Souder, Miller & Associates ♦ 201 S. Halagueno ♦ Carlsbad, NM 88221
(575) 689-7040

REVIEWED
By Kellie Jones at 3:42 pm, Nov 10, 2015

APPROVED CONDITIONAL
By Kellie Jones at 3:42 pm, Nov 10, 2015

October 20, 2015

NMOCD District II
1301 W Grand Ave
ArtesiaNM88210

1. The RP will remain open until there have been two additional rounds of sampling to ensure the product has not released the chlorides back to the surface. One sampling event should occur in April 2016 and then October 2016. OCD would like to be present at these sampling events. At that time all results will be reviewed to determine if the RP can be closed.
2. Provide the data from the 6 Oct 2015 sampling event.
3. Ensure BLM and SLO approval/concurrence.

#5B23439-BG6

SUBJECT: FINAL CLOSURE REPORT FOR INCIDENT 1RP-3771 RED HILLS WEST SWD #001, LEA COUNTY, NEW MEXICO

Dear Kellie Jones:

Souder Miller & Associates is pleased to submit the attached Final Closure Report of the remediation of the release site located on the Red Hills West SWD #001 in Eddy County, New Mexico. The purpose of the Final Report is to obtain approval from the New Mexico Oil Conservation Division (NMOCD) for the closure of the release that occurred on New Mexico State Land Office property on July 27, 2015.

Souder, Miller & Associates (SMA) responded at the request of Mewbourne Oil Company (MOC) to assess and delineate the release of production fluids associated with the Red Hills West SWD #001 well location. The release was initially reported to NMOCD by Mewbourne Oil Company on July 27, 2015 and was a result of a Lightning. The table below summarizes information regarding the release. Results of the assessment, delineation, and remedial activities follow in the attached closure report.

Table 1: Release information and Site Ranking

Name	Red Hills West SWD #001				
Location	Incident Number	API Number	Section, Township, Range		
	1RP-3771	30-025-40162	(Unit P)	Section 16	T 26S, R 32E NMPM
Estimated Date of Release	27-July-15				
Date Reported to NMOCD	27-July-15				
Reported by	Zach Thomas, MOC				
Land Owner	New Mexico State Land Office				
Reported To	NM Oil Conservation Division (NMOCD)				
Source of Release	Lightning Strike				
Released Material	Produced Water				
Released Volume	1900 bbls Produced Water				
Recovered Volume	1760 bbls Produced Water				
Net Release	140 bbls Produced Water				
Nearest Waterway	15 miles northeast of the Pecos River				

Depth to Groundwater	Estimated to be Greater than 100 feet
Nearest Domestic Water Source	Greater than 1,000 feet
NMOCD Ranking	0
SMA Response Dates	Initial: September 28, 2015 Mitigation Activities: August 4, 2015
Subcontractors	
Disposal Facility	
Estimated Yd^3 Contaminated Soil Excavated and Disposed	

Attached is a copy of the C-141 final located in Appendix B. For questions or comments pertaining to the release or the attached Closure Report please feel free to contact either of us.

Submitted by:

SOUDER, MILLER & ASSOCIATES

J. Austin Weyant

Austin Weyant
Project Scientist

Reviewed by:

Cynthia Gray, CHMM
Senior Scientist

FINAL CLOSURE REPORT FOR INCIDENT 1RP-3771

MEWBOURNE OIL COMPANY

RED HILLS WEST SWD #001

API# 30-025-40162

SECTION 16, T26S R32E, NMPM
LEA COUNTY, NM

Prepared for:
Mewbourne Oil Company
P.O. Box 7698
Tyler, TX 75711

Prepared by:
Souder, Miller & Associates
201 S. Halagueno
Carlsbad, NM 88221
575-689-7040

October 20, 2015
SMA Reference
5B23439 BG6

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1.0 Introduction

On behalf of Mewbourne Oil Company (MOC), SMA has prepared this report that describes the assessment, initial delineation, and mitigation of a release associated with the Red Hills West SWD #001 release site. The site is located in Section 16, T 26S, R 32E NMPM, Lea County, New Mexico, on land owned by the State of New Mexico. Figure 1 illustrates the vicinity and location of the site.

This report also documents the use of a "soil amendment for the treatment of brine affected sodic soils"(Evans SOS Environmental). DeSalt Plus^{tm} is a proprietary blend of additives Calcium, Nitrogen and surfactants produced by SOS Environmental INC see the MSDS sheet located in the appendix. DeSalt Plus^{tm} was applied to the effective area after a Site Relative Risk Assessment based on EPA 600-2.87 found the impacts of vertical migration of salt to ground water to be low in risk.

SMA does not distribute, apply or profit in any way from the DeSalt Plus soil Amendment, so any mention in this closure report is purely for documentation. SMA's has found through its 35 years of industry experience that similar compositions containing readily available calcium ionic source have proven to be effective, depending on site soil properties. While freshly contaminated sites are readily amendable with the application of chemicals, historic or older contaminated sites require specific preparations. Water is the main driving force for the removal of sodium species from the vegetation or plant root zone, degree and frequency of irrigation have critical effects on these types of remediation.

SMA used API AMIGO to support the conclusion that groundwater is not in immediate threat due to this release. This version of AMIGO uses a library of HYDRUS-1D unsaturated flow model results from southeastern New Mexico and a simple ground water mixing model to estimate chloride concentrations in the vadose zone and in an underlying water table aquifer see details in Appendix C.

2.0 Site Ranking and Land Jurisdiction

The release site is located approximately 15 miles northeast of the Pecos River, in an area owned by the State with an elevation of approximately 3,200 feet above sea level. After evaluation of the site using aerial photography and topographic maps, and NMOSE records depth to groundwater is estimated to be greater than 100 feet below ground surface (bgs).

SMA searched the New Mexico State Engineer's Office online water well database for water wells in the vicinity of the release. There are two wells located within a one mile radius of the site. Figure 1 depicts the site vicinity and Figure 2 shows the site itself. The physical location of this release is within the jurisdiction of NMOCD.

Based on the NMOCD Guidelines Ranking Criteria, this release location has been assigned a NMOCD ranking of 0 which requires a soil remediation standard of 10 parts per million (ppm) benzene, 50 ppm combined benzene, toluene, ethyl-benzene, and total xylenes (BTEX), and 5000 ppm total petroleum hydrocarbons (TPH). Table 1 illustrates site ranking rationale.

3.0 Assessment and Initial Results

On August 4th, August 13th, September 2nd, and September 16th 2015, after receiving 811 clearances, DFSI field personnel assessed the release area onsite with a backhoe, Photo Ionization Detector (PID), and a mobile chlorides titration kit. The potentially affected area was found to be approximately 1000 feet long and 200 feet wide.

The site delineation samples were taken to depths of six feet below surface grade (bgs). Bottom hole samples were found to exhibit only background levels of all contaminants of concern at approximately two feet (bgs) on the eastern area of the spill. The western portion contained the highest concentration of contaminants at depths below 2 foot (bgs), due to the proximity to the point of failure of the tank battery and site topography. For additional information on the initial soil results and site assessment, please refer to Field Screening Data provide by DFSI found in table 2A. Specific sample locations for all samples are depicted on Figure 2 (Sample Location Map) along with sampling details. Field screening results are noted in Table 2B in the appendices. All samples were collected and processed according to NMOCD soil sampling procedures.

Because the spilled material was limited to produced water and field screening did not indicate the presence of petroleum, the samples were sent under chain-of-custody protocols to Cardinal Analysis Laboratory for analysis for Total Chlorides using EPA Method 300.0. and method 8021B for BTEX.

