

**REVIEWED**

*By Kellie Jones at 9:33 am, Jan 14, 2016*

**APPROVED**

*By Kellie Jones at 9:33 am, Jan 14, 2016*

# **Silver Spike Energy Operating of NM Knowles SWD #002 Closure Report**

**Section 34, T16S, R38E  
Lea County, New Mexico**

**1RP-4000  
January 05, 2016**



**Prepared for:**

***Silver Spike Energy Operating of NM  
203 W. Wall Street 920  
Midland, TX 79701***

**By:**

**Safety & Environmental Solutions, Inc.  
703 East Clinton Street  
Hobbs, New Mexico 88240  
(575) 397-0510**

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## I. Company Contacts

Representative	Company	Telephone	E-mail
Michael Evans	Silver Spike	432-413-6483	Michael@silverspikeenergy.com
Bob Allen	SESI	575-397-0510	ballen@sesi-nm.com

## II. Background

Safety and Environmental Solutions, Inc. (SESI) was engaged by Silver Spike Energy to perform a site assessment of a release area in Section 34, T16S, R38E and Lea County.

According to the C-141: there was a high/low switch failure allowing the water tank to over flow. There was an undetermined volume of fluid released to ground surface impacting an area of approximately 3, 334 sq. ft. The NMOCD was notified of the incident on November 18, 2015 and the aforementioned C-141 was filed on November 30, 2015 with NMOCD and assigned 1RP-4000.

## III. Surface and Ground Water

According to the Chevron-Texaco Lea County Groundwater Map the depth to Groundwater appears to be 80' to 100' Bgs. Further research of the New Mexico Office of the State Engineer website reveals records for Lea County, Section 34, Township 16S, and Range 38E which indicate the average depth to groundwater for the area to be 84' bgs. (Appendix D). Thereby, posing no immediate threat to groundwater or life forms.

## IV. Work Performed

On November 17, 2015, SESI was onsite to photograph, assess and map the spill area (Appendix B).

On November 20, 2015, SESI personnel returned to the site with Custom Welding of Hobbs, NM. Whereby, it was determine that two (2) test trenches would be excavated combined with simultaneous field testing for soil constituents of Chlorides. The two trenches were delineated to depths of 9' and 10' bgs., respectively. The soil properties, as well as the dynamics for the interior of the bermed area made it prohibitive from a safety perspective to delineate any deeper. The representative soil samples were retrieved, packaged, preserved and transported to Cardinal Laboratories, of Hobbs New Mexico and analyzed for BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes), Chloride (Cl<sup>-</sup>) (Method SM 4500Cl-B), and TPH (method 8015M). The results of the analysis are recapped in the table below (Appendix A):

Sample Date 11/20/15	Depth	Chloride (mg/kg)	Total BTEX	GRO C6-C10	DRO >C10-C28
Test Trench #1	2.5'	3360	<0.300	<10.0	<10.0
Test Trench #1	3.5'	3760			
Test Trench #1	5.5'	2400			
Test Trench #1	8'	1100			
Test Trench #1	10'	1600			
Test Trench #2	1.5'	4560	<0.300	<10.0	<10.0
Test Trench #2	3.5'	3080			
Test Trench #2	7'	3040			
Test Trench #2	9'	2200			

On November 23, 2015 SESI personnel returned to the site with Custom Welding of Hobbs, NM whereby One Call clearance was exchanged. Utilizing a Geo Probe SESI personnel were able to advance to depths of 18' Bgs. However, due to soil consistency "cave in" became an issue compromising the integrity of representative soil samples. A total of Five (5) samples were retrieved and delivered to Cardinal Laboratories of Hobbs, NM for analysis. The table below represents a recap of the returned analytical (Appendix A).

Sample Date 11/23/15	Depth	Chloride (mg/kg)	Total BTEX	GRO C6-C10	DRO >C10-C28
BH-1	4'	1760	<0.300	<10.0	<10.0
BH-1	8'	3240	<0.300	<10.0	<10.0
BH-1	12'	2640	<0.300	<10.0	<10.0
BH-1	14.9'	3760			
BH-1	18'	4400			

On December 02, 2015 SESI personnel together with Atkins Engineering Associates, Inc. Utilizing an Ingersoll Rand model 300A the field personnel were able to advance to depths from 9' to 76' respectively, at the Borehole 2 location (Appendix E). SESI Personnel retrieved simultaneous representative soil samples and delivered them to Cardinal Laboratories of Hobbs, NM for confirmation. The results are recapped in the following table (Appendix A):

Sample Date 12/02/2015	Depth	Chloride (mg/kg)
BH-2	9-11'	1760
BH-2	14-16'	2920
BH-2	19-21'	848
BH-2	24-26'	1100
BH-2	29-31'	1120
BH-2	34-36'	1920
BH-2	39-41'	672
BH-2	44-46'	672
BH-2	49-51'	320
BH-2	54-56'	304
BH-2	59-61'	288
BH-2	64-66'	384
BH-2	69-71'	384
BH-2	74-76'	352

Based on the aforementioned field activity and soil analytical a "Remediation Plan" was submitted to representatives of Silver Spike Energy, as well as the NMOCD with concurrence and approval from the NMOCD on December 10, 2015, withstanding condition of background sampling. SESI proposed to excavate the impacted area to depths of 4' bgs. Composite samples would be retrieved from the sidewalls and bottom of the excavated area. The excavation was to be lined with a 40 mil liner, topped with fresh topsoil in order to prevent impediment of the liner, capped with caliche and restore the site to grade.

On December 10, 2015 SESI personnel at the request of the NMOCD were on site to retrieve two background representative soil samples. The representative soil samples were retrieved, packaged, preserved and transported to Cardinal Laboratories, of Hobbs New Mexico and analyzed for BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes), Chloride (Cl<sup>-</sup>) (Method SM 4500Cl-B), and TPH (method 8015M). The results of the analysis are recapped in the table below (Appendix A):

Sample ID	BTEX 8021B	Chloride SM4500Cl-B	TPH 8015M
East Background	<0.300	<16.0	<10.0
South Background	<0.300	<16.0	<10.0

## V. Conclusion

On December 11, 2015 SESI personnel together with Custom Welding personnel returned to the site in order to commence removal and disposal of contaminated soils. A total of approximately One Thousand One Hundred and Twenty yards (1,120) were removed to Sundance Services, Inc., an NMOCD approved facility for disposal. Representative soil samples were retrieved from the sidewalls and floor of the excavation. Field testing in order to confirm the horizontal extent, revealed that further excavation of the South wall by 4' and East Wall by 2' respectively (Figure 2), were necessary in order to achieve acceptable Chloride levels, as confirmed in the table below. The representative soil samples were retrieved, packaged, preserved and transported to Cardinal Laboratories, of Hobbs New Mexico and analyzed for BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes), Chloride (Cl<sup>-</sup>) (Method SM 4500Cl-B), and TPH (method 8015M) for confirmation. The results of the analysis are recapped in the following table (Appendix A):

Sample ID	BTEX 8021B	Chloride SM4500Cl-B	TPH-GRO 8015M	TPH DRO
South Wall	<0.300 mg/kg	320 mg/kg	<10.0 mg/kg	<10.0 mg/kg
East Wall	<0.300 mg/kg	288 mg/kg	<10.0 mg/kg	<10.0 mg/kg
North Wall	<0.300 mg/kg	832 mg/kg	<10.0 mg/kg	42.9 mg/kg
West Wall	<0.300 mg/kg	320 mg/kg	<10.0 mg/kg	<10.0 mg/kg
SP-1 Bottom 4'	<0.300 mg/kg	3920 mg/kg	<10.0 mg/kg	<10.0 mg/kg
SP-2 Bottom 4'	<0.300 mg/kg	2520 mg/kg	<10.0 mg/kg	<10.0 mg/kg
SP-3 Bottom 4'	<0.300 mg/kg	2520 mg/kg	<10.0 mg/kg	<10.0 mg/kg
SP-4 Bottom 3'	<0.300 mg/kg	1790 mg/kg	<10.0 mg/kg	<10.0 mg/kg
SP-5 Bottom 3'	<0.300 mg/kg	3200 mg/kg	<10.0 mg/kg	<10.0 mg/kg

Due to the above analytical: On December 18, 2014 the excavation was lined with a 40 mil. Liner, backfilled with fresh topsoil, caliche and returned to grade.

Based on the depth to groundwater, analytical information, and restoration of the site according to NMOCD guidelines; no further action is recommended. SESI, on behalf of Silver Spike Energy Operating of New Mexico, respectfully requests closure of the regulatory file for this incident.

