA-11682	POD NUMBER	3
LOCATION	185.26E.9.243	TRN NUMBER	472997
			PAGE 2 OF 2



WELL RECORD & LOG

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1. GENERAL AND WELL LOCATION	POD NUMBER (WELL NUMBER) POD5				OSE FILE NUMBER(S) RA-11682									
	WELL OWNER NAME(S) Lakeside Dairy				PHONE (OPTIONAL)									
	WELL OWNER MAILING ADDRESS 49 E. Atoka Road				CITY Artesia		STATE NM		ZIP 88210					
	WELL LOCATION (FROM GPS)		DEGREES 32		MINUTES 45		SECONDS 28.88 N		* ACCURACY REQUIRED: ONE TENTH OF A SECOND					
		LONGITUDE 104		22		42.69 W		* DATUM REQUIRED: WGS 84						
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS Monitoring Well MW-11, located on the west side of N. Lake Rd. 1/4 mile north of Dinkus Rd.														
2. OPTIONAL	(2.5 ACRE) 1/4		(10 ACRE) 1/4		(40 ACRE) 1/4		(160 ACRE) 1/4		SECTION					
	SUBDIVISION NAME				LOT NUMBER		BLOCK NUMBER		UNIT/TRACT					
	HYDROGRAPHIC SURVEY						MAP NUMBER		TRACT NUMBER					
3. DRILLING INFORMATION	LICENSE NUMBER WD-1311		NAME OF LICENSED DRILLER Lee Gebbert				NAME OF WELL DRILLING COMPANY Geoprojects International, Inc.							
	DRILLING STARTED 6-8-2011		DRILLING ENDED 6-9-2011		DEPTH OF COMPLETED WELL (FT) 66		BORE HOLE DEPTH (FT) 69		DEPTH WATER FIRST ENCOUNTERED (FT) ~53					
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input type="checkbox"/> DRY HOLE <input checked="" type="checkbox"/> SHALLOW (UNCONFINED)						STATIC WATER LEVEL IN COMPLETED WELL (FT) 51.38							
	DRILLING FLUID: <input type="checkbox"/> AIR <input type="checkbox"/> MUD <input type="checkbox"/> ADDITIVES - SPECIFY: None													
	DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: Hollow Stem Auger													
	DEPTH (FT)		BORE HOLE DIA. (IN)		CASING MATERIAL		CONNECTION TYPE (CASING)		INSIDE DIA. CASING (IN)		CASING WALL THICKNESS (IN)		SLOT SIZE (IN)	
	FROM TO													
	0 46		8.5		PVC		Threaded		2				Blank	
	46 66		8.5		PVC		Threaded		2				0.01	
	4. WATER BEARING STRATA	DEPTH (FT)		THICKNESS (FT)		FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)						YIELD (GPM)		
FROM TO														
53 58		5		Gravel, 30% fines, medium - coarse sand, saturated						2				
METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA Estimated while hand bailing								TOTAL ESTIMATED WELL YIELD (GPM) 2						

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 2011 AUG - 8 A 11:51

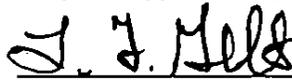
FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)	
FILE NUMBER	RA-11682	POD NUMBER	5
LOCATION	185, 26E, 16.124	TRN NUMBER	42997
			PAGE 1 OF 2

5. SEAL AND PUMP	TYPE OF PUMP: <input type="checkbox"/> SUBMERSIBLE <input type="checkbox"/> JET <input checked="" type="checkbox"/> NO PUMP - WELL NOT EQUIPPED						
	<input type="checkbox"/> TURBINE <input type="checkbox"/> CYLINDER <input type="checkbox"/> OTHER - SPECIFY:						
	ANNULAR SEAL AND GRAVEL PACK	DEPTH (FT)		BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHOD OF PLACEMENT
		FROM	TO				
2		40	8.5				
	40	44	8.5	Bentonite Pellets		Pour inside auger	
	44	69	8.5	10/20 Silica Sand		Pour inside auger	

6. GEOLOGIC LOG OF WELL	DEPTH (FT)		THICKNESS (FT)	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)	WATER BEARING?	
	FROM	TO				
	0	2	2	Sand, fine - Coarse, brown	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
	2	53	51	Silty clay/clayey silt, 15% sands, brown/gray/tan	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
	53	58	5	Gravel, 30% fines, gray	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
	58	69	11	Silty clay, 10% very fine sand, gray	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
					<input type="checkbox"/> YES <input type="checkbox"/> NO	
					<input type="checkbox"/> YES <input type="checkbox"/> NO	
					<input type="checkbox"/> YES <input type="checkbox"/> NO	
					<input type="checkbox"/> YES <input type="checkbox"/> NO	
					<input type="checkbox"/> YES <input type="checkbox"/> NO	
					<input type="checkbox"/> YES <input type="checkbox"/> NO	
					<input type="checkbox"/> YES <input type="checkbox"/> NO	
	ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL.					

7. TEST & ADDITIONAL INFO	WELL TEST	METHOD: <input type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/> AIR LIFT <input checked="" type="checkbox"/> OTHER - SPECIFY: Monitoring Well - No test
	TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.	
	ADDITIONAL STATEMENTS OR EXPLANATIONS: This well is a monitoring well for the purpose of groundwater monitoring only.	

STATE ENGINEER
 ROSWELL, NEW HAMPSHIRE
 2011 AUG - 8 A 11:51

8. SIGNATURE	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:	
	 _____ SIGNATURE OF DRILLER	7-13-11 _____ DATE

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)	
FILE NUMBER	RA-11682	POD NUMBER	5
LOCATION	185.26E.14.124	TRN NUMBER	472997
			PAGE 2 OF 2



Well Head Protection Map
 Iron Duke #2H - Marathon
 S 9-T18S-R26E, New Mexico

Figure 1

Date Saved: 12/17/2018	By: _____	Date: _____	Revisions	Descr: _____
	By: _____	Date: _____		Descr: _____
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Drawn	<u>Heather Patterson</u>
Checked	_____
Approved	_____



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 Carlsbad, New Mexico 88221
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October 29, 2018

#5E27499-BG2

NMOCD District 2
 Mr. Mike Bratcher
 811 S. First St.
 Artesia, New Mexico 88210

SUBJECT: Remediation Closure Report for the Iron Duke #002H Release (2RP-4956), Artesia, Eddy County, New Mexico

Dear Mr. Bratcher:

On behalf of Marathon Oil Permian, LLC (Marathon), Souder, Miller & Associates (SMA) has prepared this Remediation Closure Report that describes the delineation and proposed remediation for a release of liquids related to oil and gas production activities at the Iron Duke #002H site. The site is in Unit I, Section 9, Township 18S, Range 26E, Eddy County, New Mexico, on Private land. Figure 1 illustrates the vicinity and site location on an USGS 7.5 minute quadrangle map.

Table 1 summarizes information regarding the release.

Table 1: Release Information and Closure Criteria			
Name	Iron Duke #002H	Company	Marathon Oil Permian, LLC
API Number	30-015-39761	Location	32.761522° -104.378899°
Incident Number	2RP-4956		
Estimated Date of Release	August 18, 2018	Date Reported to NMOCD	August 31, 2018
Land Owner	Private	Reported To	NMOCD District 2
Source of Release	Ball valve on the load line failed		
Released Volume	10 bbls	Released Material	Produced water
Recovered Volume	Unknown	Net Release	Unknown
NMOCD Closure Criteria	51-100 feet to groundwater		
SMA Response Dates	August 22, 2018		

Iron Duke #002H Remediation Plan (2RP-4956),
October 29, 2018

Page 2 of 4

1.0 Background

On August 18, 2018, a release was discovered at the Iron Duke #002H site due to the ball valve on the load line failing. Initial response activities were conducted by Marathon Oil Permian, LLC, and included isolating the source of the release and hydrovacating free standing fluid. Figure 1 illustrates the vicinity and site location, Figure 2 illustrates the release location. The C-141 form is included in Appendix A.

2.0 Site Information and Closure Criteria

The Iron Duke #002H is located approximately five (5) miles southeast of Artesia, New Mexico on privately-owned land.

As summarized in Table 2 and illustrated in Figure 1b, depth to groundwater in the area is estimated to be fifty-five (55) feet below grade surface (bgs). There are several known water sources within ½-mile of the location, according to the New Mexico Office of the State Engineer (NMOSE) online water well database (https://gis.ose.state.nm.us/gisapps/ose_pod_locations/; accessed 8/20/2018). One NMOSE well shows water at a depth of 32 feet bgs, but upon further investigation this was found to be invalid. The well was drilled as an Artesian well in 1927, at which point the water level within the well bore was 32 feet. The water level then subsided, and the well was re-drilled to a depth of 863 feet bgs. The strongest depth to groundwater data was found from the many monitoring wells drilled for the dairy on which this well is located. Several monitoring wells were drilled for the New Mexico Environment Department Ground Water Quality Bureau discharge permit for the dairy (DP 796). These wells were permitted under NMOCD RA 11682 and have been included in Appendix B. The nearest of these monitoring wells (MW-9) is located 750 feet to the west and encountered water at 57 feet bgs. The nearest significant watercourse is an unnamed pond, located approximately 4,085 feet to the south.

Based on the information presented herein, the applicable NMOCD Closure Criteria for this site is for groundwater depth of between 51-100 feet bgs. Table 2 demonstrates the Closure Criteria applicable to this location. Pertinent well data is attached in Appendix B.