4.0 Soil Remediation Summary

After the produce water release, Na^+ cations where present in overwhelming concentration displacing other cationic species, such as calcium, magnesium, and potassium from the soil structure. Adsorption of Na^+ species disperses soil particles, which subsequently diminishes the drainage characteristics of soil. The application of the soil amendment DeSalt Plus™ was intended to counter act this effect and allow the Cations (Na+) to leach with the Cl^- ions. Further irrigation with fresh water and rainfall helped leach Cl^- or Na^+ ions out of the soil system to a greater depth.

There were 26 separate DFSI supervised irrigation events on location. Each irrigation event ranged from 2 to 4 acre/inches of water applied. DFSI conducted field sampling on August 4th, August 13th, September 2nd, and September 16th 2015. The field samples collected on September 16th 2015 indicated that the Salt plume had moved low enough in the soil profile that capillary suction would not return it to the root zone. Once the field samples where confirmed MOC and DFSI withdrew heavy irrigation on the location. With the brine plume located in the soils B horizon, a meeting was scheduled with NMOCD and NMSLO to update and present the preliminary field data.

DFSI returned to the site on October 12, 2015 to begin the NMOCD requested soil column delineation of affected soils, with approval from area utilities owners via 811 and the NMOCD. DFSI continuously guided the soil bore activities by collecting composite soil samples for field screening with a mobile titration unit (EPA 4500) and a calibrated PID. In the western area of the spill is represented by AUGER BORE PT. 1 near the locations pad. Sample locations AUGER BORE PT. 2 and AUGER BORE PT. 3 are east of the location in the affected pasture shown in Figure 2.

The lab confirmed field data shown in figure 3 and 4 where collected by DFSI over the course of the remedial project and have been averaged represent specific depths and sample blocks all raw data is located (Appendix E).

5.0 Conclusions and Recommendations

The attached sample data confirms that the release affected pasture has been successful remediated. The vadose zone outside the lease meets all NMODC closure requirements. The brine water plume has been effectively isolated in the soils B-horizon or low permeability zone. Because of the soils sandy nature(BH—Berino-Cacique) of the area soil type there is a very low risk of capillary rise or the brine plume being drawn out of the B-horizon. The surface soil (top three feet) type is characterized by the USDA, “as well drained sandy deposits with little to no water holding capacity.” The locations B-horizon is characterized by the USDA, “as cemented material with very low water transitivity.”

Even though all assessments of the area and the spill have shown a low threat to groundwater resources SMA recommends some post spill monitoring of the locations vegetation. Revegetation is key to isolating the brine plume from the groundwater and minimizes or prevents water from infiltrating. The location has soils with the right physical properties and hydraulic characteristics to contain the brine plume. The reestablishment native vegetation to reduce even further the flux rate of water through the soils cemented B-horizon would only to lower the risk to groundwater even further. Under these conditions, the soil has more capacity to absorb and control moisture, thereby reducing the risk of leachate.

NMOCD Guidelines for Remediation of Leaks, Spills, and Releases have established the following action levels for contaminants of concern with a site ranking of 0: 10 ppm (mg/kg) Benzene, 50 ppm total BTEX, and 5000 ppm TPH. The release consisted of produced water and evidence of petroleum impacts was not found during the initial assessment and delineation.

Laboratory analytical results for all final closure samples collected were below NMOCD action levels for Benzene, BTEX, and TPH as well as below laboratory detection limits for the methods used. No further remedial activities are recommended.

Soil contaminant concentrations are illustrated in Figure 2. A summary of laboratory analytical results is included in Figure #6. Laboratory reports are included in Appendix C.

Photo documentation is available by request.

6.0 Closure and Limitations

The scope of our services consisted of the performance of a preliminary spill assessment, verification of release stabilization, regulatory liaison, and preparation of this Remediation Workplan. 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 575-689-7040 or Cindy Gray at 505-325-7535.

Submitted by:

SOUDER, MILLER & ASSOCIATES

Austin Weyant
Project Scientist

Reviewed by:

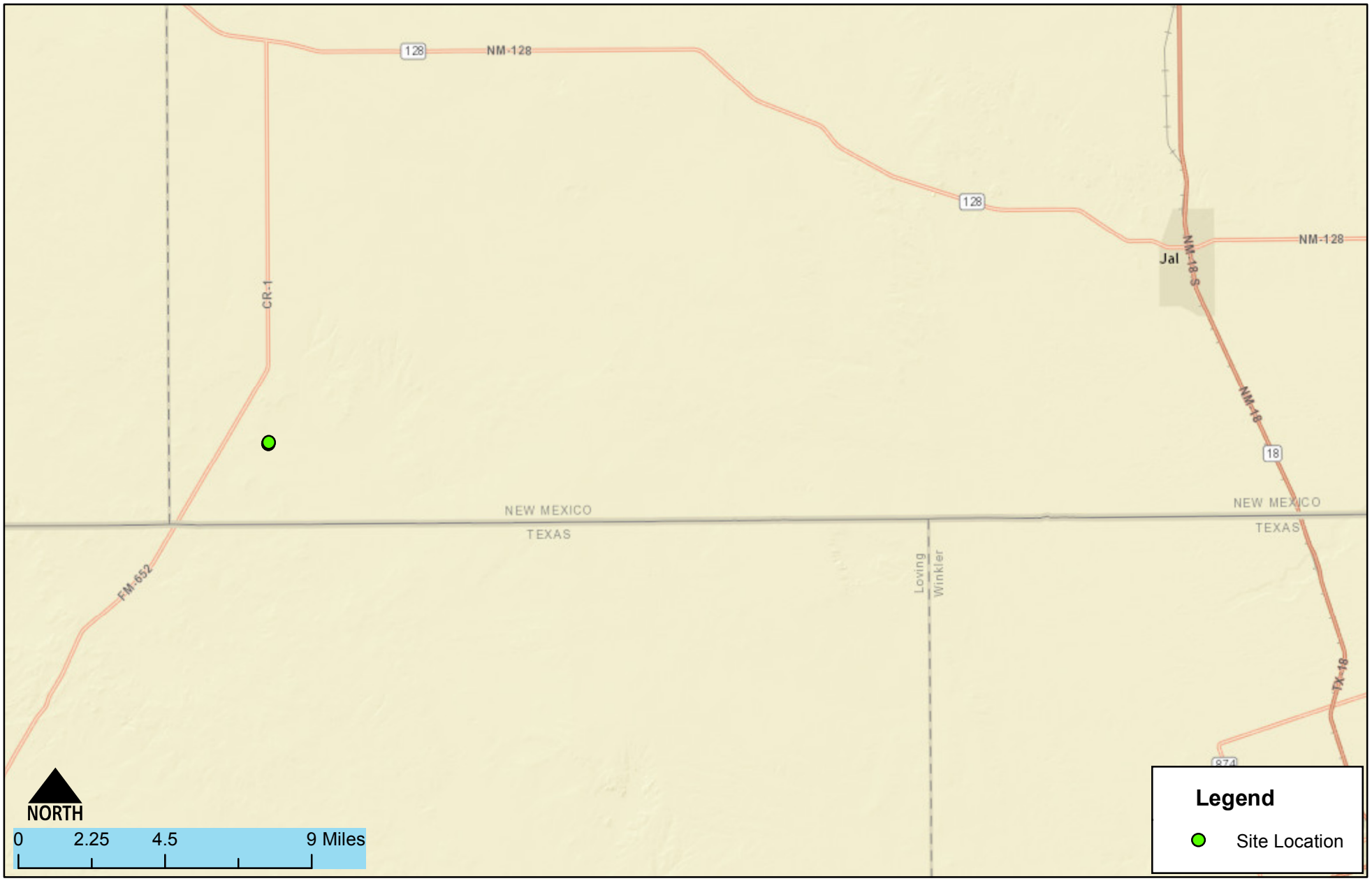
Cynthia Gray, CHMM
Senior Scientist

Figures:

Tables:

Appendices:

FIGURE 1
VICINITY MAP



Site Vicinity Map
Mewnourne -Red Hills West SWD
Jal, New Mexico

Figure 1

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Date Saved: 10/20/2015

Revisions
By: Date: Descr:
By: Date: Descr:

Drawn Lucas Middleton
Checked
Approved

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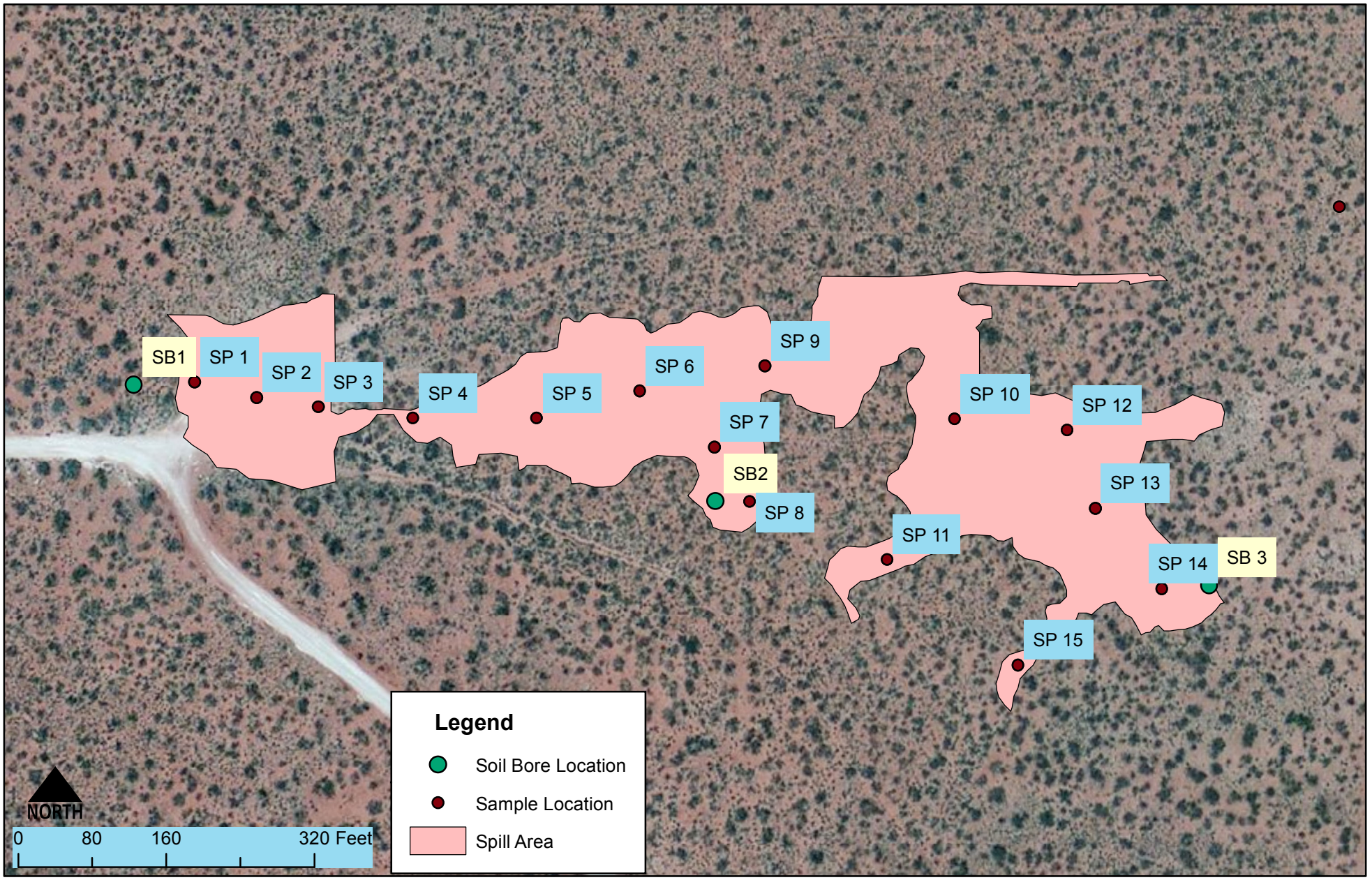
FIGURE 2