## VI. Figures & Appendices

Figure 1 – Vicinity Map

Figure 2 – Site Plan

Appendix A – Analytical Results

Appendix B—Site Photographs

Appendix C – C-141

Appendix D – Groundwater Research

Appendix E – Boring Log

# **Figure 1**

## **Vicinity Map**





Knowles SWD #002

79

Norris Rd 132

© 2015 Google

Google earth

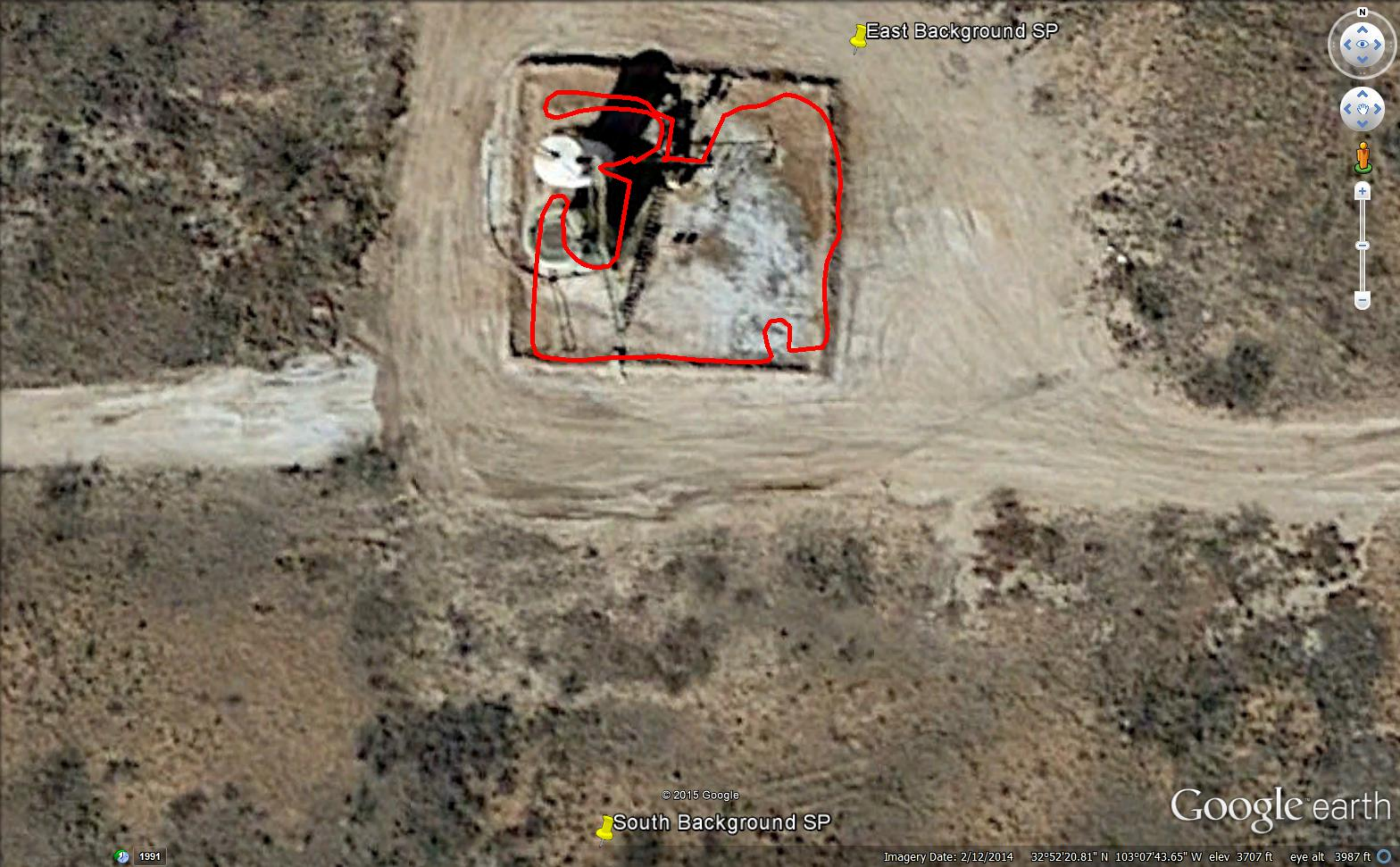
1997

Imagery Date: 2/12/2014 32°52'24.30" N 103°07'54.69" W elev 3706 ft eye alt 7110 ft



## **Figure 2 Site Plan**





East Background SP



© 2015 Google

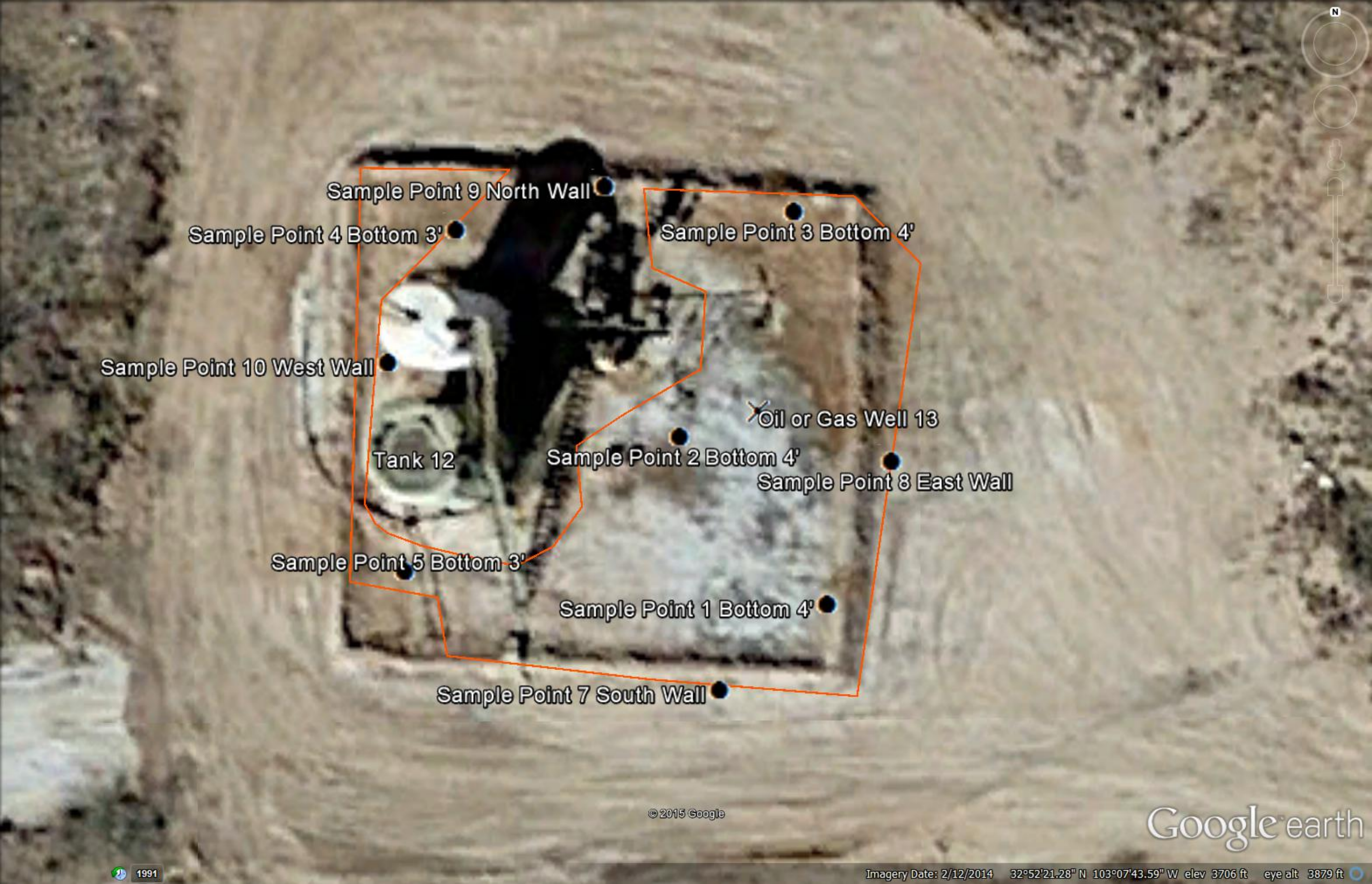
South Background SP

Google earth

1991

Imagery Date: 2/12/2014 32°52'20.81" N 103°07'43.65" W elev 3707 ft eye alt 3987 ft





Sample Point 9 North Wall

Sample Point 4 Bottom 3'

Sample Point 3 Bottom 4'

Sample Point 10 West Wall

Tank 12

Sample Point 2 Bottom 4'

Oil or Gas Well 13

Sample Point 8 East Wall

Sample Point 5 Bottom 3'

Sample Point 1 Bottom 4'

Sample Point 7 South Wall

© 2015 Google

Google earth

1991

Imagery Date: 2/12/2014 32°52'21.28" N 103°07'43.59" W elev 3706 ft eye alt 3879 ft



## **Appendix A Analytical Results**



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

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December 02, 2015

Bob Allen

Safety & Environmental Solutions

703 East Clinton

Hobbs, NM 88240

RE: KNOWLES SWD #002

Enclosed are the results of analyses for samples received by the laboratory on 11/24/15 8:30.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene

Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 11/24/2015  
Reported: 12/02/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 11/20/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: TEST TRENCH #1 2.5' (H503096-01)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/01/2015	ND	1.93	96.6	2.00	0.592	
Toluene*	<0.050	0.050	12/01/2015	ND	1.92	96.2	2.00	0.359	
Ethylbenzene*	<0.050	0.050	12/01/2015	ND	1.97	98.6	2.00	0.500	
Total Xylenes*	<0.150	0.150	12/01/2015	ND	5.90	98.4	6.00	0.375	
Total BTEX	<0.300	0.300	12/01/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 103 % 73.6-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	3360	16.0	12/01/2015	ND	416	104	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	11/26/2015	ND	203	101	200	3.48	
DRO >C10-C28	<10.0	10.0	11/26/2015	ND	201	101	200	4.92	

Surrogate: 1-Chlorooctane 91.1 % 35-147

Surrogate: 1-Chlorooctadecane 99.6 % 28-171

**Sample ID: TEST TRENCH #1 3.5' (H503096-02)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	3760	16.0	12/01/2015	ND	416	104	400	0.00		

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 11/24/2015  
Reported: 12/02/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 11/20/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: TEST TRENCH #1 5.5' (H503096-03)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2400	16.0	12/01/2015	ND	416	104	400	0.00	

**Sample ID: TEST TRENCH #1 8' (H503096-04)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1100	16.0	12/01/2015	ND	416	104	400	0.00	

**Sample ID: TEST TRENCH #1 10' (H503096-05)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1600	16.0	12/01/2015	ND	416	104	400	3.77	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 Safety & Environmental Solutions  
 Bob Allen  
 703 East Clinton  
 Hobbs NM, 88240  
 Fax To: (575) 393-4388

 Received: 11/24/2015  
 Reported: 12/02/2015  
 Project Name: KNOWLES SWD #002  
 Project Number: SIL-15-001  
 Project Location: HOBBS, NM

 Sampling Date: 11/20/2015  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Jodi Henson