3.0 Release Characterization Activities and Findings

On August 22, 2018, SMA personnel arrived on site in response to the release associated with Iron Duke #002H. SMA performed site delineation activities by collecting soil samples around the release site and throughout the visibly stained area. Soil samples were field-screened for chloride using an electrical conductivity (EC) meter.

A total of three (3) sample locations (L1-L3) were investigated using a hand-auger, to depths up to one (1) foot bgs. A total of four (4) samples were collected for laboratory analysis for total chloride using EPA Method 300.0; benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8021B; and motor, diesel and gasoline range organics (MRO, DRO, and GRO) by EPA Method 8015D. Table 3 itemizes the samples and field-screening results as well as identifying any variances from the typical specification of two samples per boring. Locations for all samples are depicted on Figure 2.

Laboratory samples were collected in accordance with the sampling protocol included in Appendix C. Samples were placed into laboratory supplied glassware, labeled, and maintained on ice until delivery to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico (Appendix D).

Iron Duke #002H Remediation Plan (2RP-4956),
October 29, 2018

Page 3 of 4

4.0 Soil Remediation Summary

On September 21, 2018 SMA personnel arrived on site to guide excavation and removal of contaminated soil. The impacted area was excavated to approximately one (1) foot bgs. SMA guided the excavation by collecting composite soil samples for field screening for chloride using an EC. To clearly demonstrate the vertical extent of the release, SMA guided the delineation an additional foot below the excavation at location L3 and collected a sample for laboratory analysis.

The release area was excavated to the NMOCD Closure Criteria as demonstrated in the attached Table 3. Confirmation samples were collected from the excavation and were composed of four sidewall (SW1-SW4) and four base (CS1-CS4) 5-point composite samples, each representing less than 200 ft² of exposed excavation area. The confirmation samples were collected from within the excavation in accordance with the sampling protocol included in Appendix C. Approximately 100 cubic yards of contaminated soil were removed and replaced with clean backfill material in order to return the surface to previous contours. The contaminated soil was transported for disposal at R360 Landfill near Hobbs, NM, an NMOCD permitted disposal facility.

5.0 Scope and Limitations

The scope of our services included: assessment sampling; verifying release stabilization, regulatory liaison, and preparing this remediation plan. All work has been performed in accordance with generally accepted professional environmental consulting practices for oil and gas releases in the Permian Basin in New Mexico.

If there are any questions regarding this report, please contact either Austin Weyant at 575-689-8801 or Shawna Chubbuck at 505-325-7535.

Submitted by:
SOUDER, MILLER & ASSOCIATES

Reviewed by:



Heather Patterson
Staff Scientist



Shawna Chubbuck
Senior Scientist

Iron Duke #002H Remediation Plan (2RP-4956),
October 29, 2018

Page 4 of 4

ATTACHMENTS:

Figures:

Figure 1: Vicinity and Well Head Protection Map

Figure 2: Site and Sample Location Map

Tables:

Table 2: NMOCD Closure Criteria Justification

Table 3: Summary of Sample Results

Appendices:

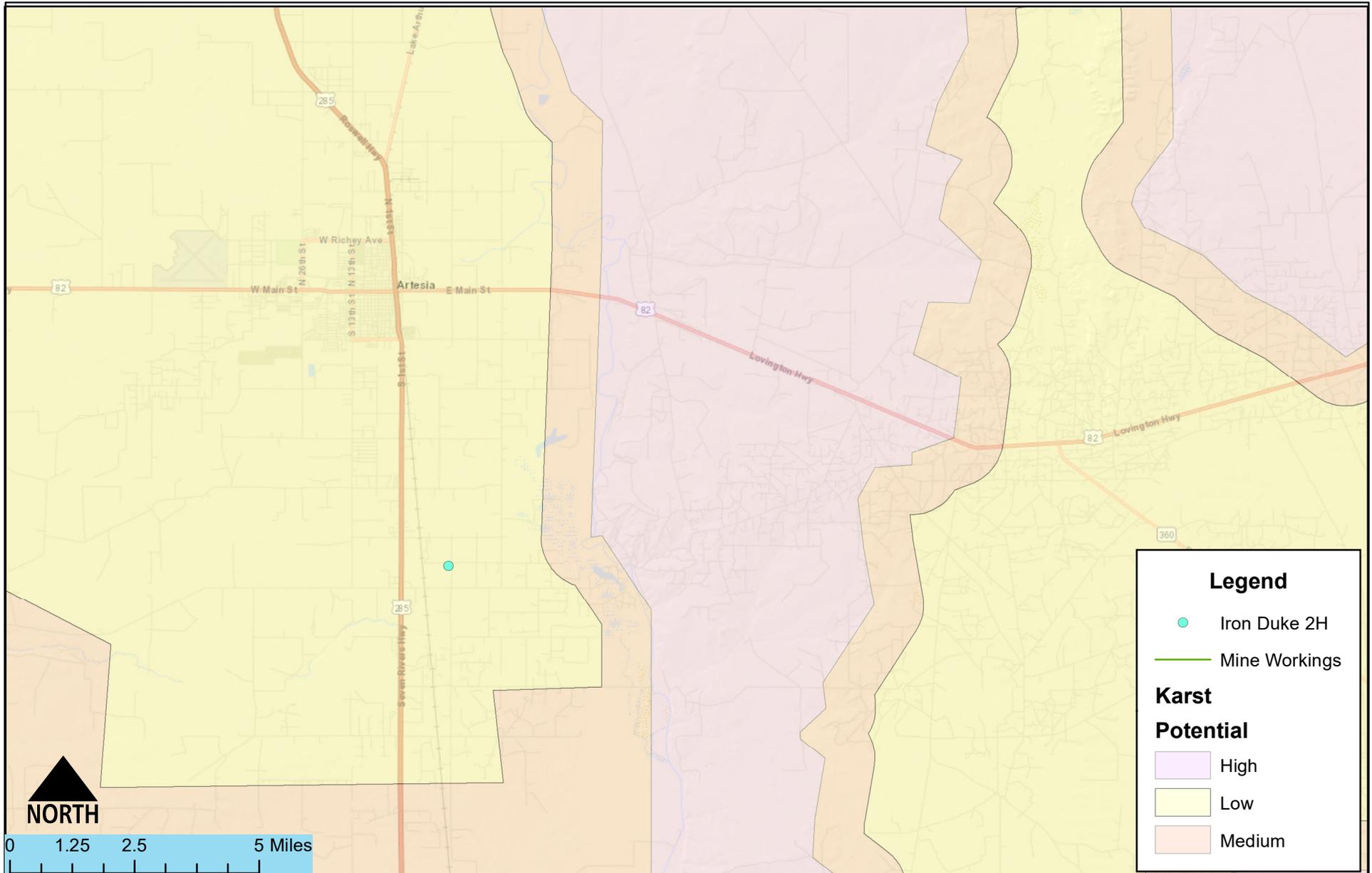
Appendix A: Form C141

Appendix B: NMOSE Wells Report

Appendix C: Sampling Protocol, Field Notes, and Photo Documentation

Appendix D: Laboratory Analytical Reports

FIGURES



Legend

- Iron Duke 2H
- Mine Workings

Karst Potential

- High
- Low
- Medium

Vicinity and Subsurface Protection Map
 Iron Duke #2H - Marathon
 S 9-T18S-R26E, New Mexico