DETAILED SITE AND SAMPLE MAP



Detailed Site and Sample Map
Mewnourne -Red Hills West SWD
Jal, New Mexico

Figure 2

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FIGURE 3
AVERAGE CHLORIDE CONCENTRATION IN THE TOP 3 FT OVER TIME

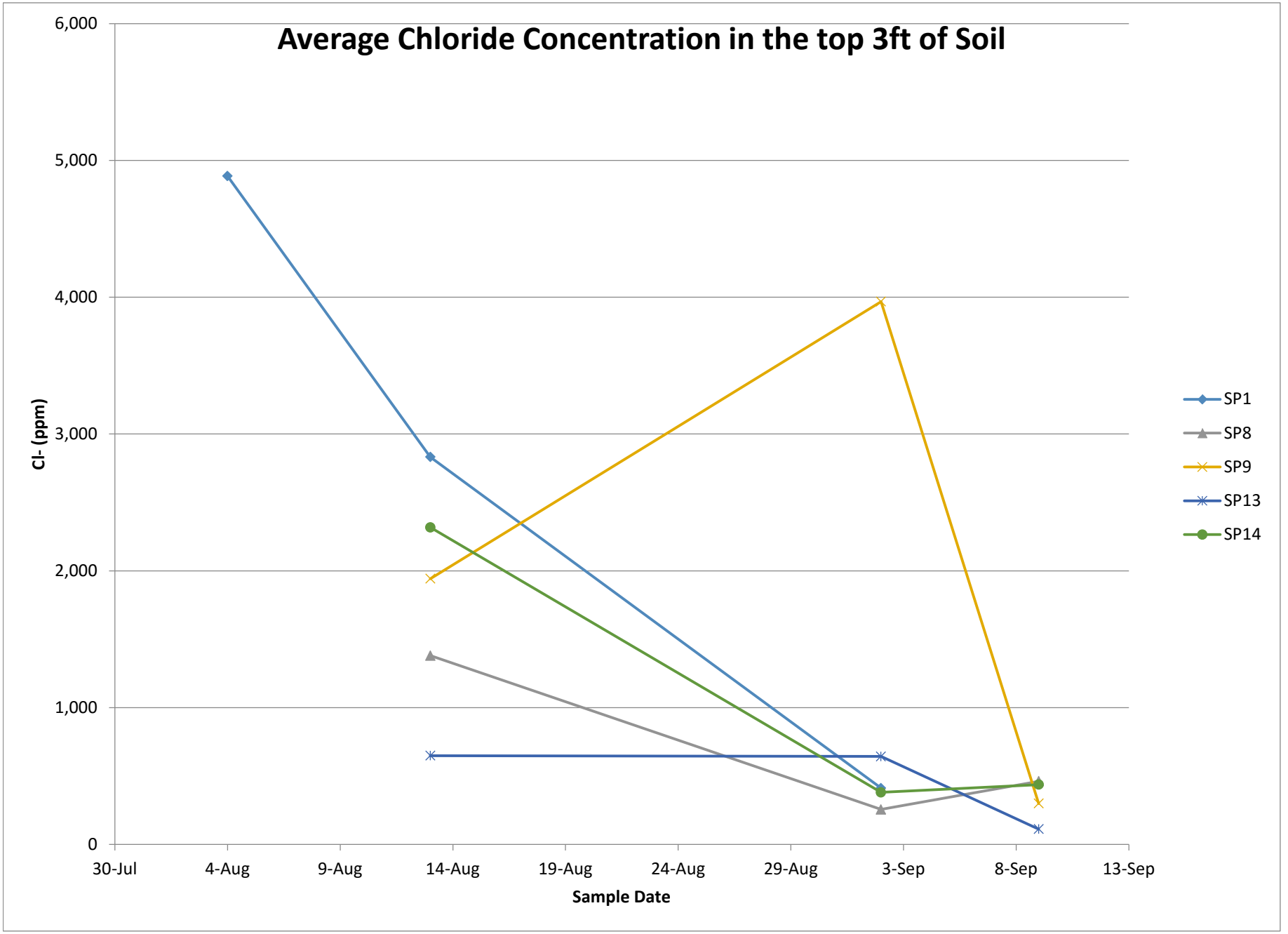
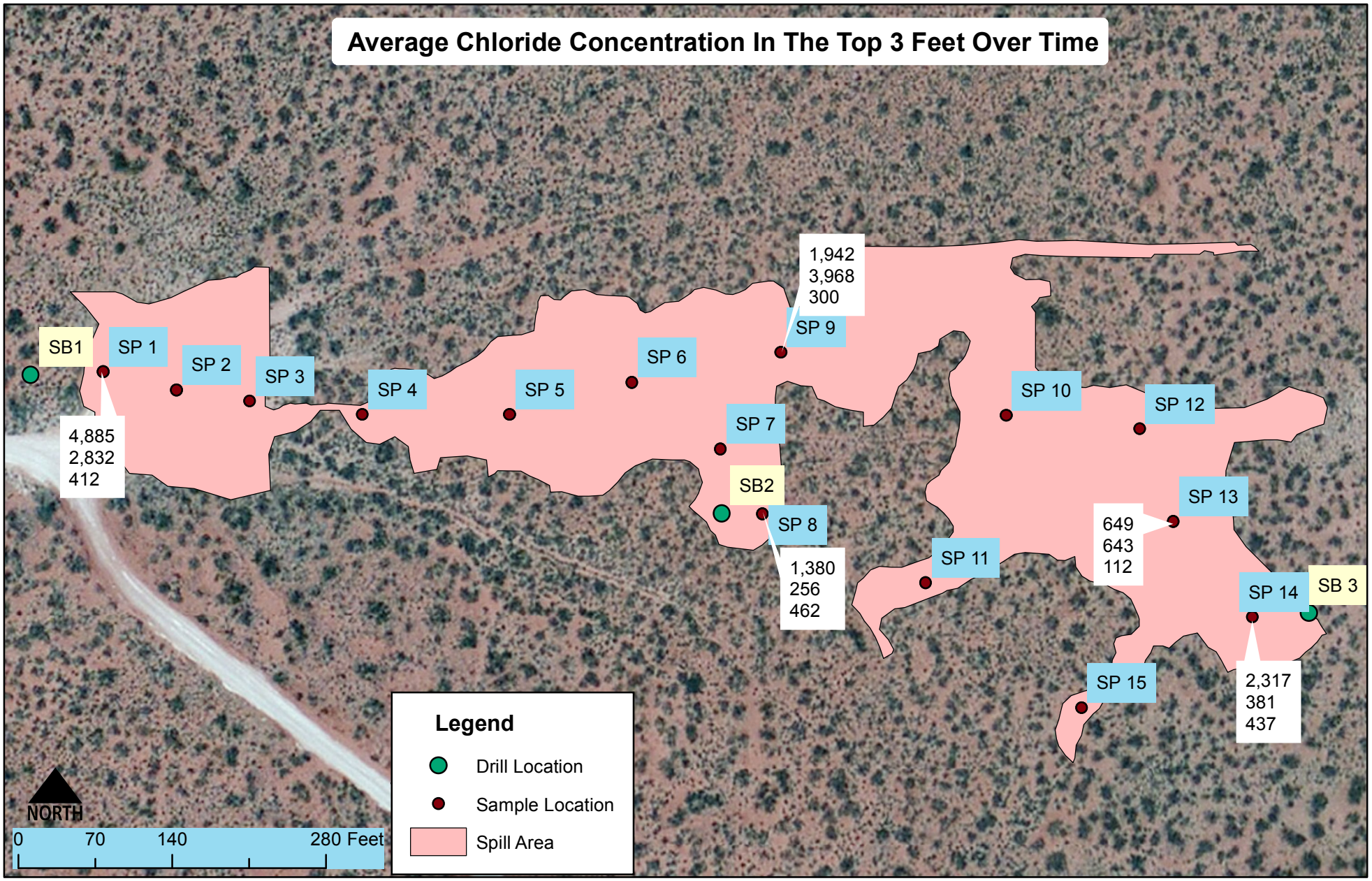

Average Chloride Concentration in the top 3ft of Soil
6,000
5,000
4,000
3,000
2,000
1,000
0
Cl- (ppm)
30-Jul
4-Aug
9-Aug
14-Aug
19-Aug
24-Aug
29-Aug
3-Sep
8-Sep
13-Sep
Sample Date
SP1
SP8
SP9
SP13
SP14

FIGURE 4
AVERAGE CHLORIDE SOIL MAP



Average Chloride Concentration In The Top 3 Feet Over Time
Mewnourne -Red Hills West SWD
Jal, New Mexico

Figure 4

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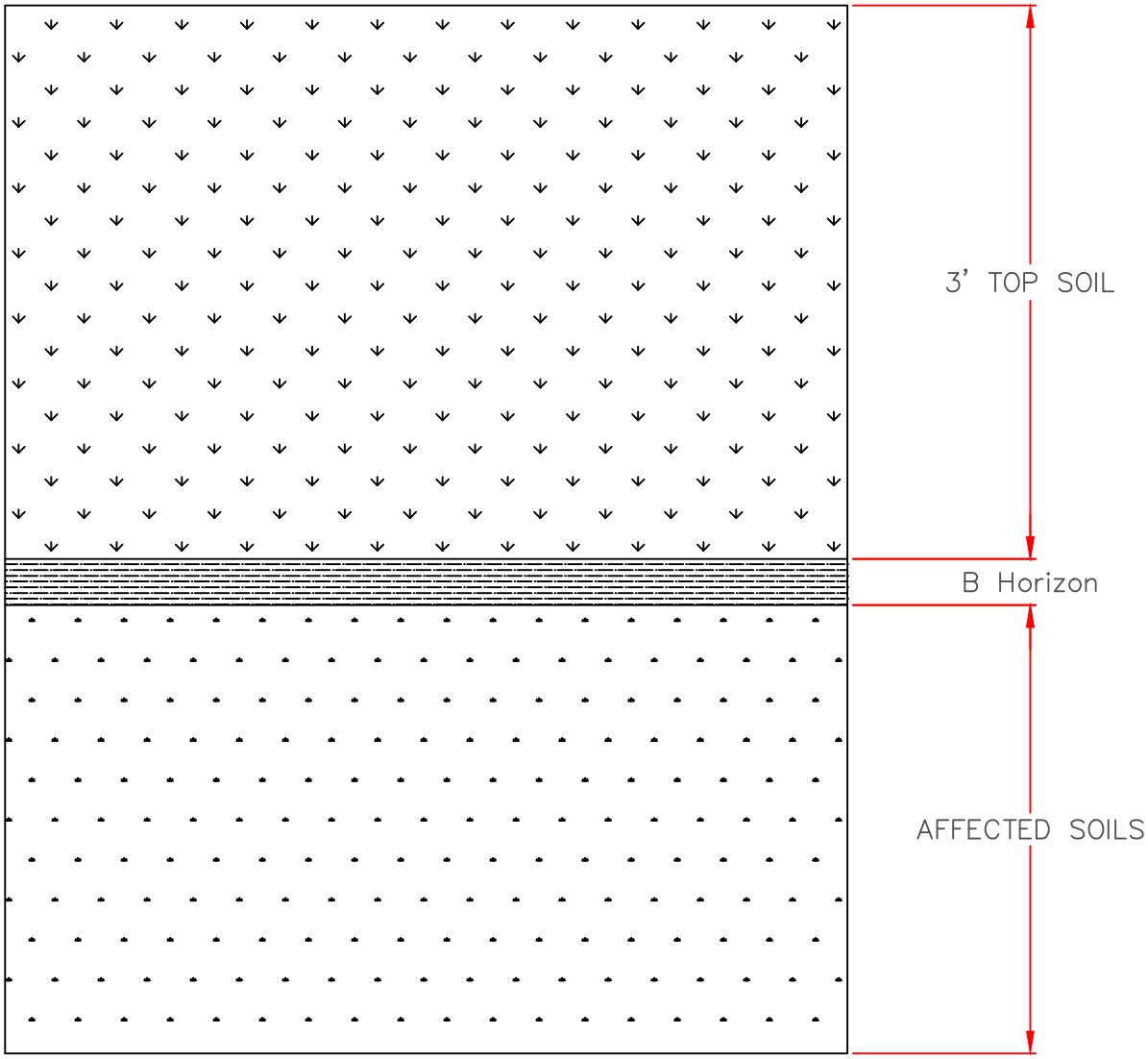
FIGURE 5