**Sample ID: TEST TRENCH #2 1.5' (H503096-06)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/01/2015	ND	1.93	96.6	2.00	0.592	
Toluene*	<0.050	0.050	12/01/2015	ND	1.92	96.2	2.00	0.359	
Ethylbenzene*	<0.050	0.050	12/01/2015	ND	1.97	98.6	2.00	0.500	
Total Xylenes*	<0.150	0.150	12/01/2015	ND	5.90	98.4	6.00	0.375	
Total BTEX	<0.300	0.300	12/01/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 103 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	4560	16.0	12/01/2015	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	11/26/2015	ND	203	101	200	3.48	
DRO >C10-C28	<10.0	10.0	11/26/2015	ND	201	101	200	4.92	

Surrogate: 1-Chlorooctane 105 % 35-147

Surrogate: 1-Chlorooctadecane 114 % 28-171

**Sample ID: TEST TRENCH #2 3.5' (H503096-07)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3080	16.0	12/01/2015	ND	416	104	400	3.77	

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 11/24/2015  
Reported: 12/02/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 11/20/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: TEST TRENCH #2 7' (H503096-08)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	3040	16.0	12/01/2015	ND	416	104	400	3.77		

**Sample ID: TEST TRENCH #2 9' (H503096-09)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2200	16.0	12/01/2015	ND	416	104	400	3.77	

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Celey D. Keene, Lab Director/Quality Manager



**Notes and Definitions**

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

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---

Celey D. Keene, Lab Director/Quality Manager



## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240

(505) 393-2326 Fax (505) 393-2476

Page 1 of 1

Company Name: Safety & Environmental Solutions, Inc.																	
Project Manager: Bob Allen																	
Address: 703 East Clinton																	
City: Hobbs State: NM Zip: 88240																	
Phone #: 575-397-0510 Fax #: 575-393-4388																	
Project #: SIL 15-001 Project Owner: Silver Spike																	
Project Name: Knowles SWD #002																	
Project Location: HOBBS, NM																	
Sampler Name: Setciv Contreperas																	
For USE ONLY																	
Lab I.D. Sample I.D.																	
HSC03096	Test Trench #1 2.5'	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	BTEX	TPH	CL
1	Test Trench #1 2.5'	G	1	V									11-20-15	0830	V	V	V
2	Test Trench #1 3.5'	G	1	V										0850	V	V	V
3	Test Trench #1 5.5'	G	1	V										0915	V	V	V
4	Test Trench #1 8'	G	1	V										0950	V	V	V
5	Test Trench #1 10'	G	1	V										1040	V	V	V
6	Test Trench #2 1.5'	G	1	V										1110	V	V	V
7	Test Trench #2 3.5'	G	1	V										1140	V	V	V
8	Test Trench #2 7'	G	1	V										1235	V	V	V
9	Test Trench #2 9'	G	1	V													
PLEASE NOTE: Liability and Delinquency. Customer's liability and delinquency are hereby acknowledged by this statement which is based in contract or tort shall be limited to the amount paid by the client for the services. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by Client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal regardless of whether such claim is based upon any of the above stated reasons or otherwise.																	
Sampler Reiminished: Date: 11-24-15 Received By: [Signature]																	
Reiminished By: Date: 8:30 AM Received By: [Signature]																	
Delivered By: (Circle One) Temp. Sample Condition Checked By: (Initials)																	
Sampler - UPS - Bus - Other: 2.60 Cool Intact Yes No																	
REMARKS: Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice and all costs of collection, including attorney's fees.																	

December 02, 2015

Bob Allen

Safety & Environmental Solutions

703 East Clinton

Hobbs, NM 88240

RE: KNOWLES SWD #2 SPIKE ENERGY

Enclosed are the results of analyses for samples received by the laboratory on 11/24/15 16:50.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

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

Accreditation applies to public drinking water matrices.

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

Sincerely,



Celey D. Keene

Lab Director/Quality Manager

**Analytical Results For:**

 Safety & Environmental Solutions  
 Bob Allen  
 703 East Clinton  
 Hobbs NM, 88240  
 Fax To: (575) 393-4388

Received:	11/24/2015	Sampling Date:	11/23/2015
Reported:	12/02/2015	Sampling Type:	Soil
Project Name:	KNOWLES SWD #2 SPIKE ENERGY	Sampling Condition:	Cool & Intact
Project Number:	SIL-15-001	Sample Received By:	Amanda Ponce
Project Location:	KNOWLES		

**Sample ID: BH-1 @ 4' (H503116-01)**

BTX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/01/2015	ND	2.00	100	2.00	2.96	
Toluene*	<0.050	0.050	12/01/2015	ND	2.00	99.8	2.00	3.24	
Ethylbenzene*	<0.050	0.050	12/01/2015	ND	2.06	103	2.00	9.79	
Total Xylenes*	<0.150	0.150	12/01/2015	ND	6.11	102	6.00	2.96	
Total BTX	<0.300	0.300	12/01/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 104 % 73.6-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1760	16.0	12/01/2015	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	11/30/2015	ND	189	94.7	200	0.468	
DRO >C10-C28	<10.0	10.0	11/30/2015	ND	188	94.0	200	3.34	

Surrogate: 1-Chlorooctane 97.9 % 35-147

Surrogate: 1-Chlorooctadecane 105 % 28-171

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received:	11/24/2015	Sampling Date:	11/23/2015
Reported:	12/02/2015	Sampling Type:	Soil
Project Name:	KNOWLES SWD #2 SPIKE ENERGY	Sampling Condition:	Cool & Intact
Project Number:	SIL-15-001	Sample Received By:	Amanda Ponce
Project Location:	KNOWLES		

**Sample ID: BH-1 @ 8' (H503116-02)**

BTEx 8021B		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	12/01/2015	ND	2.00	100	2.00	2.96		
Toluene*	<0.050	0.050	12/01/2015	ND	2.00	99.8	2.00	3.24		
Ethylbenzene*	<0.050	0.050	12/01/2015	ND	2.06	103	2.00	9.79		
Total Xylenes*	<0.150	0.150	12/01/2015	ND	6.11	102	6.00	2.96		
Total BTEx	<0.300	0.300	12/01/2015	ND						

Surrogate: 4-Bromofluorobenzene (PID) 104 % 73.6-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3240	16.0	12/01/2015	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	11/30/2015	ND	189	94.7	200	0.468	
DRO >C10-C28	<10.0	10.0	11/30/2015	ND	188	94.0	200	3.34	

Surrogate: 1-Chlorooctane 102 % 35-147

Surrogate: 1-Chlorooctadecane 110 % 28-171

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received:	11/24/2015	Sampling Date:	11/23/2015
Reported:	12/02/2015	Sampling Type:	Soil
Project Name:	KNOWLES SWD #2 SPIKE ENERGY	Sampling Condition:	Cool & Intact
Project Number:	SIL-15-001	Sample Received By:	Amanda Ponce
Project Location:	KNOWLES		

**Sample ID: BH-1 @ 12' (H503116-03)**

BTEx 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/01/2015	ND	2.00	100	2.00	2.96	
Toluene*	<0.050	0.050	12/01/2015	ND	2.00	99.8	2.00	3.24	
Ethylbenzene*	<0.050	0.050	12/01/2015	ND	2.06	103	2.00	9.79	
Total Xylenes*	<0.150	0.150	12/01/2015	ND	6.11	102	6.00	2.96	
Total BTEx	<0.300	0.300	12/01/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 105 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2640	16.0	12/01/2015	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	11/30/2015	ND	189	94.7	200	0.468	
DRO >C10-C28	<10.0	10.0	11/30/2015	ND	188	94.0	200	3.34	

Surrogate: 1-Chlorooctane 101 % 35-147

Surrogate: 1-Chlorooctadecane 110 % 28-171

**Sample ID: BH-1 @ 14.9' (H503116-04)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3760	16.0	12/01/2015	ND	416	104	400	3.77	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received:	11/24/2015	Sampling Date:	11/23/2015
Reported:	12/02/2015	Sampling Type:	Soil
Project Name:	KNOWLES SWD #2 SPIKE ENERGY	Sampling Condition:	Cool & Intact
Project Number:	SIL-15-001	Sample Received By:	Amanda Ponce
Project Location:	KNOWLES		

**Sample ID: BH-1 @ 18' (H503116-05)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	4400	16.0	12/01/2015	ND	416	104	400	3.77		

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

---

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\*=Accredited Analyte

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---

Celey D. Keene, Lab Director/Quality Manager





# ARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240

(505) 393-2326 Fax (505) 393-2476

## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

### ANALYSIS REQUEST

### BILL TO

Company Name: Safety & Environmental Solutions, Inc.

Project Manager: Bob Allen

Address: 703 East Clinton

City: Hobbs State: NM Zip: 88240

Phone #: 575-397-0510 Fax #: 575-393-4388

Project #: 515-15-001 Project Owner: S. Vaca

Project Name: KNOWLES #2 SIKEN Energy

Project Location: KNOWLES

Sampler Name: D. Boyer

FOR LAB USE ONLY

Lab I.D. Sample I.D.

HS03116

24-1 4'

8'

12-8 14.9'

24-1, 18'

6'

11'

11/23

11/23

11/23

11/23

11/23

11/23

11/23

11/23

11/23

11/23

11/23

11/23

11/23

PLEASE NOTE: Laboratory and Downstream Contractor liability and client's satisfaction are contingent upon the timely receipt of the amount paid by the client for the analyses. All charges including those for negligence and any other causes whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for indirect or consequential damages, including without limitation, business interruption, loss of use, or loss of profits incurred by client. Its subsidiaries, affiliates or successors, agents and/or related to the performance of services hereunder by Cardinal, regardless of whether such claim is asserted upon any of the above stated causes of damages or otherwise.

Sampler Relinquished: AT Boyer Date: 11/24/15 Time: 4:30

Relinquished By: AT Boyer Date: 11/24/15 Time: 4:30

Received By: AT Boyer Date: 11/24/15 Time: 4:30

Delivered By: (Circle One) UPS Temp. 14C/54 Sample Condition Good Checked By: AT Boyer

Sampler - UPS - Bus - Other: 14C/54

Cardinal cannot accept verbal changes. Please fax written changes to 575-393-2476.