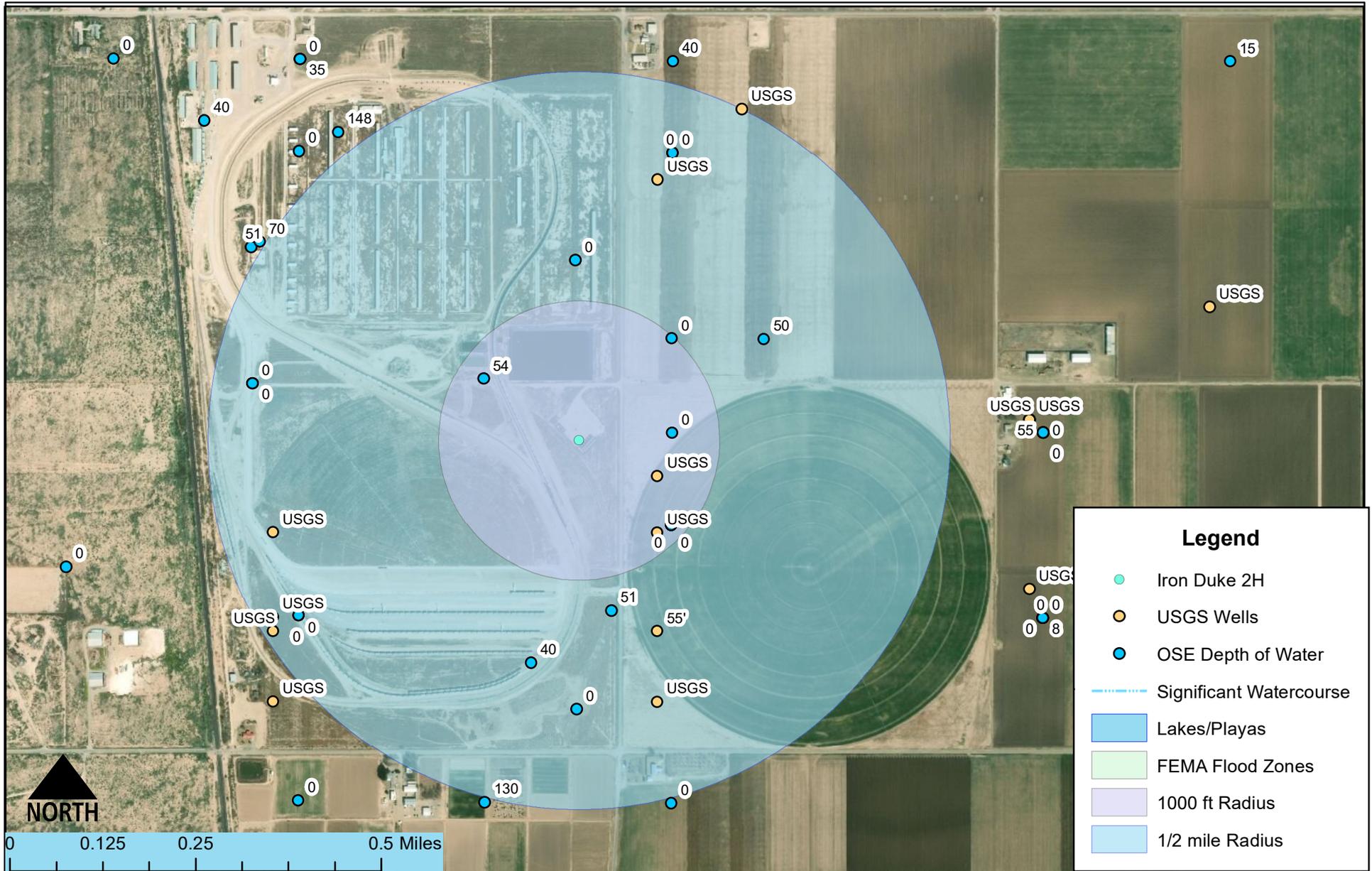
Figure 1a

Date Saved: 10/3/2018	By: _____ Date: _____ Revisions _____ Descr: _____
	By: _____ Date: _____ Descr: _____
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Drawn	<u>Heather Patterson</u>
Checked	_____
Approved	_____



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Legend

- Iron Duke 2H
- USGS Wells
- OSE Depth of Water
- - - Significant Watercourse
- Lakes/Playas
- FEMA Flood Zones
- 1000 ft Radius
- 1/2 mile Radius

Well Head and Surface Water Protection Map
 Iron Duke #2H - Marathon
 S 9-T18S-R26E, New Mexico

Figure 1b

Date Saved: 10/3/2018	Revisions		
	By: _____	Date: _____	Descr: _____
	By: _____	Date: _____	Descr: _____
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Drawn	Heather Patterson
Checked	_____
Approved	_____



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Site and Sample Location Map
 Iron Duke #2H - Marathon
 S 9-T18S-R26E, New Mexico

Figure 2

Date Saved: 10/3/2018	By: _____	Date: _____	Revisions	Descr: _____
	By: _____	Date: _____		Descr: _____
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Drawn	<u>Heather Patterson</u>
Checked	_____
Approved	_____



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TABLES

Table 2:
NMOCD Closure Criteria

Marathon Oil Permian
Iron Duke 2H (2RP-4956)

Site Information (19.15.29.11.A(2, 3, and 4) NMAC)		Source/Notes
Depth to Groundwater (feet bgs)	55	NMOSE/USGS
Horizontal Distance From All Water Sources Within 1/2 Mile (ft)	750	Figure 1b
Horizontal Distance to Nearest Significant Watercourse (ft)	4085	Topo Maps

Closure Criteria (19.15.29.12.B(4) and Table 1 NMAC)						
Depth to Groundwater		Closure Criteria (units in mg/kg)				
		Chloride *numerical limit or background, whichever is greater	TPH	GRO + DRO	BTEX	Benzene
< 50' BGS		600	100		50	10
51' to 100'	X	10000	2500	1000	50	10
>100'		20000	2500	1000	50	10
Surface Water	yes or no	if yes, then				
<300' from continuously flowing watercourse or other significant watercourse?	no	600	100		50	10
<200' from lakebed, sinkhole or playa lake?	no					
<500 feet from spring or a private, domestic fresh water well used by less than 5 households for domestic or stock watering purposes?	no					
<1000' from fresh water well or spring?	no					
Human and Other Areas						
<300' from an occupied permanent residence, school, hospital, institution or church?	no					
within incorporated municipal boundaries or within a defined municipal fresh water well field?	no					
<100' from wetland?	no					
within area overlying a subsurface mine	no					
within an unstable area?	no					
within a 100-year floodplain?	no					

Table 3:
Summary of Sample Results

Marathon Oil Permian, LLC
Iron Duke #002H (2RP-4956)

Initial Sampling Event and Vertical Delineation

Sample ID	Sample Date	Depth (feet bgs)	Action Taken	BTEX mg/Kg	Benzene mg/Kg	GRO mg/Kg	DRO mg/Kg	GRO + DRO mg/Kg	MRO mg/Kg	Total TPH mg/Kg	Cl- mg/Kg
NMOCD Closure Criteria				50	10			1000		2500	10,000
L1	8/22/2018	0.5	Excavated	<0.217	<0.024	<4.8	170	170	<50	170	1500
L2	8/22/2018	0.5	Excavated	<0.221	<0.025	<4.9	<.96	<14.5	<48	<62.5	13,000
	8/22/2018	1	In-situ	--	--	--	--	--	--	--	430
L3	8/22/2018	0.5	Excavated	<0.221	<0.025	<4.9	14	14	<50	14	1,200
	9/21/2018	2	In-situ	<0.23	<0.024	<4.8	<9.9	<15	<50	<65	56

Closure Sampling Event

Sample ID	Sample Date	Depth (feet bgs)	Action Taken	BTEX mg/Kg	Benzene mg/Kg	GRO mg/Kg	DRO mg/Kg	GRO + DRO mg/Kg	MRO mg/Kg	Total TPH mg/Kg	Cl- mg/Kg
NMOCD Closure Criteria				50	10			1000		2500	10,000
CS1	9/21/2018	1	In-situ	<0.23	<0.025	<5.0	23	23	<46	23	1400
CS2	9/21/2018	1	In-situ	<0.23	<0.024	<4.8	21	21	<45	21	1,200
CS3	9/21/2018	1	In-situ	<0.23	<0.025	<5.0	<9.6	<15	<48	<63	900
CS4	9/21/2018	1	In-situ	<0.23	<0.023	<4.6	<9.7	<15	<49	<64	1,100
SW1	9/21/2018	0-1	In-situ	<0.23	<0.025	<4.9	48	48	110	158	1100
SW2	9/21/2018	0-1	In-situ	<0.23	<0.024	<4.8	35	35	<48	35	1,700
SW3	9/21/2018	0-1	In-situ	<0.23	<0.023	<4.7	68	68	110	178	440
SW4	9/21/2018	0-1	In-situ	<0.23	<0.024	<4.8	55	55	<49	55	2,300

"--" = Not Analyzed

APPENDIX A

FORM C141

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

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	NMAP1825439764
District RP	2RP-4956
Facility ID	N/A
Application ID	pMAP1824764582

Release Notification

Responsible Party

Responsible Party Marathon Oil Permian LLC	OGRID 258462
Contact Name Callie Karrigan	Contact Telephone 575-297-0956
Contact email cnkarrigan@marathonoil.com	Incident # (assigned by OCD)
Contact mailing address 4111 Tidwell Road Carlsbad NM 88220	

Location of Release Source

Latitude 32.761522 Longitude -104.378899
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Iron Duke 002H	Site Type oil
Date Release Discovered 8/18/18	API# (if applicable) 30-015-39761

Unit Letter	Section	Township	Range	County
I	9	18S	26E	Eddy

Surface Owner: State Federal Tribal Private (Name: Ironhorse Permian Basin LLC)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input checked="" type="checkbox"/> Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of total dissolved solids (TDS) in the produced water >10,000 mg/l?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Condensate	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

At approximately 8:45 am 8/18/18, the Operator arrived onsite and observed pooling form produced water. The ball valve on the load line failed, releasing 10 bbls into the load out pot and onto the ground. Approximately a 20 ft x 20 ft area was affected. A vac truck immediately recovered standing fluids. The ball valve will be replaced and investigated.