BIO BARRIER DESIGN AND DATA



SMA
Engineering
Environmental
Surveying

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Mewbourne

BIOBARRIER DESIGN
Mewbourne- Red Hills West SWD

Designed	Drawn	Checked
LM	GJF	JAW

Date: October 2015
Scale: Horiz: NA Vert: NA
Project No: 5B23439

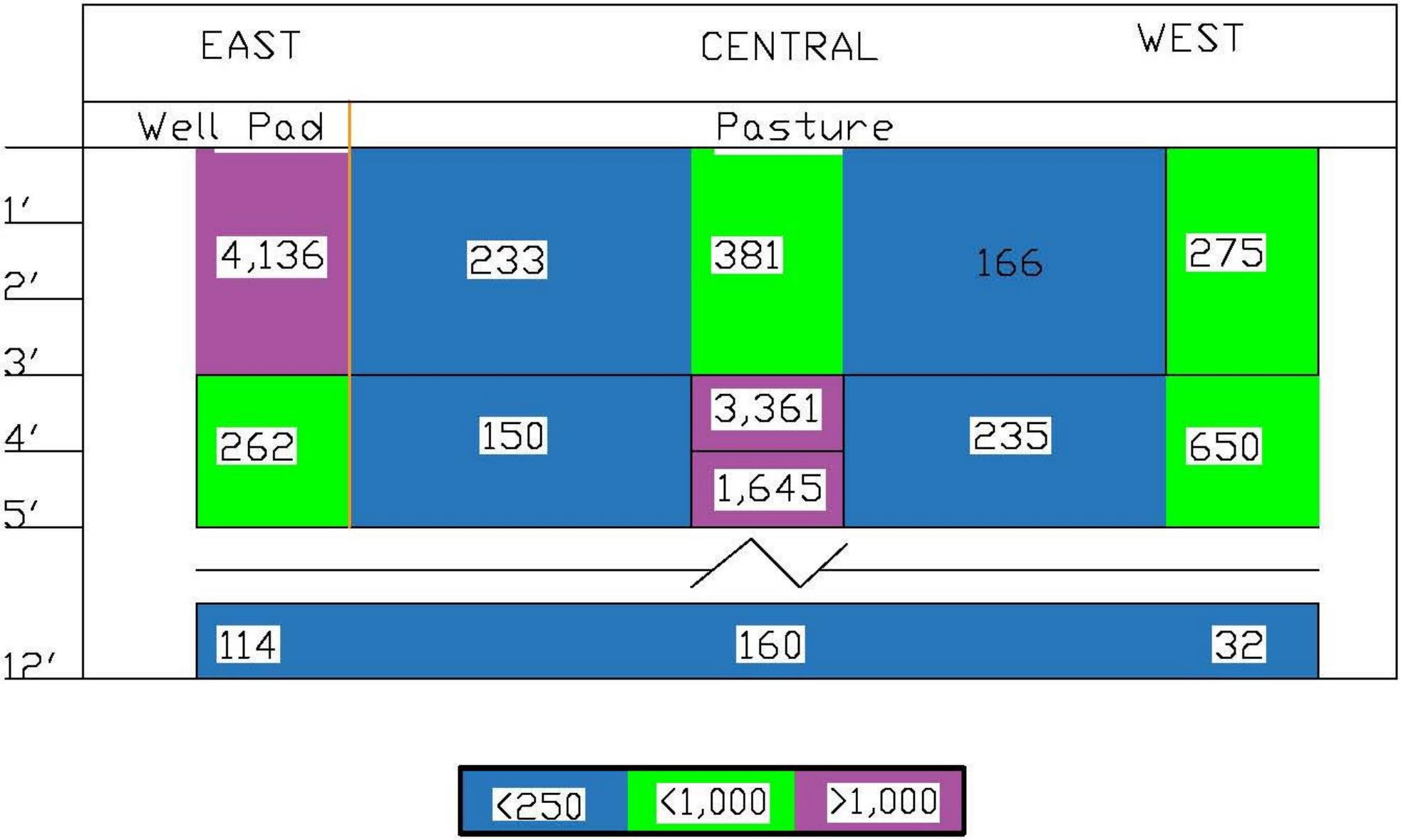
Figure 5

C:\Users\lcm\Documents\CAp design\red hills cap.dwg, LCM, 10/20/2015 3:37 PM

FIGURE 6

AFFECTED SOILS CROSS SECTION

Cross-Section of Affected Soil



Souder, Miller & Associates	Description: Cross-Section of Affected Soil at Red Hills West SWD	Date: 10/26/2015	Figure: 6
		Design By: LCM	Drawn By: LCM

FIGURE 7

EPA 4500 METHOD CORRELATION TO EPA METHOD 300 GRAPH

TABLE 1

RELEASE INFORMATION AND SITE RANKING

Table 2: Site Ranking

Depth to Groundwater	NMOCD Numeric Rank for this Site	Source for Ranking	Notes
< 50 BGS = 20		USGS Topo Maps; NMOSE Well search	All area well log water a greater than 100ft
50' to 99' = 10			
>100' = 0	0		
Ranking Criteria for Horizontal Distance to Nearest Surface Water	**NMOCD Numeric Rank for this Site**	**Source for Ranking**	**Notes**
< 200' = 20		USGS Topo Maps; Google Earth; PRCC Mapping Tool	Site located 15 Miles NE of the Pecos River
200' - 1000' = 10			
>1000' = 0	0		
Ranking Criteria for Horizontal Distance to a Water Well or Water Source	**NMOCD Numeric Rank for this Site**	**Source for Ranking**	**Notes**
<1000' from a water source? <200' from a private domestic water source? YES OR NO to BOTH. YES = 20, NO = 0		NM State Engineer Water Well Database	No wells within 2000ft of the location
	0		
Total Site Ranking	**0**		
Soil Remedation Standards	**0 to 9**	**10 to 19**	**>19**
Benzene	**10 PPM**	**10 PPM**	**10 PPM**
BTEX	**50 PPM**	**50 PPM**	**50 PPM**
TPH	**5000 PPM**	**1000 PPM**	**100 PPM**