REMARKS: Hold 14.9K 1B ST samples  
50 possible TPH/BTEX tests

Phone Result: ☐ Yes ☒ No Add'l Phone #:  
Fax Result: ☐ Yes ☒ No Add'l Fax #:



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

---

December 07, 2015

Bob Allen

Safety & Environmental Solutions

703 East Clinton

Hobbs, NM 88240

RE: KNOWLES SWD #002

Enclosed are the results of analyses for samples received by the laboratory on 12/04/15 16:50.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene

Lab Director/Quality Manager

**Analytical Results For:**

 Safety & Environmental Solutions  
 Bob Allen  
 703 East Clinton  
 Hobbs NM, 88240  
 Fax To: (575) 393-4388

 Received: 12/04/2015  
 Reported: 12/07/2015  
 Project Name: KNOWLES SWD #002  
 Project Number: SIL-15-001  
 Project Location: HOBBS, NM

 Sampling Date: 12/02/2015  
 Sampling Type: Soil  
 Sampling Condition: \*\* (See Notes)  
 Sample Received By: Jodi Henson

**Sample ID: BH-2 9-11' (H503175-01)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1760	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 14-16' (H503175-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2920	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 19-21' (H503175-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	848	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 24-26' (H503175-04)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1100	16.0	12/07/2015	ND	384	96.0	400	11.8	

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/04/2015  
Reported: 12/07/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/02/2015  
Sampling Type: Soil  
Sampling Condition: \*\* (See Notes)  
Sample Received By: Jodi Henson

**Sample ID: BH-2 29-31' (H503175-05)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1120	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 34-36' (H503175-06)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1920	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 39-41' (H503175-07)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	672	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 44-46' (H503175-08)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	672	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 49-51' (H503175-09)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	320	16.0	12/07/2015	ND	384	96.0	400	11.8	

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Celey D. Keene, Lab Director/Quality Manager



**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/04/2015  
Reported: 12/07/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/03/2015  
Sampling Type: Soil  
Sampling Condition: \*\* (See Notes)  
Sample Received By: Jodi Henson

**Sample ID: BH-2 54-56' (H503175-10)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	304	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 59-61' (H503175-11)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	288	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 64-66' (H503175-12)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	384	16.0	12/07/2015	ND	384	96.0	400	11.8		

**Sample ID: BH-2 69-71' (H503175-13)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	384	16.0	12/07/2015	ND	384	96.0	400	11.8	

**Sample ID: BH-2 74-76' (H503175-14)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	352	16.0	12/07/2015	ND	384	96.0	400	11.8	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

---

Cardinal Laboratories

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---

Celey D. Keene, Lab Director/Quality Manager



# ARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240  
(505) 393-2326 Fax (505) 393-2476

## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 2

Company Name: Safety & Environmental Solutions, Inc.		P.O. #:		BILL TO		ANALYSIS REQUEST	
Project Manager: Bob Allen		Company: Same					
Address: 703 East Clinton		Attn:					
City: Hobbs		State: NM		Zip: 88240			
Phone #: 575-397-0510		Fax #: 575-393-4388		Address:			
Project #: SIL-15-001		Project Owners: Silver Lake		City:			
Project Name: Knowles SWD #2		State:		Zip:			
Project Location: Knowles		Phone #:					
Sampler Name: Dan Beyer		Fax #:					
FOR LAB USE ONLY		MATRIX		PRESERV.		SAMPLING	
Lab I.D.		Sample I.D.					
H503175		9-11		2015		Chlorides	
1		14-16		12/2		1040	
2		19-21		11/20		1145	
3		24-36		12/2		1225	
4		29-31		13/5		1430	
5		34-36		15/20		1530	
6		39-41		16/18		1635	
7		44-46		12/2		1035	
8		49-51		12/2		1035	
9		54-56		12/2		1035	
10		54-56		12/2		1035	
11		54-56		12/2		1035	
12		54-56		12/2		1035	
13		54-56		12/2		1035	
14		54-56		12/2		1035	
15		54-56		12/2		1035	
16		54-56		12/2		1035	
17		54-56		12/2		1035	
18		54-56		12/2		1035	
19		54-56		12/2		1035	
20		54-56		12/2		1035	
21		54-56		12/2		1035	
22		54-56		12/2		1035	
23		54-56		12/2		1035	
24		54-56		12/2		1035	
25		54-56		12/2		1035	
26		54-56		12/2		1035	
27		54-56		12/2		1035	
28		54-56		12/2		1035	
29		54-56		12/2		1035	
30		54-56		12/2		1035	
31		54-56		12/2		1035	
32		54-56		12/2		1035	
33		54-56		12/2		1035	
34		54-56		12/2		1035	
35		54-56		12/2		1035	
36		54-56		12/2		1035	
37		54-56		12/2		1035	
38		54-56		12/2		1035	
39		54-56		12/2		1035	
40		54-56		12/2		1035	
41		54-56		12/2		1035	
42		54-56		12/2		1035	
43		54-56		12/2		1035	
44		54-56		12/2		1035	
45		54-56		12/2		1035	
46		54-56		12/2		1035	
47		54-56		12/2		1035	
48		54-56		12/2		1035	
49		54-56		12/2		1035	
50		54-56		12/2		1035	
51		54-56		12/2		1035	
52		54-56		12/2		1035	
53		54-56		12/2		1035	
54		54-56		12/2		1035	
55		54-56		12/2		1035	
56		54-56		12/2		1035	
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61		54-56		12/2		1035	
62		54-56		12/2		1035	
63		54-56		12/2		1035	
64		54-56		12/2		1035	
65		54-56		12/2		1035	
66		54-56		12/2		1035	
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68		54-56		12/2		1035	
69		54-56		12/2		1035	
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81		54-56		12/2		1035	
82		54-56		12/2		1035	
83		54-56		12/2		1035	
84		54-56		12/2		1035	
85		54-56		12/2		1035	
86		54-56		12/2		1035	
87		54-56		12/2		1035	
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89		54-56		12/2		1035	
90		54-56		12/2		1035	
91		54-56		12/2		1035	
92		54-56		12/2		1035	
93		54-56		12/2		1035	
94		54-56		12/2		1035	
95		54-56		12/2		1035	
96		54-56		12/2		1035	
97		54-56		12/2		1035	
98		54-56		12/2		1035	
99		54-56		12/2		1035	
100		54-56		12/2		1035	
101		54-56		12/2		1035	
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109		54-56		12/2		1035	
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111		54-56		12/2		1035	
112		54-56		12/2		1035	
113		54-56		12/2		1035	
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125		54-56		12/2		1035	
126		54-56		12/2		1035	
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128		54-56		12/2		1035	
129		54-56		12/2		1035	
130		54-56		12/2		1035	
131		54-56		12/2		1035	
132		54-56		12/2		1035	
133		54-56		12/2		1035	
134		54-56		12/2		1035	
135		54-56		12/2		1035	
136		54-56		12/2		1035	
137		54-56		12/2		1035	
138		54-56		12/2		1035	
139		54-56		12/2		1035	
140		54-56		12/2		1035	
141		54-56		12/2		1035	
142		54-56		12/2		1035	
143		54-56		12/2		1035	
144		54-56		12/2		1035	
145		54-56		12/2		1035	
146		54-56		12/2		1035	
147		54-56		12/2		1035	
148		54-56		12/2		1035	
149		54-56		12/2		1035	
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169		54-56		12/2		1035	
170		54-56		12/2		1035	
171		54-56		12/2		1035	
172		54-56		12/2		1035	
173		54-56		12/2		1035	
174		54-56		12/2		1035	
175		54-56		12/2		1035	
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179		54-56		12/2		1035	
180		54-56		12/2		1035	
181		54-56		12/2		1035	
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183		54-56		12/2		1035	
184		54-56		12/2		1035	
185		54-56		12/2		1035	
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187		54-56		12/2		1035	
188		54-56		12/2		1035	
189		54-56		12/2		1035	
190		54-56		12/2		1035	
191		54-56		12/2		1035	
192		54-56		12/2		1035	
193		54-56		12/2		1035	
194		54-56		12/2		1035	
195		54-56		12/2		1035	
196		54-56		12/2		1035	
197		54-56		12/2		1035	
198		54-56		12/2		1035	
199		54-56		12/2		1035	
200		54-56		12/2		1035	
201		54-56		12/2		1035	
202		54-56		12/2		1035	
203		54-56		12/2		1035	
204		54-56		12/2		1035	
205		54-56		12/2		1035	
206		54-56		12/2		1035	
207		54-56		12/2		1035	
208		54-56		12/2		1035	
209		54-56		12/2		1035	
210		54-56		12/2		1035	
211		54-56		12/2		1035	
212		54-56		12/2		1035	
213		54-56		12/2		1035	
214		54-56		12/2		1035	
215		54-56		12/2		1035	
216		54-56		12/2		1035	
217		54-56		12/2		1035	
218		54-56		12/2		1035	
219		54-56		12/2		1035	
220		54-56		12/2		1035	
221		54-56		12/2		1035	
222		54-56		12/2		1035	
223		54-56		12/2		1035	
224		54-56		12/2			



ARDINAL LABORATORIES, INC.