Form C-141

State of New Mexico
Oil Conservation Division

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Incident ID	NMAP1825439764
District RP	2RP-4956
Facility ID	N/A
Application ID	pMAP1824764582

Was this a major release as defined by 19.15.29.7(A) NMAC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

<input checked="" type="checkbox"/> The source of the release has been stopped. <input type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.
If all the actions described above have <u>not</u> been undertaken, explain why: Vac truck immediately recovered free standing liquids. Affected area has stabilized.
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.
Printed Name: <u>Callie Karrigan</u> Title: <u>HES Professional</u> Signature: <u><i>Callie Karrigan</i></u> Date: <u>8/31/18</u> email: <u>cnkarrigan@marathonoil.com</u> Telephone: <u>575-297-0956</u>
<u>OCD Only</u> Received by: <u></u> Date: <u>09/04/18</u>

Form C-141

State of New Mexico
Oil Conservation Division

Page 3

Incident ID	nMAP1825439764
District RP	2RP-4956
Facility ID	
Application ID	pMAP1824764582

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	55 (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas not on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

<p>Characterization Report Checklist: <i>Each of the following items must be included in the report.</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells. <input checked="" type="checkbox"/> Field data <input checked="" type="checkbox"/> Data table of soil contaminant concentration data <input checked="" type="checkbox"/> Depth to water determination <input checked="" type="checkbox"/> Determination of water sources and significant watercourses within 1/2-mile of the lateral extents of the release <input checked="" type="checkbox"/> Boring or excavation logs <input checked="" type="checkbox"/> Photographs including date and GIS information <input checked="" type="checkbox"/> Topographic/Aerial maps <input checked="" type="checkbox"/> Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

Form C-141

State of New Mexico
Oil Conservation Division

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Incident ID	nMAP1825439764
District RP	2RP-4956
Facility ID	
Application ID	pMAP1824764582

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: Callie Karrigan Title: HES Professional

Signature: Callie Karrigan Date: 10/12/2018

email: cnkarrigan@marathonoil.com Telephone: 575-297-0956

OCD Only

Received by: _____ Date: _____

Form C-141

State of New Mexico
Oil Conservation Division

Page 6

Incident ID	nMAP1825439764
District RP	2RP-4956
Facility ID	
Application ID	pMAP1824764582

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

- A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Callie Karrigan Title: HES Professional

Signature: Callie Karrigan Date: 10/12/18

email: cnkarrigan@marathonoil.com Telephone: 575-297-0956

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

APPENDIX B

NMOSE WELLS REPORT



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
RA 01144	RA	ED	1 1 3	10	18S	26E	558343	3625021*	186	697					
RA 11682 POD3	RA	ED	3 4 2	09	18S	26E	557934	3625136	247	70	54	16			
RA 00010 CLW202760	O	RA	ED	3 1 3	10	18S	26E	558343	3624821*	278	863	32	831		
RA 00010 CLW202772	O	RA	ED	3 1 3	10	18S	26E	558343	3624821*	278	863	32	831		
RA 00010 CLW202817	O	RA	ED	3 1 3	10	18S	26E	558343	3624821*	278	863	32	831		
RA 00010 CLW202829	O	RA	ED	3 1 3	10	18S	26E	558343	3624821*	278	863	32	831		
RA 02877	RA	ED	3 1 3	10	18S	26E	558343	3624821*	278	150					
RA 11682 POD5	RA	ED	4 2 1	16	18S	26E	558214	3624632	399	66	51	15			
RA 03789	RA	ED	4 3 1	10	18S	26E	558541	3625227*	433	114	50	64			
RA 00010	RA	ED	1 3 3	10	18S	26E	558344	3624616*	452	863	32	831			
RA 00010 A	RA	ED	1 3 3	10	18S	26E	558344	3624616*	452	863	32	831			
RA 03326	RA	ED	4 4	09	18S	26E	558041	3624518*	523	75	40	35			
RA 02048	RA	ED		09	18S	26E	557433	3625123*	729						
RA 11682 POD4	RA	ED	1 3 2	09	18S	26E	557447	3625432	816	85	70	15			
RA 02959	RA	ED	1 1 1	10	18S	26E	558340	3625832*	824	136	40	96			
RA 11682 POD1	RA	ED	4 4 4	09	18S	26E	557428	3625421	827	71	51	20			
RA 11948 POD1	RA	ED	1 1 2	09	18S	26E	557615	3625672	841	220	148	72			
RA 03421	RA	ED	1 2 2	16	18S	26E	557942	3624213*	842	665	130	535			
RA 03756	RA	ED	1 1 4	10	18S	26E	559147	3625027*	990	148	55	93			

Average Depth to Water: **55 feet**
 Minimum Depth: **32 feet**
 Maximum Depth: **148 feet**

Record Count: 19

UTMNAD83 Radius Search (in meters):

Easting (X): 558156.28

Northing (Y): 3625028.23

Radius: 1000

*UTM location was derived from PLSS - see Help

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.



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER
www.ose.state.nm.us

1. GENERAL AND WELL LOCATION	POD NUMBER (WELL NUMBER) POD3				OSE FILE NUMBER(S) RA-11682							
	WELL OWNER NAME(S) Lakeside Dairy				PHONE (OPTIONAL)							
	WELL OWNER MAILING ADDRESS 49 E. Atoka Road				CITY Artesia		STATE NM		ZIP 88210			
	WELL LOCATION (FROM GPS)	DEGREES LATITUDE	MINUTES 45	SECONDS 45.30 N	* ACCURACY REQUIRED: ONE TENTH OF A SECOND * DATUM REQUIRED: WGS 84							
	LONGITUDE	104	22	53.34 W								
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS Monitoring Well MW-9, on dairy property at address and Lat. Long above.												
2. OPTIONAL	(2.5 ACRE) ¼		(10 ACRE) ¼		(40 ACRE) ¼		(160 ACRE) ¼		SECTION			
	SUBDIVISION NAME				LOT NUMBER		BLOCK NUMBER		UNIT/TRACT			
	HYDROGRAPHIC SURVEY						MAP NUMBER		TRACT NUMBER			
3. DRILLING INFORMATION	LICENSE NUMBER WD-1311		NAME OF LICENSED DRILLER Lee Gebbert				NAME OF WELL DRILLING COMPANY Geoprojects International, Inc.					
	DRILLING STARTED 6-5-2011		DRILLING ENDED 6-7-2011		DEPTH OF COMPLETED WELL (FT) 70		BORE HOLE DEPTH (FT) 74		DEPTH WATER FIRST ENCOUNTERED (FT) ~57			
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input type="checkbox"/> DRY HOLE <input checked="" type="checkbox"/> SHALLOW (UNCONFINED)						STATIC WATER LEVEL IN COMPLETED WELL (FT) 54.16					
	DRILLING FLUID: <input type="checkbox"/> AIR <input type="checkbox"/> MUD <input type="checkbox"/> ADDITIVES - SPECIFY: None											
	DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: Hollow Stem Auger											
	DEPTH (FT)		BORE HOLE DIA. (IN)		CASING MATERIAL		CONNECTION TYPE (CASING)		INSIDE DIA. CASING (IN)		CASING WALL THICKNESS (IN)	SLOT SIZE (IN)
	FROM	TO										
	0	50	8.5		PVC		Threaded		2			Blank
	50	70	8.5		PVC		Threaded		2			0.01
	DEPTH (FT)		THICKNESS (FT)		FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)						YIELD (GPM)	
FROM	TO											
57	68	11		Sandy silt, 10% gravel, tan/brown						2		
METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA Estimated while hand bailing								TOTAL ESTIMATED WELL YIELD (GPM) 280				

STATE ENGINEER OFFICE
 ROSWELL, NEW MEXICO
 2011 AUG - 8 AM

FOR OSE INTERNAL USE

WELL RECORD & LOG (Version 6/9/08)

FILE NUMBER RA-11682	POD NUMBER 3	TRN NUMBER 472997
LOCATION 185.26E.09 243	PAGE 1 OF 2	

5. SEAL AND PUMP	TYPE OF PUMP:	<input type="checkbox"/> SUBMERSIBLE	<input type="checkbox"/> JET	<input checked="" type="checkbox"/> NO PUMP - WELL NOT EQUIPPED			
		<input type="checkbox"/> TURBINE	<input type="checkbox"/> CYLINDER	<input type="checkbox"/> OTHER - SPECIFY:			
	ANNULAR SEAL AND GRAVEL PACK	DEPTH (FT)		BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHOD OF PLACEMENT
		FROM	TO				
2		44	8.5	Cement/Bentonite (6%)		Tremie	
44	48	8.5	Bentonite Pellets		Pour inside auger		
48	71	8.5	10/20 Silica Sand		Pour inside auger		

6. GEOLOGIC LOG OF WELL	DEPTH (FT)		THICKNESS (FT)	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)	WATER BEARING?
	FROM	TO			
	0	4	34	Sand, 25% fines, Brown	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	4	34	30	Silt, clayey, trace gravels, brown/tan/red	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	34	37	7	Gravel, 30% fines, gray/tan	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	37	41	4	Silty clay, very fine - fine sand, gray/green	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	41	48	7	Sand, fine - medium, rounded gravel, tan/gray	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	48	52	4	Gravel, 30% fines, semi cemented, gray	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	52	57	5	Silty Clay, 20% fine sand, brown	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	57	68	11	Sandy Silt, 10% gravel, tan.brown	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
	68	70	2	Sand, medium - coarse, tan/brown	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
	70	74	4	Gravel, 25% sand, tan/gray	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL

7. TEST & ADDITIONAL INFO	WELL TEST	METHOD: <input type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/> AIR LIFT <input checked="" type="checkbox"/> OTHER - SPECIFY: Monitoring Well - No test
		TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

ADDITIONAL STATEMENTS OR EXPLANATIONS:

This well is a monitoring well for the purpose of groundwater monitoring only.