TABLE 2

SITE RELITIVE RISK ASSESSMENT

Table 1: Screening for Assessment relative rist to groundwater			
Parameter	Rating	Weight	Score (R*W)
Chloride mass	4	10	40
Aquifer thickness	8	7	56
Depth to groundwater	5	3	15
Effective width or surface impact	3	3	9
Annual precipitation	1	2	2
Pan evaporationindex	1	2	2
Surface soil type top 3 ft	4	4	16
Slope	10	1	10
3 ft aquifer	4	5	20
Hydraulic conductivity of aquifer	4	4	16
Low- Moderate Risk		Total	186

TABLE 3

SUMMARY OF LABORATORY ANALYSES

Diversified Environmental Services

Company Name: MEWBOURNE SP Date: 8/4/2015
Location Name: RED HILLS SWD #1 Rel Date:

SP1	CHL	PID
SURF	16,744	6.2
1'	1624	8.2
2'	674	77.3
3'	499	104.5
4'	624	85.3
5'	624	29.4
6'	624	16.3

SP2	CHL	PID
6 INCHES	8622	258.4
1'	699	63.2
2'	624	90.4
3'	624	79.5
4'	1024	56.1
5'	649	8.6
6'	624	24.2

SP3	CHL	PID
6 INCHES	2374	53.7
1'	2124	62.4
2'	1749	74.8
3'	1449	64.8
4'	749	121.4
5'	624	64.4
6'	749	46.7
7'	674	5.7
8'	624	5.3

SP4	CHL	PID
SURF	874	3.7
1'	874	5.7
2'	3748	7.2
3'	4873	15.4

SP5	CHL

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

Diversified Environmental Services

Company Name: MEWBOURNE SP Date: 8/13/2015
Location Name: RED HILLS SWD Rel Date:

SP1	CHL	PID
1'	4873	48.2
2'	2124	36.8
3'	1499	12.4
4'	874	8.4

SP2	CHL	PID
1'	6622	0
2'	3323	0
3'	1674	0
4'	1249	0

SP3	CHL	PID
1'	1874	1.2
2'	2624	0.3
3'	3373	0
4'	3623	0

SP3A	CHL	PID
1'	1499	0
2'	2024	0
3'	1749	0
4'	1624	0

SP4	CHL
SURF	4498
1'	1999
2'	1299
3'	4373
4'	1749

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP5	CHL	PID
SURF	1274	128.3
1'	749	112.4
2'	2374	72.4
3'	774	72.1
4'	3373	68.4

SP6	CHL	PID
SURF	1799	283.6
1'	3024	142.4
2'	3423	128.6
3'	4748	84.3
4'	3373	75.4

SP7	CHL	PID
SURF	999	38.4
1'	4248	24.4
2'	3373	12.6
3'	3498	5.9
4'	3623	3.4

SP8	CHL	PID
SURF	1249	23.4
1'	1149	10.2
2'	2249	12.6
3'	874	8.6
4'	749	4.4

SP9	CHL
SURF	1374
1'	4023
2'	999
3'	1374
4'	999

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP10	CHL	PID
SURF	3873	5.6
1'	1999	0.8
2'	1624	0.3
3'	1374	0
4'	1499	0

SP11	CHL	PID
SURF	999	0
1'	674	0
2'	624	0

SP12	CHL	PID
SURF	1124	0
1'	624	0
2'	574	0

SP13	CHL	PID
SURF	1249	0
1'	649	0
2'	699	0

SP14	CHL	PID
SURF	4873	28.4
1'	2249	8.9
2'	1274	0.3
3'	874	0
4'	749	0

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP15	CHL	PID
SURF	2124	12.4
1'	1499	0.1
2'	699	0
3'	674	0

SP16	CHL	PID
SURF	1124	0
1'	749	0
2'	674	0

SP18	CHL	TPH

SP19	CHL	TPH

SP20	CHL	TPH

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

Diversified Environmental Services

Company Name: Mewborn SP Date: 9/2/2015

Location Name: Red Hills State SWD #1 Rel Date:

SP1	CHL	PID
Surface	275	30
1'	1,000	62.2
2'	275	69
3'	100	27
4'	100	0.2
5'	75	0.6

SP2	CHL	PID
Surface	650	0.2
1'	2,699	0
2'	1,600	0.1
3'	425	0
4'	1,000	0
5'	625	0

SP3	CHL	PID
Surface	1,175	0.3
1'	175	0.7
2'	200	0.9
3'	200	0.3
4'	150	0.4
5'	175	0.1

SP4	CHL	PID
Surface	175	0
1'	250	0
2'	225	0.8
3'	725	2.4
4'	1,325	0.7
5'	625	2.8

SP5	CHL
Surface	75
1'	100
2'	125
3'	100
4'	100
5'	100

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP6	CHL	PID
Surface	100	0
1'	450	0.2
2'	750	4.6
3'	1,025	11.2
4'	1,600	3.4
5'	1,375	0.9

SP7	CHL	PID
Surface	225	0.4
1'	175	0.5
2'	150	2.2
3'	150	0
4'	350	1.3
5'	950	0.3

SP8	CHL	PID
Surface	450	0
1'	200	0
2'	200	0
3'	175	0
4'	200	0
5'	250	0

SP9	CHL	PID
Surface	6,498	0
1'	3,349	0.2
2'	3,474	0.2
3'	2,549	0
4'	175	0.1
5'	1,000	0

SP10	CHL
Surface	3,249
1'	2,599
2'	3,499
3'	3,499
4'	2,974
5'	2,224

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

Diversified Environmental Services

Company Name: Mewbourne SP Date: 9/9/2015

Location Name: Red Hills State SWD #1 Rel Date:

SP1	CHL	PID
Surface	2,499	1.4
1'	2,724	37.1
2'	850	1.7
3'	175	1.3
4'	175	0.2
5'	150	0.2

SP2	CHL	PID
Surface	1,475	0
1'	15,995	2.6
2'	1,175	0.2
3'	3,899	0.2
4'	500	0
5'	225	0

SP3	CHL	PID
Surface	4,349	0.8
1'	425	0
2'	250	0.7
3'	225	0.1
4'	150	0
5'	125	0

SP4	CHL	PID
Surface	400	2.1
1'	150	6.2
2'	150	0.7
3'	75	0.7
4'	875	0.1
REFUSAL		

SP5	CHL
Surface	250
1'	100
2'	125
3'	125
4'	150
5'	125

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP16	CHL	PID
Surface	325	0.6
1'	400	0
2'	175	0.1
3'	125	0.5
4'	150	0.1
5'	275	0

SP17	CHL	PID

SP18	CHL	PID

SP19	CHL	PID

SP20	CHL	PID

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP11	CHL	PID
Surface	100	0
1'	700	0
2'	225	0
3'	125	0
4'	175	0
5'	125	0

SP12	CHL	PID
Surface	100	0
1'	100	0
2'	100	0.2
3'	100	0
4'	250	0.4
5'	2,199	0.1

SP13	CHL	PID
Surface	500	0
1'	1,025	1.3
2'	500	3.5
3'	550	3.5
4'	2,274	0
5'	800	0

SP14	CHL	PID
Surface	375	0.4
1'	300	0.3
2'	425	3
3'	425	2
4'	925	0.8

SP15	CHL	PID
Surface	325	0.7
1'	325	1.4
2'	300	1.3
3'	675	0.7
4'	525	0.1
5'	1,749	0.2

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP6	CHL	PID
Surface	750	0.1
1'	2,074	0
2'	650	1.9
3'	1,400	0.2
4'	500	0.2
REFUSAL		