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## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 2 of 2

[illegible]



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

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December 22, 2015

Bob Allen

Safety & Environmental Solutions

703 East Clinton

Hobbs, NM 88240

RE: KNOWLES SWD #002

Enclosed are the results of analyses for samples received by the laboratory on 12/18/15 11:20.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene

Lab Director/Quality Manager



**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/10/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: EAST BACKGROUND (H503289-01)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTEX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 73.6-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	<16.0	16.0	12/21/2015	ND	432	108	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 101 % 35-147

Surrogate: 1-Chlorooctadecane 108 % 28-171

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/10/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: SOUTH BACKGROUND (H503289-02)**

BTX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	<16.0	16.0	12/21/2015	ND	432	108	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 106 % 35-147

Surrogate: 1-Chlorooctadecane 111 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/11/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: SOUTH WALL (H503289-03)**

BTX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	320	16.0	12/21/2015	ND	432	108	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 101 % 35-147

Surrogate: 1-Chlorooctadecane 102 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/11/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: EAST WALL (H503289-04)**

BTX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 100 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	288	16.0	12/21/2015	ND	432	108	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 113 % 35-147

Surrogate: 1-Chlorooctadecane 106 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/17/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: NORTH WALL (H503289-05)**

BTX 8021B		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51		
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29		
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62		
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77		
Total BTX	<0.300	0.300	12/21/2015	ND						

Surrogate: 4-Bromofluorobenzene (PID) 101 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	832	16.0	12/21/2015	ND	432	108	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	42.9	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 96.8 % 35-147

Surrogate: 1-Chlorooctadecane 115 % 28-171

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



**Analytical Results For:**

 Safety & Environmental Solutions  
 Bob Allen  
 703 East Clinton  
 Hobbs NM, 88240  
 Fax To: (575) 393-4388

 Received: 12/18/2015  
 Reported: 12/22/2015  
 Project Name: KNOWLES SWD #002  
 Project Number: SIL-15-001  
 Project Location: HOBBS, NM

 Sampling Date: 12/17/2015  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Jodi Henson

**Sample ID: WEST WALL (H503289-06)**

BTX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	320	16.0	12/21/2015	ND	432	108	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 101 % 35-147

Surrogate: 1-Chlorooctadecane 105 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/17/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: SP-1 BOTTOM 4' (H503289-07)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTEX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 73.6-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	3920	16.0	12/21/2015	ND	432	108	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 106 % 35-147

Surrogate: 1-Chlorooctadecane 116 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/17/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: SP-2 BOTTOM 4' (H503289-08)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTEX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.4 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2520	16.0	12/21/2015	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 99.3 % 35-147

Surrogate: 1-Chlorooctadecane 101 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/17/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: SP-3 BOTTOM 4' (H503289-09)**

BTX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2520	16.0	12/21/2015	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 101 % 35-147

Surrogate: 1-Chlorooctadecane 112 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/17/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: SP-4 BOTTOM 3' (H503289-10)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTEX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 73.6-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	1790	16.0	12/21/2015	ND	400	100	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 88.6 % 35-147

Surrogate: 1-Chlorooctadecane 108 % 28-171

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Celey D. Keene, Lab Director/Quality Manager



**Analytical Results For:**

Safety & Environmental Solutions  
Bob Allen  
703 East Clinton  
Hobbs NM, 88240  
Fax To: (575) 393-4388

Received: 12/18/2015  
Reported: 12/22/2015  
Project Name: KNOWLES SWD #002  
Project Number: SIL-15-001  
Project Location: HOBBS, NM

Sampling Date: 12/17/2015  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: SP-5 BOTTOM 3' (H503289-11)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/21/2015	ND	2.20	110	2.00	1.51	
Toluene*	<0.050	0.050	12/21/2015	ND	2.25	113	2.00	1.29	
Ethylbenzene*	<0.050	0.050	12/21/2015	ND	2.06	103	2.00	2.62	
Total Xylenes*	<0.150	0.150	12/21/2015	ND	6.56	109	6.00	1.77	
Total BTEX	<0.300	0.300	12/21/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3200	16.0	12/21/2015	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/19/2015	ND	173	86.5	200	7.80	
DRO >C10-C28	<10.0	10.0	12/19/2015	ND	180	90.0	200	9.08	

Surrogate: 1-Chlorooctane 95.4 % 35-147

Surrogate: 1-Chlorooctadecane 102 % 28-171

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

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---

Celey D. Keene, Lab Director/Quality Manager







# CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240  
(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

### ANALYSIS REQUEST

Company Name: SEST  
Project Manager:

Address: 703 E. CLINTON, #103

City: HOBBS State: NM Zip: 88240

Phone #: (505) 397-0510

Fax #: (505) 393-4388

Project #: 15-001 Project Owner: Silke Spicer

Project Name: Kowles Sub # 2

Project Location: Son Jerry

Company: SAME  
Attn:  
Address:  
City:  
State:  
Zip:  
Phone #:  
Fax #:

FOR LAB USE ONLY

LAB I.D.

Sample I.D.

H503289

11 58-S Bottom STA 9

(G)RAB OR (C)OMP.

# CONTAINERS

GROUNDWATER

WASTEWATER

SOIL

OIL

SLUDGE

OTHER:

ACID:

ICE / COOL

OTHER:

DATE

TIME

DATE

TIME

DATE

TIME

DATE

TIME

DATE

TIME

DATE

TIME

DATE

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DATE

TIME

TPH (8015)  
BTEX  
Chlorides

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Terms and Conditions: Payment will be charged on all accounts more than 30 days past due at the rate of 2 1/2% per annum from the original date of invoice, and all costs of collection, including attorney's fees.

Phone Result: ☐ Yes ☐ No Additional Fax #:

Fax Result: ☐ Yes ☐ No

REMARKS:

Relinquished By: Son Jerry

Date: 12/18/15

Received By: (Lab Staff)

Time: 11:20

Sample Condition

Cool ☐ Intact ☐

Yes ☐ No ☐

CHECKED BY: (Initials)

Signature

2.00

Sampler - UPS - Bus - Other:

Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

## **Appendix B**

### **Site Photographs**



Silver Spike Energy  
Knowles SWD #002  
API 30-025-07287



Sign marking location 11-13-15



Impacted area facing west



Impacted area facing northwest



Impacted area facing northwest



Impacted area west side of tanks



Impacted area facing north



Silver Spike Energy  
Knowles SWD #002  
API 30-025-07287



Excavated area facing west



Excavated area facing northwest



Excavated area South of battery



Excavated area northwest



Excavated area west side of tanks



Excavated and lined west side of tanks



Silver Spike Energy  
Knowles SWD #002  
API 30-025-07287



Lined Excavation facing north



Lined area facing south



Lined west side of tanks with layered top soil



Lined north side layered topsoil





Silver Spike Energy  
Knowles SWD #002  
API 30-025-07287



Completion looking northeast



Completion looking east



Completion looking north

## **Appendix C**

### **C-141**

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
811 S. First St., Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy Minerals and Natural Resources

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

Form C-141  
Revised August 8, 2011

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

**Release Notification and Corrective Action**

**OPERATOR**

☐ Initial Report ☒ Final Report

Name of Company: Silver Spike Energy Operating of NM, LLC	Contact: Mike Evans
Address: 203 W Wall Suite 920 Midland, TX 79701	Telephone No. 432-413-6483
Facility Name: Knowles SWD #002	Facility Type: SWD

Surface Owner Fee	Mineral Owner Fee	API No. 30-025-07287
-------------------	-------------------	----------------------

**LOCATION OF RELEASE**

Unit Letter P	Section: 34	Township: 26S	Range 38E	Feet from the 660	North/South Line South	Feet from the 660	East/West Line East	County: Lea
------------------	----------------	------------------	--------------	----------------------	---------------------------	----------------------	------------------------	----------------

Latitude 32.8726654 Longitude -103.1286621

**NATURE OF RELEASE**

Type of Release Produced Water	Volume of Release 22 bbls	Volume Recovered 0
Source of Release Water tank overflow	Date and Hour of Occurrence Unknown	Date and Hour of Discovery Unknown
Was Immediate Notice Given? PLEASE SEE ATTACHED EXHIBIT TO C141 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom?	
By Whom:	Date and Hour:	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.\*

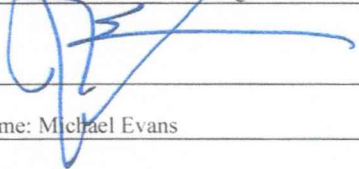
Describe Cause of Problem and Remedial Action Taken.\*

Due to the failure of the High/Low switch on the water tank and overflow occurred. SESI was contacted to remediate the site according to NMOCD guidelines.

Describe Area Affected and Cleanup Action Taken.\*

The spill impacted ground surface area measuring approximately 4,923 sq. ft. and was retained to the interior of the bermed area for the battery. Custom Welding of Hobbs, NM was utilized to excavate according the approved remediation plan. SESI has remediated the site in accordance with said plan and respectfully requests closure of the regulatory file for this site.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: 	<b>OIL CONSERVATION DIVISION</b>		
Printed Name: Michael Evans	Approved by Environmental Specialist:		
Title: EHS Representative	Approval Date:	Expiration Date:	
E-mail Address: Michael@silverspikeenergy.com	Conditions of Approval:		Attached <input type="checkbox"/>
Date: 12/29/15 Phone: 432-413-6483			

\* Attach Additional Sheets If Necessary



## **Appendix D Groundwater Analysis**



# 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	Depth Well	Depth Water	Water Column
<a href="#">L 00078</a>	R	L	LE	1	1	23	16S	38E		675409	3643153*	120		
<a href="#">L 00078 POD2</a>		L	LE	3	1	3	23	16S	38E	675321	3642245*	160	52	108
<a href="#">L 00078 POD3</a>		L	LE	1	1	4	23	16S	38E	676125	3642457*	216	90	126
<a href="#">L 00080</a>		L	LE	1	1	1	35	16S	38E	675359	3640023*	130		
<a href="#">L 00084</a>		L	LE	3	3	2	25	16S	38E	677753	3641070*		85	
<a href="#">L 00137</a>		L	LE	1	2	3	34	16S	38E	674165	3639199*	135		
<a href="#">L 00189</a>		L	LE	1	3	1	34	16S	38E	673756	3639598*	178		
<a href="#">L 00189 S</a>		L	LE	1	1	1	34	16S	38E	673749	3640001*	180	95	85
<a href="#">L 00204</a>		L	LE	4	4	3	28	16S	38E	672735	3640190*	140	70	70
<a href="#">L 00204 POD3</a>	R	L	LE	3	1	2	33	16S	38E	672944	3639792*	165	93	72
<a href="#">L 00204 S</a>		L	LE		1	2	33	16S	38E	673045	3639893*	183	110	73
<a href="#">L 00204 S2</a>		L	LE	1	4	4	28	16S	38E	673340	3640400*	125	60	65
<a href="#">L 00204 S3</a>		L	LE	3	4	2	33	16S	38E	673353	3639393*	180	100	80
<a href="#">L 00204 S4</a>		L	LE			3	28	16S	38E	672434	3640487*	155		
<a href="#">L 00204 S5</a>		L	LE	1	2	2	33	16S	38E	673346	3639997*	150	80	70
<a href="#">L 00212</a>		L	LE	3	3	4	24	16S	38E	677741	3641878*	179		
<a href="#">L 00347</a>		L	LE		1	07	16S	38E		669164	3646085*	130		
<a href="#">L 00347 POD2</a>		L	LE	1	4	1	07	16S	38E	669226	3645989*	135	58	77
<a href="#">L 00347 POD3</a>		L	LE	1	2	1	18	16S	38E	669244	3644778*	125	41	84
<a href="#">L 00353</a>		L	LE	1	1	1	19	16S	38E	668903	3643160*	185	60	125
<a href="#">L 00353 POD1</a>	R	L	LE		1	1	19	16S	38E	669004	3643061*	124		
<a href="#">L 00353 S</a>		L	LE	1	2	1	19	16S	38E	669266	3643166*	185	100	85
<a href="#">L 00353 S2</a>		L	LE	1	2	1	19	16S	38E	669266	3643166*	202	76	126
<a href="#">L 00358</a>		L	LE	3	1	3	21	16S	38E	672099	3642201*	194	84	110
<a href="#">L 00513</a>		L	LE				05	16S	38E	671127	3647318*	220	90	130
<a href="#">L 00514</a>		L	LE				03	16S	38E	674345	3647366*	130		