STATE ENGINEER OF NEW MEXICO
ROSWELL, NEW MEXICO
2011 AUG - 8 A 11:00

8. SIGNATURE	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:	
	 _____ SIGNATURE OF DRILLER	7-13-11 _____ DATE

FOR OSE INTERNAL USE

WELL RECORD & LOG (Version 6/9/08)

FILE NUMBER RA-11682	POD NUMBER 3	TRN NUMBER 472997
LOCATION 185.26E.9.243	PAGE 2 OF 2	



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION	POD NUMBER (WELL NUMBER) POD5				OSE FILE NUMBER(S) RA-11682									
	WELL OWNER NAME(S) Lakeside Dairy				PHONE (OPTIONAL)									
	WELL OWNER MAILING ADDRESS 49 E. Atoka Road				CITY Artesia		STATE NM		ZIP 88210					
	WELL LOCATION (FROM GPS)	DEGREES LATITUDE	MINUTES 32	SECONDS 45	28.88 N	* ACCURACY REQUIRED: ONE TENTH OF A SECOND * DATUM REQUIRED: WGS 84								
	LONGITUDE	104	22	42.69 W										
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS Monitoring Well MW-11, located on the west side of N. Lake Rd. 1/4 mile north of Dinkus Rd.														
2. OPTIONAL	(2.5 ACRE) <input type="checkbox"/> 1/4		(10 ACRE) <input type="checkbox"/> 1/4		(40 ACRE) <input type="checkbox"/> 1/4		(160 ACRE) <input type="checkbox"/> 1/4		SECTION					
	SUBDIVISION NAME				LOT NUMBER		BLOCK NUMBER		UNIT/TRACT					
	HYDROGRAPHIC SURVEY						MAP NUMBER		TRACT NUMBER					
3. DRILLING INFORMATION	LICENSE NUMBER WD-1311		NAME OF LICENSED DRILLER Lee Gebbert				NAME OF WELL DRILLING COMPANY Geoprojects International, Inc.							
	DRILLING STARTED 6-8-2011		DRILLING ENDED 6-9-2011		DEPTH OF COMPLETED WELL (FT) 66		BORE HOLE DEPTH (FT) 69		DEPTH WATER FIRST ENCOUNTERED (FT) ~53					
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input type="checkbox"/> DRY HOLE <input checked="" type="checkbox"/> SHALLOW (UNCONFINED)						STATIC WATER LEVEL IN COMPLETED WELL (FT) 51.38							
	DRILLING FLUID: <input type="checkbox"/> AIR <input type="checkbox"/> MUD <input type="checkbox"/> ADDITIVES - SPECIFY: None													
	DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: Hollow Stem Auger													
	DEPTH (FT)		BORE HOLE DIA. (IN)		CASING MATERIAL		CONNECTION TYPE (CASING)		INSIDE DIA. CASING (IN)		CASING WALL THICKNESS (IN)		SLOT SIZE (IN)	
	FROM TO													
	0 46		8.5		PVC		Threaded		2				Blank	
	46 66		8.5		PVC		Threaded		2				0.01	
	4. WATER BEARING STRATA	DEPTH (FT)		THICKNESS (FT)		FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)						YIELD (GPM)		
FROM TO														
53 58		5		Gravel, 30% fines, medium - coarse sand, saturated						2				
METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA Estimated while hand bailing								TOTAL ESTIMATED WELL YIELD (GPM) 2						

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
2011 AUG - 8 A 11:51

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)	
FILE NUMBER	RA-11682	POD NUMBER	5
LOCATION	185, 26E, 16.124	TRN NUMBER	42997
			PAGE 1 OF 2

5. SEAL AND PUMP	TYPE OF PUMP: <input type="checkbox"/> SUBMERSIBLE <input type="checkbox"/> JET <input checked="" type="checkbox"/> NO PUMP - WELL NOT EQUIPPED						
	<input type="checkbox"/> TURBINE <input type="checkbox"/> CYLINDER <input type="checkbox"/> OTHER - SPECIFY:						
	ANNULAR SEAL AND GRAVEL PACK	DEPTH (FT)		BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHOD OF PLACEMENT
		FROM	TO				
2		40	8.5				
	40	44	8.5	Bentonite Pellets		Pour inside auger	
	44	69	8.5	10/20 Silica Sand		Pour inside auger	

6. GEOLOGIC LOG OF WELL	DEPTH (FT)		THICKNESS (FT)	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)	WATER BEARING?	
	FROM	TO			<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
	0	2	2	Sand, fine - Coarse, brown	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
	2	53	51	Silty clay/clayey silt, 15% sands, brown/gray/tan	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
	53	58	5	Gravel, 30% fines, gray	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
	58	69	11	Silty clay, 10% very fine sand, gray	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO
					<input type="checkbox"/> YES	<input type="checkbox"/> NO

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL.

7. TEST & ADDITIONAL INFO	WELL TEST	METHOD: <input type="checkbox"/> BAILER <input type="checkbox"/> PUMP <input type="checkbox"/> AIR LIFT <input checked="" type="checkbox"/> OTHER - SPECIFY: Monitoring Well - No test
	TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.	

ADDITIONAL STATEMENTS OR EXPLANATIONS:
This well is a monitoring well for the purpose of groundwater monitoring only.

STATE ENGINEER
ROSWELL, NEW HAMPSHIRE
2011 AUG - 8 A 11:51

8. SIGNATURE	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:	
	<u>J. J. Melt</u> SIGNATURE OF DRILLER	<u>7-13-11</u> DATE

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)	
FILE NUMBER	RA-11682	POD NUMBER	5
LOCATION	185.26E.14.124	TRN NUMBER	472997
			PAGE 2 OF 2

APPENDIX C

SAMPLING PROTOCOL, FIELD NOTES, & PHOTO DOCUMENTATION



Sampling Protocol

Representatives from SMA chose the Judgmental Sampling Method as described in EPA's Final Sampling Guidance for SW-846, 2002 to adequately quantify contaminant concentrations on the Iron Duke #2H Location. The utility of this particular method functions on the sufficient knowledge of the contaminant, which we possess. This design is also useful when identifying the composition of a release, which we have documented. In addition, this sampling design was chosen for this project because of the locations uniform soil type and the several operational considerations that precluded the implementation of a different statistical design.

The soil samples were collected in laboratory supplied containers in accordance with this sampling protocol, immediately placed on ice and sent under standard chain-of-custody protocols to Hall Environmental Analysis Laboratory (HEAL) in Albuquerque, New Mexico for analysis. A total of fourteen (14) samples were collected for laboratory analysis for total chloride using EPA Method 300.0; benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8021B; and motor, diesel and gasoline range organics (MRO, DRO, and GRO) by EPA Method 8015D.

Sampling Analysis Field Quality Assurance Procedures

A unique sample numbering was used to identify each sample collected and designated for on-site and off-site laboratory analysis. The purpose of this numbering scheme was to provide a tracking system for the retrieval of analytical and field data on each sample. Sample identification numbers were recorded on sample labels or tags, field notes, chain-of-custody records (COC) and all other applicable documentation used during the project. Sample labels were affixed to all sample containers during sampling activities. Information was recorded on each sample container label at the time of sample collection. The information recorded on the labels were as follows: sample identification number; sample type (discrete or composite); site name and area/location number; analysis to be performed; type of chemical preservative present in container; date and time of sample collection; and sample collector's name and initials. All samples were packed in ice in an approved rigid body container, custody sealed signed and shipped to the appropriate laboratory via insured courier service.

COC procedures implemented for the project provided documentation of the handling of each sample from the time of collection until completion of laboratory analysis. A COC form serves as a legal record of possession of the sample. A sample is considered to be under custody if one or more of the following criteria are met: the sample is in the sampler's possession; the sample is in the sampler's view after being in possession; the sample was in the sampler's possession and then was placed into a locked area to prevent tampering; and/or the sample is in a designated secure area. Custody was documented throughout the project field sampling activities by a chain-of custody form initiated each day during which samples are collected. Container custody seals placed on either individual samples or on the rigid body container were used to ensure that no sample tampering occurs between the time the samples are placed into the containers and the time the containers are opened for analysis at the laboratory. Container custody seals were signed and dated by the individual responsible for completing the COC form contained within the container.

Photo Log

Photo Taken September 21, 2018

Facing southeast

32.761615°, -104.379232°



Photo Taken September 21, 2018

Facing south

32.761615°, -104.379232°





Field Screening

Location Name: <i>Iron Duke</i>				Date: <i>9/21/18</i>					<i>HAP</i>	
Sample Name:	Collection Time:	EC (mS)	Temp (°C)	PID Reading /PF	Soil Color	Primary Soil Type	Moisture Level	Other Remarks/Notes:		
<i>SW 1</i>	<i>11:55</i>	<i>1.28</i>	<i>23.4°</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>SW 2</i>	<i>12:01</i> <i>11:52</i>	<i>1.68</i>	<i>23.0</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>SW 3</i>	<i>12:16</i>	<i>1.09</i>	<i>24.8°</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>SW 4</i>	<i>12:23</i>	<i>2.05</i>	<i>23.4°</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>CS 1</i>	<i>12:29</i>	<i>1.29</i>	<i>22.8</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>CS 2</i>	<i>12:33</i>	<i>1.36</i>	<i>22.4</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>CS 3</i>	<i>12:37</i>	<i>0.85</i>	<i>22.5°</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>CS 4</i>	<i>12:43</i>	<i>1.29</i>	<i>22.7°</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry Moist Wet		
<i>L3-2</i>	<i>12:54</i>	<i>0.46</i>	<i>22.8°</i>		Light Tan Gray Yellow	Dark Brown Olive Red	Gravel Sand Rock Silt Clay	Dry <u>Moist</u> Wet		

APPENDIX D

LABORATORY ANALYTICAL REPORTS



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

September 05, 2018

Austin Weyant
Souder, Miller & Associates
201 S Halagueno
Carlsbad, NM 88221
TEL: (575) 689-7040
FAX

RE: Iron Duke

OrderNo.: 1808F63

Dear Austin Weyant:

Hall Environmental Analysis Laboratory received 4 sample(s) on 8/24/2018 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 #NM0901