SP7	CHL	PID
Surface	150	1.5
1'	975	1.6
2'	950	0.6
3'	150	1.4
4'	150	0
5'	125	0.1

SP8	CHL	PID
Surface	575	0
1'	2,424	0
2'	3,149	0
3'	350	0
4'	1,999	0
5'	1,645	0.1

SP9	CHL	PID
Surface	325	0.7
1'	250	0
2'	375	0
3'	250	0
4'	4,724	0
REFUSAL		

SP10	CHL
Surface	2,474
1'	1,749
2'	900
3'	175
4'	925
5'	450

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP11	CHL	PID
Surface	1,000	0.8
1'	125	2.5
2'	175	16.4
3'	200	10.3
4'	225	3.8
5'	250	14

SP12	CHL	PID
Surface	125	0.1
1'	150	0
2'	150	0
3'	125	0
4'	125	0
5'	125	0.4

SP13	CHL	PID
Surface	125	0.4
1'	75	0.3
2'	150	0.1
3'	100	0.1
4'	475	0.1
5'	575	0.2

SP14	CHL	PID
Surface	600	9
1'	775	1.8
2'	200	4
3'	175	0.1
4'	750	3.9
5'	800	0.3

SP15	CHL	PID
Surface	425	2.1
1'	325	0.1
2'	225	0
3'	225	0.2
4'	175	0.8
5'	125	0.1

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

SP16	CHL	PID
Surface	300	0.4
1'	175	0
2'	125	0.1
3'	100	0.2
4'	150	0.2
5'	100	0.7

SP17	CHL	PID

SP18	CHL	PID

SP19	CHL	PID

SP20	CHL	PID

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

APPENDIX A

LABORATORY ANALYTICAL REPORTS

CARDINAL Laboratories

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

August 29, 2015

ZACK THOMAS

MEWBOURNE OIL COMPANY

P. O. BOX 5270

HOBBS, NM 88240

RE: RED HILLS SWD #1

Enclosed are the results of analyses for samples received by the laboratory on 08/24/15 16:30.

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.

Cardinal Laboratories is accreditated 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

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name: Newborn
Project Manager: Zach Thomas
Address:
City: State: Zip:
Phone #: Fax #:
Project #: Project Owner:
Project Name: Newborn
Project Location: Red Hills West SWD #1
Sampler Name: Chris Flores

BILL TO
P.O. #:
Company: Diversified DFSI
Attn:
Address:
City:
State: Zip:
Phone #:
Fax #:

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	Chloride
H502242															
1	Frac Tank Water Sample		1						✓			✓	8-24-2015	10:30AM	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. 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 consequental 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.

Relinquished By: Date: 8-24-2015 Time: 4:30
Received By: Jodi Henson
Relinquished By: Date: Time:
Received By:

Delivered By: (Circle One)
Sampler - UPS - Bus - Other: 11.4°c

Sample Condition: Cool ☐ Yes ☐ No; Intact ☑ Yes ☐ No
CHECKED BY: (Initials)

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:
email to: lcrenshaw@diversifiedfsi.com
malves@diversifiedfsi.com
mburton@diversifiedfsi.com
mpatterson@diversifiedfsi.com
cflores@diversifiedfsi.com

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

#54

CARDINAL Laboratories

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

October 12, 2015

ZACK THOMAS

MEWBOURNE OIL COMPANY

P. O. BOX 5270

HOBBS, NM 88240

RE: RED HILLS STATE SWD #1

Enclosed are the results of analyses for samples received by the laboratory on 10/06/15 15:55.

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.

Cardinal Laboratories is accreditated 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,

Mike Snyder For Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

MEWBOURNE OIL COMPANY
ZACK THOMAS
P. O. BOX 5270
HOBBS NM, 88240
Fax To: (575) 937-6252

Received:	10/06/2015	Sampling Date:	10/06/2015
Reported:	10/12/2015	Sampling Type:	Soil
Project Name:	RED HILLS STATE SWD #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: AUGER BORE PT. 1 @ 12' (H502644-01)

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	10/07/2015	ND	2.04	102	2.00	2.92	
Toluene*	<0.050	0.050	10/07/2015	ND	1.90	95.2	2.00	2.19	
Ethylbenzene*	<0.050	0.050	10/07/2015	ND	1.61	80.3	2.00	1.41	
Total Xylenes*	<0.150	0.150	10/07/2015	ND	5.63	93.8	6.00	0.660	
Total BTEX	<0.300	0.300	10/07/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID *106 %* *85.6-137*

Chloride, SM4500Cl-B mg/kg Analyzed By: AP

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	10/09/2015	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	10/08/2015	ND	207	103	200	1.36	
DRO >C10-C28	<10.0	10.0	10/08/2015	ND	237	119	200	0.539	

Surrogate: 1-Chlorooctane *89.2 %* *47.2-157*

Surrogate: 1-Chlorooctadecane *93.2 %* *52.1-176*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

MEWBOURNE OIL COMPANY
ZACK THOMAS
P. O. BOX 5270
HOBBS NM, 88240
Fax To: (575) 937-6252

Received:	10/06/2015	Sampling Date:	10/06/2015
Reported:	10/12/2015	Sampling Type:	Soil
Project Name:	RED HILLS STATE SWD #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: AUGER BORE PT. 2 @ 12' (H502644-02)

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	10/07/2015	ND	2.04	102	2.00	2.92	
Toluene*	<0.050	0.050	10/07/2015	ND	1.90	95.2	2.00	2.19	
Ethylbenzene*	<0.050	0.050	10/07/2015	ND	1.61	80.3	2.00	1.41	
Total Xylenes*	<0.150	0.150	10/07/2015	ND	5.63	93.8	6.00	0.660	
Total BTEX	<0.300	0.300	10/07/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID *106 %* *85.6-137*

Chloride, SM4500Cl-B mg/kg Analyzed By: AP

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**160**	16.0	10/09/2015	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	10/08/2015	ND	207	103	200	1.36	
DRO >C10-C28	<10.0	10.0	10/08/2015	ND	237	119	200	0.539	

Surrogate: 1-Chlorooctane *95.5 %* *47.2-157*

Surrogate: 1-Chlorooctadecane *100 %* *52.1-176*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

MEWBOURNE OIL COMPANY
ZACK THOMAS
P. O. BOX 5270
HOBBS NM, 88240
Fax To: (575) 937-6252

Received:	10/06/2015	Sampling Date:	10/06/2015
Reported:	10/12/2015	Sampling Type:	Soil
Project Name:	RED HILLS STATE SWD #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: AUGER BORE PT. 3 @ 12' (H502644-03)

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	10/07/2015	ND	2.04	102	2.00	2.92	
Toluene*	<0.050	0.050	10/07/2015	ND	1.90	95.2	2.00	2.19	
Ethylbenzene*	<0.050	0.050	10/07/2015	ND	1.61	80.3	2.00	1.41	
Total Xylenes*	<0.150	0.150	10/07/2015	ND	5.63	93.8	6.00	0.660	
Total BTEX	<0.300	0.300	10/07/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID *105 %* *85.6-137*

Chloride, SM4500Cl-B mg/kg Analyzed By: AP

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**32.0**	16.0	10/09/2015	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	10/08/2015	ND	207	103	200	1.36	
DRO >C10-C28	<10.0	10.0	10/08/2015	ND	237	119	200	0.539	

Surrogate: 1-Chlorooctane *101 %* *47.2-157*

Surrogate: 1-Chlorooctadecane *103 %* *52.1-176*

Cardinal Laboratories *=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

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

*=Accredited Analyte

Mike Snyder For Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name: Newbourne	BILL TO
Project Manager: Zach Thomas	P.O. #:
Address:	Company: Newbourne
City: State: Zip:	Attn: Zach Thomas
Phone #: Fax #:	Address:
Project #: Project Owner:	City:
Project Name: Newbourne	State: Zip:
Project Location: Red Hills State SWD #1	Phone #:
Sampler Name: Chris Flores	Fax #:

FOR LAB USE ONLY				MATRIX							PRESERV.			SAMPLING		ANALYSIS REQUEST												
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chloride	BTEX	TPH												
H502604																												
1	Auger Bore Point 1 @ 12'	G	1			✓					✓		10-6-2015	10:05 AM	X	X	X												
2	Auger Bore Point 2 @ 12'	G	1			✓					✓			11:35 AM	X	X	X												
3	Auger Bore Point 3 @ 12'	G	1			✓					✓			12:20 PM	X	X	X												

Relinquished By:	Date: 10-6-2015	Received By: Jodi Henson	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Time: 3:55	Received By:	Fax Result: ☐ Yes ☐ No Add'l Fax #:
	Date:		REMARKS: email to: lcrenshaw@diversifiedfsi.com malves@ mbarton@ mpatterson@ cflores@
Delivered By: (Circle One) Sampler - UPS - Bus - Other: 1.8°C	Time:	Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

#54

CARDINAL Laboratories

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

September 01, 2015

ZACK THOMAS

MEWBOURNE OIL COMPANY

P. O. BOX 5270

HOBBS, NM 88240

RE: RED HILLS WEST SWD #1

Enclosed are the results of analyses for samples received by the laboratory on 08/31/15 16:37.