\*UTM location was derived from PLSS - see Help

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(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	Depth Well	Depth Water	Water Column
<a href="#">L 00602</a>	L	LE		1	1	2	28	16S	38E	672917	3641605*	189	100	89
<a href="#">L 00602 S</a>	L	LE		1	3	2	28	16S	38E	672924	3641202*	140	43	97
<a href="#">L 00602 S2</a>	L	LE				2	28	16S	38E	673226	3641304*	178	103	75
<a href="#">L 00602 S3</a>	L	LE				2	28	16S	38E	673226	3641304*	174	98	76
<a href="#">L 00727 POD12</a>	L	LE		3	4	33		16S	38E	673065	3638683*	172	75	97
<a href="#">L 00727 POD2</a>	R	L	LE	3	4	33		16S	38E	673065	3638683*	160	50	110
<a href="#">L 00727 POD4</a>	L	LE		4	3	4	33	16S	38E	673164	3638582*	195	70	125
<a href="#">L 00727 POD4</a>	R	L	LE	4	3	4	33	16S	38E	673164	3638582*	195	70	125
<a href="#">L 00727 POD5</a>	L	LE			4	4	33	16S	38E	673468	3638687*	198	100	98
<a href="#">L 00727 POD9</a>	L	LE		1	3	3	34	16S	38E	673769	3638790*	200	105	95
<a href="#">L 00752</a>	L	LE		3	1	4	30	16S	38E	669623	3640550	200		
<a href="#">L 00752 POD2</a>	L	LE				3	30	16S	38E	669252	3640441*	177	120	57
<a href="#">L 00752 POD4</a>	L	LE				3	30	16S	38E	669646	3640304	200		
<a href="#">L 00753</a>	L	LE		1	1	1	30	16S	38E	669207	3641652	214	140	74
<a href="#">L 00753</a>	R	L	LE	1	1	1	30	16S	38E	669207	3641652	214	140	74
<a href="#">L 00753 S</a>	L	LE				1	30	16S	38E	669239	3641248*	170	90	80
<a href="#">L 00753 S2</a>	L	LE				1	30	16S	38E	669239	3641248*	170	140	30
<a href="#">L 00755</a>	L	LE		1	1	2	30	16S	38E	669696	3641561*	182	181	1
<a href="#">L 00755</a>	R	L	LE	1	1	2	30	16S	38E	669696	3641561*	182	181	1
<a href="#">L 00756</a>	L	LE		1	1	3	30	16S	38E	668880	3640830	163	110	53
<a href="#">L 00756</a>	R	L	LE	1	1	3	30	16S	38E	668880	3640830	163	110	53
<a href="#">L 00767</a>	R	L	LE		2	4	32	16S	38E	671850	3639073*	142		
<a href="#">L 00767 POD2</a>	L	LE		1	2	4	32	16S	38E	671749	3639172*	178	91	87
<a href="#">L 00776</a>	L	LE			1	1	26	16S	38E	675434	3641538*	140		
<a href="#">L 00777</a>	L	LE			3	1	26	16S	38E	675441	3641135*	140		
<a href="#">L 00778</a>	L	LE			1	3	26	16S	38E	675447	3640731*	140		
<a href="#">L 00779</a>	L	LE			1	1	27	16S	38E	673823	3641517*	191	100	91
<a href="#">L 00779 POD11</a>	L	LE		3	3	4	27	16S	38E	674547	3640216*	245	102	143
<a href="#">L 00779 POD12</a>	L	LE		1	2	1	27	16S	38E	674032	3641714	196	94	102

\*UTM location was derived from PLSS - see Help






























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(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<a href="#">L 00779 POD13</a>	L	LE		4	1	1	27	16S	38E	673641	3641347 	193	115	78
<a href="#">L 00779 S</a>	R	L	LE		1	3	27	16S	38E	673836	3640710* 	171	70	101
<a href="#">L 00780</a>	L	LE		3	1	1	27	16S	38E	673722	3641416* 	130	58	72
<a href="#">L 00780</a>	R	L	LE	3	1	1	27	16S	38E	673722	3641416* 	130	58	72
<a href="#">L 00781</a>	L	LE			1	3	27	16S	38E	673836	3640710* 	130	75	55
<a href="#">L 00781</a>	R	L	LE		1	3	27	16S	38E	673836	3640710* 	130	75	55
<a href="#">L 00782</a>	L	LE		1	1	2	27	16S	38E	674528	3641627* 	185	100	85
<a href="#">L 00783</a>	L	LE		1	3	2	27	16S	38E	674534	3641223* 	180	180	0
<a href="#">L 00784</a>	L	LE			4	3	27	16S	38E	674245	3640311* 	130		
<a href="#">L 00785</a>	L	LE			3	4	27	16S	38E	674648	3640317* 	130		
<a href="#">L 00786</a>	L	LE			4	3	27	16S	38E	674245	3640311* 	118	67	51
<a href="#">L 00787</a>	L	LE			2	1	34	16S	38E	674252	3639908* 	140	65	75
<a href="#">L 00788</a>	L	LE		1	1	2	35	16S	38E	676163	3640034* 	191	100	91
<a href="#">L 00788 POD3</a>	L	LE			2	3	26	16S	38E	675849	3640737* 	150	47	103
<a href="#">L 00789</a>	L	LE		4	2	1	35	16S	38E	675961	3639828* 	191	100	91
<a href="#">L 00801</a>	L	LE		1	1	1	29	16S	38E	670500	3641574* 	187	84	103
<a href="#">L 00801 POD4</a>	L	LE			4	1	29	16S	38E	671192	3641070 	248	110	138
<a href="#">L 00801 S</a>	L	LE				1	29	16S	38E	670809	3641273* 	190	100	90
<a href="#">L 00801 S2</a>	L	LE		1	4	1	29	16S	38E	670910	3641176* 	182	80	102
<a href="#">L 00802</a>	L	LE		2	1	1	12	16S	38E	677068	3646503* 	117	40	77
<a href="#">L 00802 S</a>	L	LE			2	1	12	16S	38E	677371	3646411* 	200	70	130
<a href="#">L 00813</a>	L	LE		1	2	3	28	16S	38E	672528	3640793* 	130	50	80
<a href="#">L 00813</a>	R	L	LE	1	2	3	28	16S	38E	672528	3640793* 	130	50	80
<a href="#">L 00814</a>	L	LE		3	1	3	28	16S	38E	672125	3640588* 	150	60	90
<a href="#">L 00814</a>	R	L	LE	3	1	3	28	16S	38E	672125	3640588* 	150	60	90
<a href="#">L 00848</a>	L	LE		1	1	3	33	16S	38E	672152	3639176* 	135		
<a href="#">L 00848</a>	R	L	LE	1	1	3	33	16S	38E	672152	3639176* 	135		
<a href="#">L 00848 POD2</a>	L	LE			4	3	33	16S	38E	672662	3638679* 	130	50	80
<a href="#">L 00848 POD2</a>	R	L	LE		4	3	33	16S	38E	672662	3638679* 	130	50	80

\*UTM location was derived from PLSS - see Help
































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(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<a href="#">L 00849</a>	L	LE		3	1	4	33	16S	38E	672957	3638985*		140	
<a href="#">L 00849</a>	R	L	LE	3	1	4	33	16S	38E	672957	3638985*		140	
<a href="#">L 00849 POD2</a>	L	LE		3	1	4	33	16S	38E	672957	3638985*		187	115 72
<a href="#">L 00849 POD2</a>	R	L	LE	3	1	4	33	16S	38E	672957	3638985*		187	115 72
<a href="#">L 00849 POD3</a>	R	L	LE	4	1	4	33	16S	38E	673157	3638985*		195	70 125
<a href="#">L 00874</a>	L	LE		3	1	3	12	16S	38E	676880	3645497*		213	80 133
<a href="#">L 00875</a>	L	LE		1	3	4	12	16S	38E	677692	3645306*		213	80 133
<a href="#">L 00875 POD2</a>	L	LE				4	12	16S	38E	677994	3645408*			104
<a href="#">L 00921 POD1</a>	L	LE				3	30	16S	38E	669252	3640441*		73	
<a href="#">L 01052</a>	L	LE		4	2	2	28	16S	38E	673520	3641411*		90	60 30
<a href="#">L 01094</a>	L	LE					19	16S	38E	669627	3642456*		80	
<a href="#">L 01131 POD1</a>	L	LE		4	4	2	31	16S	38E	670331	3639354*		74	70 4
<a href="#">L 01143 POD1</a>	L	LE			3	4	33	16S	38E	673065	3638683*		124	60 64
<a href="#">L 01187</a>	L	LE		1	2	2	21	16S	38E	673294	3643224*		150	35 115
<a href="#">L 01187</a>	R	L	LE	1	2	2	21	16S	38E	673294	3643224*		150	35 115
<a href="#">L 01187 POD2</a>	L	LE			2	2	21	16S	38E	672997	3643381		182	100 82
<a href="#">L 01230</a>	L	LE		1	3	2	22	16S	38E	674509	3642837*		150	
<a href="#">L 01230 POD5</a>	L	LE				4	22	16S	38E	674823	3642132*		205	
<a href="#">L 01231</a>	L	LE		1	1	4	22	16S	38E	674515	3642434*		155	64 91
<a href="#">L 01232</a>	L	LE		1	3	4	15	16S	38E	674496	3643644*		150	
<a href="#">L 01232</a>	R	L	LE	1	3	4	15	16S	38E	674496	3643644*		150	
<a href="#">L 01344</a>	L	LE			2	3	22	16S	38E	674213	3642329*		100	55 45
<a href="#">L 01424</a>	L	LE		3	1	2	09	16S	38E	672842	3646247*		150	52 98
<a href="#">L 01424 POD2</a>	L	LE		3	2	3	19	16S	38E	669225	3642051		175	105 70
<a href="#">L 01424 POD3</a>	L	LE			1	3	19	16S	38E	669018	3642256*		173	90 83
<a href="#">L 01424 POD4</a>	L	LE		2	2	3	19	16S	38E	669480	3642361*		175	
<a href="#">L 01441</a>	L	LE		1	1	1	35	16S	38E	675359	3640023*		123	50 73
<a href="#">L 01446</a>	L	LE			4	4	34	16S	38E	675077	3638707*		115	
<a href="#">L 01606 POD1</a>	L	LE			2	4	34	16S	38E	675070	3639111*		115	50 65