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

Analytical Report

Lab Order **1808F63**

Date Reported: 9/5/2018

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: L1-0.5

Project: Iron Duke

Collection Date: 8/22/2018 9:56:00 AM

Lab ID: 1808F63-001

Matrix: SOIL

Received Date: 8/24/2018 8:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	1500	75		mg/Kg	50	8/31/2018 1:00:08 PM	40066
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	8/28/2018 5:45:26 PM	40007
Surr: BFB	107	70-130		%Rec	1	8/28/2018 5:45:26 PM	40007
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: Irm
Diesel Range Organics (DRO)	170	10		mg/Kg	1	8/28/2018 3:40:59 PM	40010
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	8/28/2018 3:40:59 PM	40010
Surr: DNOP	110	50.6-138		%Rec	1	8/28/2018 3:40:59 PM	40010
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	0.024		mg/Kg	1	8/28/2018 5:45:26 PM	40007
Toluene	ND	0.048		mg/Kg	1	8/28/2018 5:45:26 PM	40007
Ethylbenzene	ND	0.048		mg/Kg	1	8/28/2018 5:45:26 PM	40007
Xylenes, Total	ND	0.097		mg/Kg	1	8/28/2018 5:45:26 PM	40007
Surr: 4-Bromofluorobenzene	121	70-130		%Rec	1	8/28/2018 5:45:26 PM	40007
Surr: Toluene-d8	97.5	70-130		%Rec	1	8/28/2018 5:45:26 PM	40007

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 **1808F63**

Date Reported: 9/5/2018

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: L2-0.5

Project: Iron Duke

Collection Date: 8/22/2018 10:05:00 AM

Lab ID: 1808F63-002

Matrix: SOIL

Received Date: 8/24/2018 8:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	13000	750		mg/Kg	500	8/31/2018 1:12:33 PM	40066
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/28/2018 6:08:38 PM	40007
Surr: BFB	110	70-130		%Rec	1	8/28/2018 6:08:38 PM	40007
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: Irm
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	8/28/2018 4:05:37 PM	40010
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	8/28/2018 4:05:37 PM	40010
Surr: DNOP	100	50.6-138		%Rec	1	8/28/2018 4:05:37 PM	40010
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	0.025		mg/Kg	1	8/28/2018 6:08:38 PM	40007
Toluene	ND	0.049		mg/Kg	1	8/28/2018 6:08:38 PM	40007
Ethylbenzene	ND	0.049		mg/Kg	1	8/28/2018 6:08:38 PM	40007
Xylenes, Total	ND	0.098		mg/Kg	1	8/28/2018 6:08:38 PM	40007
Surr: 4-Bromofluorobenzene	123	70-130		%Rec	1	8/28/2018 6:08:38 PM	40007
Surr: Toluene-d8	97.6	70-130		%Rec	1	8/28/2018 6:08:38 PM	40007

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 **1808F63**

Date Reported: 9/5/2018

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: L2-1

Project: Iron Duke

Collection Date: 8/22/2018 10:11:00 AM

Lab ID: 1808F63-003

Matrix: SOIL

Received Date: 8/24/2018 8:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	430	30		mg/Kg	20	8/30/2018 4:59:16 PM	40085

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 1808F63

Date Reported: 9/5/2018

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: L3-0.5

Project: Iron Duke

Collection Date: 8/22/2018 10:20:00 AM

Lab ID: 1808F63-004

Matrix: SOIL

Received Date: 8/24/2018 8:45:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	1200	75		mg/Kg	50	8/31/2018 1:24:57 PM	40085
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/28/2018 6:31:52 PM	40007
Surr: BFB	105	70-130		%Rec	1	8/28/2018 6:31:52 PM	40007
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: Irm
Diesel Range Organics (DRO)	14	10		mg/Kg	1	8/28/2018 4:30:09 PM	40010
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	8/28/2018 4:30:09 PM	40010
Surr: DNOP	104	50.6-138		%Rec	1	8/28/2018 4:30:09 PM	40010
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	0.025		mg/Kg	1	8/28/2018 6:31:52 PM	40007
Toluene	ND	0.049		mg/Kg	1	8/28/2018 6:31:52 PM	40007
Ethylbenzene	ND	0.049		mg/Kg	1	8/28/2018 6:31:52 PM	40007
Xylenes, Total	ND	0.098		mg/Kg	1	8/28/2018 6:31:52 PM	40007
Surr: 4-Bromofluorobenzene	117	70-130		%Rec	1	8/28/2018 6:31:52 PM	40007
Surr: Toluene-d8	97.1	70-130		%Rec	1	8/28/2018 6:31:52 PM	40007

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#: 1808F63

05-Sep-18

Client: Souder, Miller & Associates

Project: Iron Duke

Sample ID	MB-40066	SampType:	mblk	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBS	Batch ID:	40066	RunNo:	53830					
Prep Date:	8/30/2018	Analysis Date:	8/30/2018	SeqNo:	1776658	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	LCS-40066	SampType:	ics	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSS	Batch ID:	40066	RunNo:	53830					
Prep Date:	8/30/2018	Analysis Date:	8/30/2018	SeqNo:	1776659	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.9	90	110			

Sample ID	MB-40085	SampType:	mblk	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBS	Batch ID:	40085	RunNo:	53830					
Prep Date:	8/30/2018	Analysis Date:	8/30/2018	SeqNo:	1776688	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	LCS-40085	SampType:	ics	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSS	Batch ID:	40085	RunNo:	53830					
Prep Date:	8/30/2018	Analysis Date:	8/30/2018	SeqNo:	1776689	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.7	90	110			

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#: **1808F63**

05-Sep-18

Client: Souder, Miller & Associates**Project:** Iron Duke

Sample ID	LCS-40010	SampType:	LCS	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	LCSS	Batch ID:	40010	RunNo:	53750					
Prep Date:	8/27/2018	Analysis Date:	8/28/2018	SeqNo:	1773440	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	4.7		5.000		93.4	50.6	138			

Sample ID	MB-40010	SampType:	MBLK	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	PBS	Batch ID:	40010	RunNo:	53750					
Prep Date:	8/27/2018	Analysis Date:	8/28/2018	SeqNo:	1773441	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	10		10.00		100	50.6	138			

Sample ID	MB-40034	SampType:	MBLK	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	PBS	Batch ID:	40034	RunNo:	53774					
Prep Date:	8/28/2018	Analysis Date:	8/29/2018	SeqNo:	1774604	Units:	%Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	11		10.00		106	50.6	138			

Sample ID	LCS-40034	SampType:	LCS	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	LCSS	Batch ID:	40034	RunNo:	53774					
Prep Date:	8/28/2018	Analysis Date:	8/29/2018	SeqNo:	1774605	Units:	%Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.8		5.000		116	50.6	138			

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#: **1808F63**

05-Sep-18

Client: Souder, Miller & Associates**Project:** Iron Duke

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID ics-40007	SampType: LCS4		TestCode: EPA Method 8260B: Volatiles Short List							
Client ID: BatchQC	Batch ID: 40007		RunNo: 53769							
Prep Date: 8/27/2018	Analysis Date: 8/28/2018		SeqNo: 1773977		Units: mg/Kg					
Benzene	0.49	0.025	0.5000	0	97.3	80	120			
Toluene	0.52	0.050	0.5000	0	104	80	120			
Ethylbenzene	0.54	0.050	0.5000	0	107	80	120			
Xylenes, Total	1.6	0.10	1.500	0	108	80	120			
Surr: 4-Bromofluorobenzene	0.57		0.5000		115	70	130			
Surr: Toluene-d8	0.48		0.5000		96.8	70	130			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID mb-40007	SampType: MBLK		TestCode: EPA Method 8260B: Volatiles Short List							
Client ID: PBS	Batch ID: 40007		RunNo: 53769							
Prep Date: 8/27/2018	Analysis Date: 8/28/2018		SeqNo: 1773978		Units: mg/Kg					
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.61		0.5000		122	70	130			
Surr: Toluene-d8	0.52		0.5000		103	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#: 1808F63
05-Sep-18

Client: Souder, Miller & Associates
Project: Iron Duke

Sample ID: ics-40007	SampType: LCS	TestCode: EPA Method 8015D Mod: Gasoline Range								
Client ID: LCSS	Batch ID: 40007	RunNo: 53769								
Prep Date: 8/27/2018	Analysis Date: 8/28/2018	SeqNo: 1773951	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	52	5.0	50.00	0	104	70	130			
Surr: BFB	510		500.0		102	70	130			

Sample ID: mb-40007	SampType: MBLK	TestCode: EPA Method 8015D Mod: Gasoline Range								
Client ID: PBS	Batch ID: 40007	RunNo: 53769								
Prep Date: 8/27/2018	Analysis Date: 8/28/2018	SeqNo: 1773952	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	540		500.0		108	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



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: SMA-CARLSBAD

Work Order Number: 1808F63

RcptNo: 1

Received By: Jazzmine Burkhead 8/24/2018 8:45:00 AM

Completed By: Michelle Garcia 8/24/2018 2:55:39 PM

Reviewed By: ENM

8/24/18

Jazzmine Burkhead

Michelle Garcia

Labeled by: SAB 08/24/18

Chain of Custody

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

Log In

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

of preserved bottles checked for pH: (<2 or >12 unless noted)
Adjusted?
Checked By: SAB 08/24/18

Special Handling (if applicable)

- 15. Was client notified of all discrepancies with this order? Yes [] No [] NA [checked]

Person Notified:
By Whom:
Regarding:
Client Instructions:
Date:
Via: [] eMail [] Phone [] Fax [] In Person

16. Additional remarks:

17. Cooler Information

Table with 7 columns: Cooler No, Temp °C, Condition, Seal Intact, Seal No, Seal Date, Signed By. Row 1: 1, 5.1, Good, Yes, , ,