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.

Cardinal Laboratories is accreditated 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

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

RUSH

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name: Newborn		BILL TO	
Project Manager: Zach Thomas		P.O. #:	
Address:		Company: Diversified DFSI	
City:	State: Zip:	Attn:	
Phone #:	Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name: Newborn		State: Zip:	
Project Location: Red Hills West SWD #1		Phone #:	
Sampler Name: Chris Flores		Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chloride
H502312															
1	West Frac Tank Water Sample	G	1						✓			✓	8-31-2015	3:20pm	X
2	East Frac Tank Water Sample	G	1						✓			✓	"	3:30pm	X

Relinquished By:	Date: 8-31-2015	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
	Time: 4:37		Fax Result: ☐ Yes ☐ No Add'l Fax #:
Relinquished By:	Date:	Received By:	REMARKS: email to: lcrenshaw@diversifiedfsi.com, malves@diversifiedfsi.com, mburton@diversifiedfsi.com, mpatterson@diversifiedfsi.com, cflores@diversifiedfsi.com
	Time:		

Delivered By: (Circle One)
Sampler - UPS - Bus - Other: 30.6°C

Sample Condition: Cool ☐ Yes ☑ No; Intact ☑ Yes ☐ No

CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2826

#54

APPENDIX B
FORM C141 FINAL

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: Mewbourne Oil Company	Contact: Zack Thomas
Address: PO Box 5270 Hobbs NM 88241	Telephone No. 575-393-5905
Facility Name: Red Hills West SWD #1	Facility Type: Salt Water Disposal

Surface Owner: State	Mineral Owner: State	API No. 30-025-40162

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
P	16	26S	32E	700'	South	690'	East	Lea

Latitude 32.0375328 **Longitude** -103.6736145

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release: estimated 1900 bbls PW	Volume Recovered: 1760 bbls PW
Source of Release: Tank Battery	Date and Hour of Occurrence 7-27-15	Date and Hour of Discovery 7-27-15 5:00 pm
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Kellie Jones (NMOCD) & Shelly Tucker (BLM) & Ian Dolly (SLO)	
By Whom? Zack Thomas	Date and Hour 7-29-15 8:00 am	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

Lightning struck fiberglass tank causing fire to destroy entire SWD storage facility. Jal VFD responded and extinguished the fire. All transfer pumps associated with this SWD were shut off.

Describe Area Affected and Cleanup Action Taken.*

Affected area- pad surface and approximately 300 yards East of pad. Vacuum trucks were used to recover all standing fluid. For complete details of the remediation reference closure report dated October 20, 2015.

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: Z. Thomas

Printed Name: Zack Thomas

Title: Environmental Rep.

E-mail Address: zthomas@mewbourne.com

Date: 10-20-15 Phone: 575-602-2188

OIL CONSERVATION DIVISION

Approved by Environmental Specialist:

Approval Date: Expiration Date:

Conditions of Approval: Attached ☐

* Attach Additional Sheets If Necessary

Appendix C:
API Amigo Summary

AMIGO

New File | Choose File | No file chosen | Save | Quick Start | Manual | AMIGO

Units

Metric (m) / English (inches)

Climate

Arid Hot (NM/W.Texas, Hobbs)

Input for a Distant Well

Distance to Well	1000	[ft]
Source Width	3.28	[ft]
Longitudinal Dispersivity	10	[-]
Transverse Dispersivity	1	[-]

Groundwater Characterictics

Background Cl Concentration in Aquifer	cGW =	285	[mg/L]
Aquifer porosity	n =	0.3	[-]
Groundwater Table Depth	D =	100	[ft]
Aquifer Thickness	H =	35.84	[ft]
Slope of Water Table	i =	0.05	[-]
Hydraulic Conductivity	Ks =	3.28	[ft/d]
Groundwater Flux	Q =	5.88	[ft2/d]

Source Characteristics

Chloride Load: M = 0.032 [kg/m2]

Max. length of the spill in direction of GW flow: L = 1000 [ft]

Plant Uptake Trigger

1% Input Concentration

10% Input Concentration

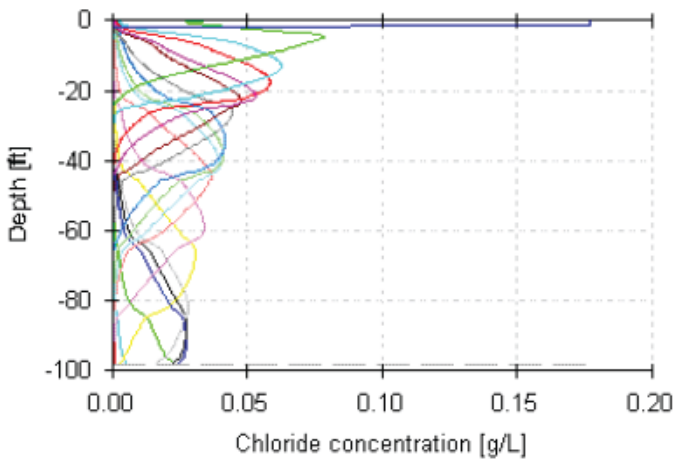
Soil Profiles

Surface Layer: Medium Sand

Soil Profile: P4 - Caliche (1) + Medium Sand (5)

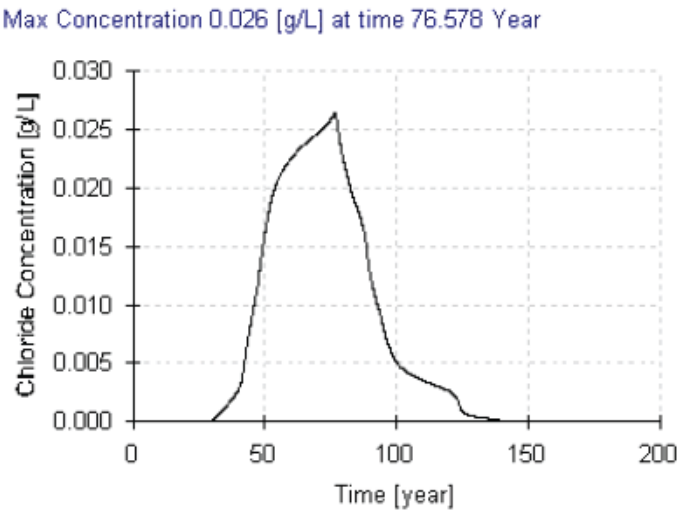
Output Charts

Quantity 1: Chloride concentration [g/L]



Reduce | Display All | Legend | Export | Export All

Quantity 2: Chloride Concentration [g/L]



Refresh | Auto-Refresh | Export | Export All