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POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<a href="#">L 01706</a>	L	LE		1	1	1	10	16S	38E	673647	3646459*	150	25	125
<a href="#">L 01707</a>	L	LE		1	1	1	15	16S	38E	673672	3644844*	150	30	120
<a href="#">L 01707 S</a>	L	LE		1	3	1	15	16S	38E	673678	3644440*	160	47	113
<a href="#">L 01708</a>	L	LE		1	1	3	22	16S	38E	673709	3642423*	207	110	97
<a href="#">L 01708 POD3</a>	L	LE				3	22	16S	38E	674018	3642122	228	228	0
<a href="#">L 01708 S</a>	L	LE		3	1	3	22	16S	38E	673709	3642223*	150	110	40
<a href="#">L 01747 POD2</a>	L	LE		1	4	2	26	16S	38E	676546	3641251*	196	170	26
<a href="#">L 01747 POD3</a>	L	LE			1	1	25	16S	38E	676546	3641251	148	80	68
<a href="#">L 01765 POD2</a>	L	LE		1	3	3	35	16S	38E	675378	3638812*	151	61	90
<a href="#">L 01765 S</a>	L	LE			2	3	35	16S	38E	675875	3639122*	160	71	89
<a href="#">L 01768</a>	L	LE		1	2	2	10	16S	38E	674854	3646475*	90	35	55
<a href="#">L 01768 S</a>	L	LE			2	4	10	16S	38E	674968	3645569*	128	95	33
<a href="#">L 01952</a>	R	L	LE	4	4	4	27	16S	38E	675201	3640330	100	55	45
<a href="#">L 01952 POD2</a>	L	LE		4	4	4	27	16S	38E	675200	3640329	230	123	107
<a href="#">L 01999</a>	L	LE			1	1	15	16S	38E	673773	3644745*	105	40	65
<a href="#">L 02110</a>	L	LE			3	3	35	16S	38E	675479	3638713*	100	45	55
<a href="#">L 02446</a>	L	LE		3	4	2	34	16S	38E	674963	3639414*	125	48	77
<a href="#">L 02458</a>	L	LE		2	2	3	30	16S	38E	669507	3640748*	148	115	33
<a href="#">L 02781</a>	L	LE		4	2	2	33	16S	38E	673546	3639797*	115	50	65
<a href="#">L 02923</a>	L	LE					04	16S	38E	672736	3647343*	125	30	95
<a href="#">L 02924</a>	L	LE		2	2	2	26	16S	38E	676740	3641655*	110		
<a href="#">L 03143</a>	L	LE			2	2	05	16S	38E	671710	3647943*	120	30	90
<a href="#">L 03146</a>	L	LE					01	16S	38E	677565	3647411*	128	50	78
<a href="#">L 03193</a>	L	LE			1	1	04	16S	38E	672112	3647949*	120	35	85
<a href="#">L 03229</a>	L	LE			2	2	22	16S	38E	675006	3643147*	120	40	80
<a href="#">L 03255</a>	L	LE			2	2	05	16S	38E	671710	3647943*	120	30	90
<a href="#">L 03273</a>	L	LE		4	2	2	28	16S	38E	673520	3641411*	110	65	45
<a href="#">L 03291</a>	L	LE			3	4	32	16S	38E	671452	3638666*	140	65	75
<a href="#">L 03464</a>	L	LE		4	3	3	33	16S	38E	672359	3638573*	125	70	55

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


























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(In feet)

POD Number	POD		Q Q Q						X	Y	Depth Well	Depth Water	Water Column		
	Sub-Code	basin	County	64	16	4	Sec	Tws						Rng	
<a href="#">L 03466</a>	L	LE		2	2	09		16S	38E	673346	3646354*		110	56	54
<a href="#">L 03480</a>	L	LE		2	2	2	32	16S	38E	671936	3639977*		120	55	65
<a href="#">L 04446</a>	L	LE					01	16S	38E	677565	3647411*		130	50	80
<a href="#">L 04508</a>	L	LE		4	1	30		16S	38E	669401	3641053*		110	54	56
<a href="#">L 04590</a>	L	LE			2	07		16S	38E	669931	3646097*		150	114	36
<a href="#">L 04638</a>	L	LE		3	3	21		16S	38E	672206	3641899*		120	52	68
<a href="#">L 05038</a>	L	LE		2	4	3	02	16S	38E	675853	3646889*		120	55	65
<a href="#">L 05193</a>	L	LE					20	16S	38E	671197	3642481*		126	50	76
<a href="#">L 05202</a>	L	LE		1	4	30		16S	38E	669810	3640656*		125	45	80
<a href="#">L 05206</a>	L	LE					06	16S	38E	669557	3647294*		120	87	33
<a href="#">L 05234</a>	L	LE		1	4	24		16S	38E	677836	3642383*		83	46	37
<a href="#">L 05348</a>	L	LE		4	2	08		16S	38E	671742	3645927*		106	65	41
<a href="#">L 05390</a>	L	LE		3	3	34		16S	38E	673870	3638691*		100	64	36
<a href="#">L 05427</a>	L	LE		3	3	4	33	16S	38E	672964	3638582*		163		
<a href="#">L 05427</a>	R	L	LE	3	3	4	33	16S	38E	672964	3638582*		163		
<a href="#">L 05467</a>	L	LE		4	2	31		16S	38E	670232	3639455*		110	65	45
<a href="#">L 05691</a>	L	LE		4	2	21		16S	38E	673401	3642722*		125	55	70
<a href="#">L 05753</a>	L	LE		3	3	3	23	16S	38E	675327	3641841*		95	70	25
<a href="#">L 06221</a>	L	LE		1	4	01		16S	38E	677761	3647223*		122	44	78
<a href="#">L 06330 POD2</a>	L	LE			2	27		16S	38E	674836	3641325*		159		
<a href="#">L 06463</a>	L	LE		2	4	15		16S	38E	674994	3643954*		110	60	50
<a href="#">L 06502</a>	L	LE			4	19		16S	38E	669991	3642066*		100	50	50
<a href="#">L 06513</a>	L	LE		4	4	4	21	16S	38E	673513	3641814*		115	60	55
<a href="#">L 06630</a>	L	LE		1	4	15		16S	38E	674591	3643949*		120	60	60
<a href="#">L 06825</a>	L	LE		4	1	2	24	16S	38E	677922	3643089*		120	58	62
<a href="#">L 06834</a>	L	LE		3	2	2	28	16S	38E	673320	3641411*		123	53	70
<a href="#">L 07050</a>	L	LE		3	3	34		16S	38E	673870	3638691*		100	80	20
<a href="#">L 07307</a>	R	L	LE	1	4	11		16S	38E	676176	3645586*		94	54	40
<a href="#">L 07338</a>	R	L	LE	3	1	35		16S	38E	675466	3639520*		100	25	75