Chain-of-Custody Record

Client: SMF Turn-Around Time: 5 days turn
 Standard Rush
 Project Name: Don Duke

Mailing Address: _____
 Project #: _____

Phone #: _____
 Project Manager: Austin Webster
 email or Fax#: _____
 Sampler: Heather Patten

QA/QC Package: Level 4 (Full Validation)
 Accreditation: NELAP Other _____
 EDD (Type) _____
 On Ice: Yes No
 Sample Temperature: 5
 Container Type and # 402
 Preservative Type _____
 HEAL No. 1808FL03

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.
8/22/18	9:50	20.1	61-0.5	402		001
8/22/18	10:05		62-0.5			002
8/22/18	10:11		62-1			003
8/22/18	10:20		63-0.5			004

Date	Time	Relinquished by:	Date	Time	Received by:	Remarks:
8/22/18	1400	<u>[Signature]</u>	8/23/18	1400	<u>[Signature]</u>	<u>Concord Marathon</u>
8/23/18	1900	<u>[Signature]</u>	08/24/18	08:45	<u>[Signature]</u>	

Analysis Request	
BTEX + MTBE + TMBs (8021)	X
BTEX + MTBE + TPH (Gas only)	X
TPH 8015B (GRO / DRO / MRO)	X
TPH (Method 418.1)	
EDB (Method 504.1)	
PAH's (8310 or 8270 SIMS)	
RCRA 8 Metals	X
Anions (F ⁻ , NO ₃ ⁻ , NO ₂ ⁻ , PO ₄ ³⁻ , SO ₄ ²⁻)	X
8081 Pesticides / 8082 PCBs	
8260B (VOA)	
8270 (Semi-VOA)	
Air Purbles (Y or N)	



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

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

October 05, 2018

Austin Weyant
Souder, Miller & Associates
201 S Halagueno
Carlsbad, NM 88221
TEL: (575) 689-7040
FAX

RE: Iron Duke

OrderNo.: 1809F19

Dear Austin Weyant:

Hall Environmental Analysis Laboratory received 9 sample(s) on 9/26/2018 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 #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

Analytical Report

Lab Order **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: SW1

Project: Iron Duke

Collection Date: 9/21/2018 11:55:00 AM

Lab ID: 1809F19-001

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: SRM
Chloride	1100	30		mg/Kg	20	9/28/2018 8:05:48 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	48	10		mg/Kg	1	10/2/2018 5:01:03 PM	40665
Motor Oil Range Organics (MRO)	110	50		mg/Kg	1	10/2/2018 5:01:03 PM	40665
Surr: DNOP	116	50.6-138		%Rec	1	10/2/2018 5:01:03 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/28/2018 9:55:43 AM	40633
Surr: BFB	92.7	15-316		%Rec	1	9/28/2018 9:55:43 AM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	9/28/2018 9:55:43 AM	40633
Toluene	ND	0.049		mg/Kg	1	9/28/2018 9:55:43 AM	40633
Ethylbenzene	ND	0.049		mg/Kg	1	9/28/2018 9:55:43 AM	40633
Xylenes, Total	ND	0.099		mg/Kg	1	9/28/2018 9:55:43 AM	40633
Surr: 4-Bromofluorobenzene	93.3	80-120		%Rec	1	9/28/2018 9:55:43 AM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: SW2

Project: Iron Duke

Collection Date: 9/21/2018 12:01:00 PM

Lab ID: 1809F19-002

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	1700	75		mg/Kg	50	10/1/2018 6:05:14 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	35	9.6		mg/Kg	1	10/2/2018 6:07:19 PM	40665
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/2/2018 6:07:19 PM	40665
Surr: DNOP	120	50.6-138		%Rec	1	10/2/2018 6:07:19 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/28/2018 11:06:31 AM	40633
Surr: BFB	92.4	15-316		%Rec	1	9/28/2018 11:06:31 AM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	9/28/2018 11:06:31 AM	40633
Toluene	ND	0.048		mg/Kg	1	9/28/2018 11:06:31 AM	40633
Ethylbenzene	ND	0.048		mg/Kg	1	9/28/2018 11:06:31 AM	40633
Xylenes, Total	ND	0.097		mg/Kg	1	9/28/2018 11:06:31 AM	40633
Surr: 4-Bromofluorobenzene	90.3	80-120		%Rec	1	9/28/2018 11:06:31 AM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: SW3

Project: Iron Duke

Collection Date: 9/21/2018 12:16:00 PM

Lab ID: 1809F19-003

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	440	30		mg/Kg	20	10/1/2018 6:17:38 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	68	9.5		mg/Kg	1	10/2/2018 6:29:22 PM	40665
Motor Oil Range Organics (MRO)	110	48		mg/Kg	1	10/2/2018 6:29:22 PM	40665
Surr: DNOP	122	50.6-138		%Rec	1	10/2/2018 6:29:22 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/28/2018 12:16:43 PM	40633
Surr: BFB	92.6	15-316		%Rec	1	9/28/2018 12:16:43 PM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.023		mg/Kg	1	9/28/2018 12:16:43 PM	40633
Toluene	ND	0.047		mg/Kg	1	9/28/2018 12:16:43 PM	40633
Ethylbenzene	ND	0.047		mg/Kg	1	9/28/2018 12:16:43 PM	40633
Xylenes, Total	ND	0.093		mg/Kg	1	9/28/2018 12:16:43 PM	40633
Surr: 4-Bromofluorobenzene	92.3	80-120		%Rec	1	9/28/2018 12:16:43 PM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: SW4

Project: Iron Duke

Collection Date: 9/21/2018 12:23:00 PM

Lab ID: 1809F19-004

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	2300	75		mg/Kg	50	10/1/2018 6:30:03 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	55	9.8		mg/Kg	1	10/2/2018 6:51:29 PM	40665
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/2/2018 6:51:29 PM	40665
Surr: DNOP	122	50.6-138		%Rec	1	10/2/2018 6:51:29 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/28/2018 12:39:59 PM	40633
Surr: BFB	90.9	15-316		%Rec	1	9/28/2018 12:39:59 PM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	9/28/2018 12:39:59 PM	40633
Toluene	ND	0.048		mg/Kg	1	9/28/2018 12:39:59 PM	40633
Ethylbenzene	ND	0.048		mg/Kg	1	9/28/2018 12:39:59 PM	40633
Xylenes, Total	ND	0.096		mg/Kg	1	9/28/2018 12:39:59 PM	40633
Surr: 4-Bromofluorobenzene	91.9	80-120		%Rec	1	9/28/2018 12:39:59 PM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: CS1

Project: Iron Duke

Collection Date: 9/21/2018 12:29:00 PM

Lab ID: 1809F19-005

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	1400	75		mg/Kg	50	10/1/2018 6:42:27 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	23	9.2		mg/Kg	1	10/2/2018 7:13:39 PM	40665
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	10/2/2018 7:13:39 PM	40665
Surr: DNOP	123	50.6-138		%Rec	1	10/2/2018 7:13:39 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/28/2018 1:03:22 PM	40633
Surr: BFB	91.8	15-316		%Rec	1	9/28/2018 1:03:22 PM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	9/28/2018 1:03:22 PM	40633
Toluene	ND	0.050		mg/Kg	1	9/28/2018 1:03:22 PM	40633
Ethylbenzene	ND	0.050		mg/Kg	1	9/28/2018 1:03:22 PM	40633
Xylenes, Total	ND	0.10		mg/Kg	1	9/28/2018 1:03:22 PM	40633
Surr: 4-Bromofluorobenzene	91.6	80-120		%Rec	1	9/28/2018 1:03:22 PM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: CS2

Project: Iron Duke

Collection Date: 9/21/2018 12:33:00 PM

Lab ID: 1809F19-006

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	1200	75		mg/Kg	50	10/1/2018 6:54:52 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	21	9.1		mg/Kg	1	10/2/2018 7:35:48 PM	40665
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	10/2/2018 7:35:48 PM	40665
Surr: DNOP	124	50.6-138		%Rec	1	10/2/2018 7:35:48 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/28/2018 1:26:38 PM	40633
Surr: BFB	91.8	15-316		%Rec	1	9/28/2018 1:26:38 PM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	9/28/2018 1:26:38 PM	40633
Toluene	ND	0.048		mg/Kg	1	9/28/2018 1:26:38 PM	40633
Ethylbenzene	ND	0.048		mg/Kg	1	9/28/2018 1:26:38 PM	40633
Xylenes, Total	ND	0.095		mg/Kg	1	9/28/2018 1:26:38 PM	40633
Surr: 4-Bromofluorobenzene	91.1	80-120		%Rec	1	9/28/2018 1:26:38 PM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: CS3

Project: Iron Duke

Collection Date: 9/21/2018 12:37:00 PM

Lab ID: 1809F19-007

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	900	30		mg/Kg	20	10/1/2018 7:07:16 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	10/2/2018 7:57:47 PM	40665
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/2/2018 7:57:47 PM	40665
Surr: DNOP	140	50.6-138	S	%Rec	1	10/2/2018 7:57:47 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/28/2018 1:49:54 PM	40633
Surr: BFB	92.2	15-316		%Rec	1	9/28/2018 1:49:54 PM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	9/28/2018 1:49:54 PM	40633
Toluene	ND	0.050		mg/Kg	1	9/28/2018 1:49:54 PM	40633
Ethylbenzene	ND	0.050		mg/Kg	1	9/28/2018 1:49:54 PM	40633
Xylenes, Total	ND	0.10		mg/Kg	1	9/28/2018 1:49:54 PM	40633
Surr: 4-Bromofluorobenzene	93.1	80-120		%Rec	1	9/28/2018 1:49:54 PM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: CS4