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(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	Depth Well	Depth Water	Water Column
<a href="#">L 07338 POD2</a>	L	LE		3	1	35	16S	38E		675466	3639520*	100	73	27
<a href="#">L 07344</a>	L	LE		3	1	25	16S	38E		677050	3641158*	100	25	75
<a href="#">L 07511</a>	R	L	LE	4	4	1	17	16S	38E	671059	3644200*	125	58	67
<a href="#">L 07586</a>	L	LE		1	1	07	16S	38E		668959	3646288*	150	80	70
<a href="#">L 07806</a>	L	LE			1	17	16S	38E		670758	3644496*	70	58	12
<a href="#">L 07807</a>	L	LE			4	35	16S	38E		676484	3638924*	150	68	82
<a href="#">L 08630</a>	L	LE		4	3	33	16S	38E		672662	3638679*	175	75	100
<a href="#">L 08643</a>	L	LE		4	3	33	16S	38E		672662	3638679*	175		
<a href="#">L 08723</a>	L	LE				05	16S	38E		671127	3647318*	102	62	40
<a href="#">L 08754</a>	L	LE		1	2	2	26	16S	38E	676540	3641655*	140		
<a href="#">L 08767</a>	L	LE		1	1	3	34	16S	38E	673763	3639194*	130		
<a href="#">L 08797</a>	L	LE		2	4	3	33	16S	38E	672761	3638778*	175	75	100
<a href="#">L 08798</a>	L	LE		2	4	3	33	16S	38E	672761	3638778*	175	75	100
<a href="#">L 08799</a>	L	LE		4	4	3	33	16S	38E	672761	3638578*	175	75	100
<a href="#">L 08800</a>	L	LE		4	4	3	33	16S	38E	672761	3638578*	175	75	100
<a href="#">L 08835</a>	L	LE		3	4	3	33	16S	38E	672561	3638578*	175	75	100
<a href="#">L 08836</a>	L	LE		4	4	3	33	16S	38E	672761	3638578*	175	75	100
<a href="#">L 08837</a>	L	LE		1	4	3	33	16S	38E	672561	3638778*	175	75	100
<a href="#">L 08838</a>	L	LE		2	4	3	33	16S	38E	672761	3638778*	175	75	100
<a href="#">L 08882</a>	L	LE			4	2	21	16S	38E	673401	3642722*	135	65	70
<a href="#">L 09003</a>	L	LE		4	4	3	33	16S	38E	672761	3638578*	153	75	78
<a href="#">L 09008</a>	L	LE		2	2	2	27	16S	38E	675131	3641632*	200	76	124
<a href="#">L 09024</a>	L	LE		1	1	1	19	16S	38E	668903	3643160*	150	85	65
<a href="#">L 09047</a>	L	LE		3	1	1	24	16S	38E	676917	3643076*	144	72	72
<a href="#">L 09157</a>	L	LE		3	4	4	08	16S	38E	671653	3645019*	130	61	69
<a href="#">L 09209</a>	L	LE		4	4	3	33	16S	38E	672761	3638578*	180	75	105
<a href="#">L 09223</a>	L	LE		4	4	3	33	16S	38E	672761	3638578*	160	75	85
<a href="#">L 09268</a>	L	LE		3	1	2	11	16S	38E	676062	3646292*	135	70	65
<a href="#">L 09281</a>	L	LE		3	3	4	33	16S	38E	672964	3638599	163	70	93

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(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<a href="#">L 09427</a>	L	LE		2	2	16	16S	38E		673370	3644739*	150		
<a href="#">L 09527</a>	L	LE		1	1	1	30	16S	38E	668930	3641549*	155	75	80
<a href="#">L 09647</a>	L	LE		1	3	3	22	16S	38E	673716	3642020*	153	85	68
<a href="#">L 09867</a>	L	LE		3	2	08	16S	38E		671340	3645921*	138	85	53
<a href="#">L 09968</a>	R	L	LE	2	3	09	16S	38E		672553	3645535*	70		
<a href="#">L 09968 POD2</a>	L	LE				09	16S	38E		672760	3645729*	160	70	90
<a href="#">L 10030</a>	L	LE		3	3	2	25	16S	38E	677753	3641070*	150	79	71
<a href="#">L 10061</a>	L	LE		4	1	3	31	16S	38E	669167	3638938*	210	80	130
<a href="#">L 10129</a>	L	LE		3	1	3	35	16S	38E	675372	3639016*	160	90	70
<a href="#">L 10151</a>	L	LE		4	1	07	16S	38E		669327	3645890*	200	85	115
<a href="#">L 10152</a>	L	LE		3	3	3	34	16S	38E	673769	3638590*	150	83	67
<a href="#">L 10211</a>	L	LE		3	3	3	23	16S	38E	675327	3641841*	155	83	72
<a href="#">L 10215</a>	L	LE		4	2	04	16S	38E		673326	3647564*	75	60	15
<a href="#">L 10216</a>	L	LE		1	1	03	16S	38E		673721	3647973*	65	50	15
<a href="#">L 10321</a>	L	LE				12	16S	38E		677590	3645797*	136	50	86
<a href="#">L 10415</a>	L	LE		4		13	16S	38E		678018	3643795*	195	70	125
<a href="#">L 10421</a>	L	LE		1	1	4	33	16S	38E	672957	3639185*	176	64	112
<a href="#">L 10690</a>	L	LE		4	4	14	16S	38E		676610	3643575*	244	65	179
<a href="#">L 10874</a>	L	LE		3		16	16S	38E		672381	3643712*	105	85	20
<a href="#">L 10910</a>	L	LE		4	4	27	16S	38E		675051	3640322*	158	80	78
<a href="#">L 11112</a>	L	LE		4	2	4	28	16S	38E	673533	3640604*	157		
<a href="#">L 11243</a>	L	LE		3	3	3	18	16S	38E	668897	3643363*	200		
<a href="#">L 11408</a>	L	LE		1	1	2	30	16S	38E	669696	3641561*	155	95	60
<a href="#">L 11481</a>	L	LE		4	1	3	21	16S	38E	672299	3642201*	212		
<a href="#">L 11484</a>	L	LE		1	1	1	35	16S	38E	675359	3640023*	210	106	104
<a href="#">L 11597</a>	L	LE		1	4	3	33	16S	38E	672561	3638778*	200	111	89
<a href="#">L 11757</a>	L	LE		4	3	4	34	16S	38E	674774	3638601*	212		
<a href="#">L 12110 POD1</a>	L	LE		3	3	1	07	16S	38E	668776	3645890	180		
<a href="#">L 12292 POD1</a>	L	LE		4	2	1	03	16S	38E	654772	3648081	134	68	66

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(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<a href="#">L 12314 POD1</a>	L	LE		4	2	2	21	16S	38E	673534	3642987	183	100	83
<a href="#">L 12504 POD1</a>	L	LE		2	2	1	30	16S	38E	669541	3641559	191		
<a href="#">L 12757 POD1</a>	L	LE				1	30	16S	38E	669239	3641248*	230	106	124
<a href="#">L 13206 POD1</a>	L	LE		2	2	2	10	16S	38E	675090	3646533	178	76	102
<a href="#">L 13442 POD1</a>	L	LE		2	3	2	34	16S	38E	674832	3639563	185	120	65
<a href="#">L 13616 POD1</a>	L	LE		1	2	3	34	16S	38E	673974	3639694	210	118	92

Average Depth to Water: **76 feet**

Minimum Depth: **25 feet**

Maximum Depth: **228 feet**

Record Count: 235

PLSS Search:

Township: 16S

Range: 38E

\*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.

## **Appendix E Boring Log**



**Safety & Environmental  
Solutions, Inc.**

## LOG OF BORING BH-2

(Page 1 of 1)

Silver Spike Energy  
Knowles SWD #2  
SE/4 Sec. 34, T16S, R38E  
Lea County, New Mexico  
N32.872550°, W103.128773°

Date, Time Started : 12/02/15, 0930  
Date, Time Complete : 12/03/15, 1700  
Hole Diameter : 8 1/4 in.  
Drilling Method : Hollow Stem Auger  
Drilling Equipment : Ingersol-Rand 300A

Drilled By : Atkins Engineering Assoc.  
Sampling Method : 2 ft. splitspoon  
Logged By : David Boyer, P.G.

Depth in Feet	Sample	Sample Type	Recovery (ft.)	USCS	GRAPHIC	Sample Condition	Sample Type
						Remoulded Undisturbed Lost Rock Core	SS Split Spoon (24") CB Core Barrel (4') CT Auger Cuttings NR No recovery
DESCRIPTION							
0		CB	4.0	AR		0-1.5 ft. Disturbed mixture of CALICHE, SAND, and minor CLAY (Geoprobe core recovery, 11/23)	
				ML		1.5-3.5 ft. SANDY SILT, black, H/C staining and odor (Geoprobe core)	
5		CB	3.5	SM		4-8 ft. SILTY SAND, light brown, w/caliche fragments, H/C odor (Geoprobe core)	
10		SS	1.6	SM		8-12 ft. SILTY SAND with caliche fragments, light brown, H/C odor (Geoprobe core) 9-11 ft. SAND, light brown, fine grained with caliche fragments	
						Hard drilling 11 - 14 ft.	
15		SS	1.6	SP/CA		14-16 ft. SAND, light brown with more frequent caliche and/or sandstone fragments	
20		SS	1.6	CA/SP		19-21 ft. CALICHE and some SANDSTONE with fine grained, SAND light brown	
25		SS	0.6	CA/SP		24-26 ft. CALICHE with minor SANDSTONE and fine grained SAND, light brown, no H/C staining or odor. Begin hard drilling 24.5 ft.	
30		SS	<0.5	SS		29-31 ft. Powdered cuttings in splitspoon, mostly very fine grained SANDSTONE, very light brown, cuttings may contain some slough from above.	
						Still hard drilling below 31 ft.	
35		SS	0.75	ML		34-36 ft. SANDY SILT, light brown, very fine grained, dry, some minor clay. Hammer refusal at 9 in., material most likely powder and slough from above	
40		SS	2.0	CA/SS SP		39-40 ft. CALICHE and SANDSTONE fragments, some sand, creme-colored, sand is very fine to fine grained 40-41 ft. SAND, light brown, very fine to fine grained, dry, occasional SS frags	
45		SS	1.5	SP/SS		44.0-44.4 ft. Slough. 44.4 ft-46 ft. SAND and SANDSTONE, sand light brown, very fine grained, dry, frequent consolidated sandstone	
50		SS	1.4	SP		49-51 ft. SAND, light brown, very fine to fine grained, uniform, dry, infrequent sandstone fragments	
55		SS	1.3	SM/ML		54-56 ft. SILTY SAND/SANDY SILT, light brown, very fine grained sand, uniform, few sandstone fragments	
60		SS	1.4	SM		59-61 ft. SILTY SAND, light brown, very fine grained, slightly damp,	
65		SS	1.2	SM		64-66 ft. SILTY SAND, light brown, very fine grained, dry, no sandstone fragments	
70		SS	1.0	SP		69-71 ft. SAND, light brown, very fine grained, uniform, dry,	
75		SS	0.5	SP/SS		74-76 ft. Spoon shoe empty except for small SAND sample and SANDSTONE fragment ("cookie" shaped). Slough above sandstone fragment.	
80							

**Notes:**

Backfilled to surface with 34 bags Holeplug 3/8" bentonite chips, hydrated with approximately 80 gallons H2O. Procedure was to pull one auger at a time, emplace chips through auger and hydrate.

Location of BH-2 is 4 ft. east of BH-1 (Geoprobe boring) and 30.5 ft. south-southwest of SWD injection well.  
H/C -- Hydrocarbon