Project: Iron Duke

Collection Date: 9/21/2018 12:43:00 PM

Lab ID: 1809F19-008

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	1100	75		mg/Kg	50	10/2/2018 6:32:53 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	10/2/2018 8:19:53 PM	40665
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/2/2018 8:19:53 PM	40665
Surr: DNOP	118	50.6-138		%Rec	1	10/2/2018 8:19:53 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	9/28/2018 2:13:13 PM	40633
Surr: BFB	91.7	15-316		%Rec	1	9/28/2018 2:13:13 PM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.023		mg/Kg	1	9/28/2018 2:13:13 PM	40633
Toluene	ND	0.046		mg/Kg	1	9/28/2018 2:13:13 PM	40633
Ethylbenzene	ND	0.046		mg/Kg	1	9/28/2018 2:13:13 PM	40633
Xylenes, Total	ND	0.093		mg/Kg	1	9/28/2018 2:13:13 PM	40633
Surr: 4-Bromofluorobenzene	92.4	80-120		%Rec	1	9/28/2018 2:13:13 PM	40633

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 **1809F19**

Date Reported: **10/5/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller & Associates

Client Sample ID: L3-2

Project: Iron Duke

Collection Date: 9/21/2018 12:54:00 PM

Lab ID: 1809F19-009

Matrix: SOIL

Received Date: 9/26/2018 8:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: smb
Chloride	56	30		mg/Kg	20	10/1/2018 7:32:05 PM	40664
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: lrm
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	10/2/2018 8:41:43 PM	40665
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	10/2/2018 8:41:43 PM	40665
Surr: DNOP	118	50.6-138		%Rec	1	10/2/2018 8:41:43 PM	40665
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/28/2018 2:36:34 PM	40633
Surr: BFB	93.2	15-316		%Rec	1	9/28/2018 2:36:34 PM	40633
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	9/28/2018 2:36:34 PM	40633
Toluene	ND	0.048		mg/Kg	1	9/28/2018 2:36:34 PM	40633
Ethylbenzene	ND	0.048		mg/Kg	1	9/28/2018 2:36:34 PM	40633
Xylenes, Total	ND	0.096		mg/Kg	1	9/28/2018 2:36:34 PM	40633
Surr: 4-Bromofluorobenzene	92.6	80-120		%Rec	1	9/28/2018 2:36:34 PM	40633

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#: **1809F19**
05-Oct-18

Client: Souder, Miller & Associates
Project: Iron Duke

Sample ID MB-40664	SampType: MBLK	TestCode: EPA Method 300.0: Anions								
Client ID: PBS	Batch ID: 40664	RunNo: 54545								
Prep Date: 9/28/2018	Analysis Date: 9/28/2018	SeqNo: 1808088	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID LCS-40664	SampType: LCS	TestCode: EPA Method 300.0: Anions								
Client ID: LCSS	Batch ID: 40664	RunNo: 54545								
Prep Date: 9/28/2018	Analysis Date: 9/28/2018	SeqNo: 1808089	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.1	90	110			

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#: **1809F19**

05-Oct-18

Client: Souder, Miller & Associates**Project:** Iron Duke

Sample ID LCS-40665	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 40665		RunNo: 54570							
Prep Date: 9/28/2018	Analysis Date: 10/2/2018		SeqNo: 1810169				Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	10	50.00	0	99.7	70	130			
Surr: DNOP	5.7		5.000		115	50.6	138			

Sample ID MB-40665	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 40665		RunNo: 54570							
Prep Date: 9/28/2018	Analysis Date: 10/2/2018		SeqNo: 1810170				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	11		10.00		113	50.6	138			

Sample ID 1809F19-001AMS	SampType: MS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: SW1	Batch ID: 40665		RunNo: 54570							
Prep Date: 9/28/2018	Analysis Date: 10/2/2018		SeqNo: 1810172				Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	66	9.7	48.59	48.02	36.6	53.5	126			S
Surr: DNOP	5.3		4.859		110	50.6	138			

Sample ID 1809F19-001AMSD	SampType: MSD		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: SW1	Batch ID: 40665		RunNo: 54570							
Prep Date: 9/28/2018	Analysis Date: 10/2/2018		SeqNo: 1810173				Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	9.1	45.66	48.02	3.62	53.5	126	27.9	21.7	RS
Surr: DNOP	5.0		4.566		110	50.6	138	0	0	

Sample ID MB-40755	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 40755		RunNo: 54604							
Prep Date: 10/2/2018	Analysis Date: 10/3/2018		SeqNo: 1812024				Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	11		10.00		113	50.6	138			

Sample ID LCS-40755	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 40755		RunNo: 54604							
Prep Date: 10/2/2018	Analysis Date: 10/3/2018		SeqNo: 1812025				Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

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#: **1809F19**
 05-Oct-18

Client: Souder, Miller & Associates
Project: Iron Duke

Sample ID: LCS-40755	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: LCSS	Batch ID: 40755	RunNo: 54604								
Prep Date: 10/2/2018	Analysis Date: 10/3/2018	SeqNo: 1812025	Units: %Rec							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.5		5.000		110	50.6	138			

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 REPORTWO#: **1809F19****Hall Environmental Analysis Laboratory, Inc.**

05-Oct-18

Client: Souder, Miller & Associates**Project:** Iron Duke

Sample ID MB-40633	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 40633	RunNo: 54524								
Prep Date: 9/27/2018	Analysis Date: 9/28/2018	SeqNo: 1807324	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	960		1000		96.2	15	316			

Sample ID LCS-40633	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: LCSS	Batch ID: 40633	RunNo: 54524								
Prep Date: 9/27/2018	Analysis Date: 9/28/2018	SeqNo: 1807325	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	106	75.9	131			
Surr: BFB	1100		1000		106	15	316			

Sample ID 1809F19-001AMS	SampType: MS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: SW1	Batch ID: 40633	RunNo: 54524								
Prep Date: 9/27/2018	Analysis Date: 9/28/2018	SeqNo: 1807327	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	4.7	23.63	0	119	77.8	128			
Surr: BFB	1000		945.2		110	15	316			

Sample ID 1809F19-001AMSD	SampType: MSD	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: SW1	Batch ID: 40633	RunNo: 54524								
Prep Date: 9/27/2018	Analysis Date: 9/28/2018	SeqNo: 1807328	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	4.7	23.45	0	117	77.8	128	2.45	20	
Surr: BFB	1000		938.1		111	15	316	0	0	

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#: **1809F19**

05-Oct-18

Client: Souder, Miller & Associates**Project:** Iron Duke

Sample ID	MB-40633	SampType:	MBLK	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	PBS	Batch ID:	40633	RunNo:	54524					
Prep Date:	9/27/2018	Analysis Date:	9/28/2018	SeqNo:	1807339	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	0.95		1.000		95.0	80	120			

Sample ID	LCS-40633	SampType:	LCS	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	LCSS	Batch ID:	40633	RunNo:	54524					
Prep Date:	9/27/2018	Analysis Date:	9/28/2018	SeqNo:	1807340	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.90	0.025	1.000	0	90.3	77.3	128			
Toluene	0.94	0.050	1.000	0	94.1	79.2	125			
Ethylbenzene	0.92	0.050	1.000	0	92.5	80.7	127			
Xylenes, Total	2.8	0.10	3.000	0	93.5	81.6	129			
Surr: 4-Bromofluorobenzene	0.96		1.000		96.0	80	120			

Sample ID	1809F19-002AMS	SampType:	MS	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	SW2	Batch ID:	40633	RunNo:	54524					
Prep Date:	9/27/2018	Analysis Date:	9/28/2018	SeqNo:	1807343	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.024	0.9479	0	102	68.5	133			
Toluene	1.0	0.047	0.9479	0.009363	108	75	130			
Ethylbenzene	1.0	0.047	0.9479	0	110	79.4	128			
Xylenes, Total	3.1	0.095	2.844	0.01564	109	77.3	131			
Surr: 4-Bromofluorobenzene	0.90		0.9479		95.0	80	120			

Sample ID	1809F19-002AMSD	SampType:	MSD	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	SW2	Batch ID:	40633	RunNo:	54524					
Prep Date:	9/27/2018	Analysis Date:	9/28/2018	SeqNo:	1807344	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.024	0.9506	0	105	68.5	133	3.04	20	
Toluene	1.1	0.048	0.9506	0.009363	111	75	130	2.91	20	
Ethylbenzene	1.1	0.048	0.9506	0	113	79.4	128	3.56	20	
Xylenes, Total	3.2	0.095	2.852	0.01564	113	77.3	131	3.58	20	
Surr: 4-Bromofluorobenzene	0.93		0.9506		97.5	80	120	0	0	

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 87105
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: SMA-CARLSBAD

Work Order Number: 1809F19

RcptNo: 1

Received By: Erin Melendrez

9/26/2018 8:50:00 AM

EM

Completed By: Ashley Gallegos

9/28/2018 10:34:05 AM

AG

Reviewed By: ENM

9/27/18

labeled by: JAB 09/27/18

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? Yes No
(Note discrepancies on chain of custody)
- 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? Yes No
(If no, notify customer for authorization.)

of preserved bottles checked for pH: *2*
 (<2 or >12 unless noted)
 Adjusted?
 Checked by: *JAB 09/27/18*

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	3.5	Good	Yes			

