FINAL

PRODUCED WATER SPILL SITE ASSESSMENT REPORT

WEST LOVINGTON UNIT #099
PRODUCED WATER SPILL SITE
LEA COUNTY, NEW MEXICO

Prepared for
Chevron Mid-Continent Business Unit (MCBU)

Project No: 60591818
January 31, 2019

AECOM Technical Services, Inc.
9400 Amberglen Blvd.
Austin, Texas 78729
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1.0 INTRODUCTION

On behalf of Chevron Mid-Continent Business Unit (MCBU), AECOM Technical Services, Inc. (AECOM) has prepared this Site Assessment Report to describe the assessment activities conducted to characterize potential impacts to environmental media (soil and groundwater) resulting from a produced water spill that occurred at the West Lovington Unit #099 injection well site (the Site) on August 24, 2018. The primary objectives of the site assessment were to delineate the vertical and horizontal extent of chloride-impacted soil resulting from the produced water spill and to evaluate the potential for chloride impact to groundwater.

2.0 BACKGROUND

The Site is located at Latitude 32.8548012, Longitude -103.3835907, approximately 2 miles west of the intersection of New Mexico Highway 483 and West Stiles Road, and approximately 6.5 miles southwest of Lovington, New Mexico (Figure 1). The Site ground surface elevation is approximately 3,900 feet (ft) above mean sea level and local topography slopes slightly to the south (Figure 2).

On August 24, 2018, a minor release of approximately 19.5 barrels (bbls) of produced water, with a dissolved chloride concentration greater than 10,000 milligrams per liter (mg/L), occurred at the Site as the result of internal corrosion of an injection line. As required by the New Mexico Oil Conservation Division (NMOCD) under 19.15.29 New Mexico Administrative Code (NMAC), Chevron's initial response to the release included:

- Stopping the release at the source;
- Securing the impacted soil area to protect human health and the environment;
- Containing the released produced water; and
- Recovering 12 bbls of produced water.

A Release Notification, Form C-141 dated September 6, 2018 was submitted to the NMOCD. The Form C-141 documents the responsible party, location of the release source, nature, and volume of the release, and initial response to the release. The Form C-141 for the West Lovington Unit #099 Site is provided as Appendix A.

3.0 INITIAL SITE ASSESSMENT/CHARACTERIZATION

The findings from an initial assessment/characterization of the Site are summarized below.

- Based on a Water Column/Average Depth to Water Report from the New Mexico Water Rights Reporting System (NMWRRS) for wells located within 1,500 meters (4,921 feet [ft]) of the Site, the shallowest potential depth to groundwater beneath the Site is 86 feet below ground surface (ft bgs) and the average depth to groundwater is 111 ft bgs. A copy of the Water Column/Average Depth to Water Report is attached as Appendix B.
- Approximately 19.5 bbls of produced water were released and 12 bbls were recovered. The underlying soils at the facility are composed of limestone and

clay and it seems unlikely that the remaining 7.5 bbls of released fluid would have resulted in chloride impact to groundwater.

- There are no continuously flowing watercourses or other significant watercourses within 300 ft of the Site.
- The Site is not located within 200 ft of any lakebed, sinkhole, or playa lake.
- The nearest occupied permanent residence, school, hospital, institution, or church is approximately five miles from the Site.
- There are no springs or wells used for domestic or stock watering purposes within 500 ft of the Site.
- There are no reported fresh water wells or springs within the 1,000 ft of the Site.
- No incorporated municipal boundaries or defined municipal fresh water well fields are located within five miles of the Site.
- No wetlands are present within 300 ft of the Site.
- No subsurface mines are located beneath the Site.
- No karst geology features or other unstable areas are known to be located near the Site.
- A 100-year floodplain was not identified near the Site.
- All operations near the Site are for oil and gas exploration, development, production, or storage only, and no impact to areas that are not on an exploration, development, production, or storage site are expected.
- Figure 1 shows the location of the Site and surrounding area on an aerial photograph. Based on information obtained during the initial desktop assessment/characterization, and the volume of produced water released and recovered, no impact to groundwater, surface water, springs, or other sources of fresh water is currently suspected. However, sampling is required to characterize the extent of potential chloride impacts to soil at the Site.

4.0 SOIL ASSESSMENT

On December 14, 2018, AECOM and drilling subcontractor Harrison & Cooper Incorporated (HCI) drilled five soil borings to a depth of 30 feet below ground surface (ft bgs) using an air rotary rig. The first soil boring (Boring #1)was drilled near the suspected center of the release area, approximately 10 ft west of the WLU #099 injection well. The four additional borings were drilled 30 to 35 ft in each cardinal direction from the first boring. Due to the hard rock subsurface at the Site, soil samples could not be collected using split-spoon sampling equipment. During the drilling activities, soil cuttings were retrieved at 5-ft to 10-ft depth intervals for lithological logging and field screening purposes. An electrical conductivity (EC) meter was used to field screen the soil cuttings to help determine sample depths for laboratory

analysis. Four soil samples from each boring were selected for laboratory analysis. In addition to a surface sample and total depth sample, two other depth intervals from each boring were selected for laboratory analysis based on the EC field screening results. The soil samples were submitted to Xenco Laboratories in Midland, Texas for chloride analysis by Method U.S. Environmental Protection Agency (EPA) 300.0. The EC field screening data and chloride soil sample results are presented in Table 1. Soil boring locations and laboratory analytical results are shown on Figure 3. The laboratory analytical report is included as Appendix C. Soil boring logs are provided as Appendix D and a photo log from site activities is provided as Appendix E.

5.0 SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

None of the soil samples exhibited chloride concentrations greater than the 10,000 mg/kg limit specified in NMAC 19.15.29.12 Table 1 for groundwater at depths between 51 and 100 ft. The highest reported chloride concentration was 898 milligrams per kilogram (mg/kg) for the 10 ft bgs sample collected at boring #3, located approximately 38 ft south of the WLU #99 injection well (Figure 3). Deeper vertical delineation soil samples from boring #3 exhibited chloride concentrations of 105 mg/kg and 93.4 mg/kg at depths of 15 and 30 ft bgs, respectively. Chloride was not reported at concentrations greater than 600 mg/kg in borings #1, #2, #4, and #5. Based on the analytical results for samples collected from boring #3, the vertical extent of chloride impact to soil has been delineated to below 600 mg/kg as required by the NMOCD under 19.15.29.11 NMAC.

The soil assessment results indicate that current Site conditions do not pose a significant threat for potential impact to groundwater underlying the Site. Therefore, no further action is recommended for the Site based on the following:

- The vertical and horizontal extent of chloride-impacted soil has been delineated as required by the NMOCD under 19.15.29 NMAC.
- Reported chloride concentrations do not exceed 600 mg/kg below a depth of 10 ft bgs, which provides a separation distance of 76 ft between the elevated soil chloride concentrations and anticipated minimum depth to groundwater beneath the Site.

6.0 REFERENCES CITED

AECOM Technical Services (AECOM), November 2018. Chevron Draft Site Sampling Plan, West Lovington Unit (WLU) #099. November 21.

New Mexico Water Rights Reporting System (NMWRRS), September 2018. New Mexico Office of the State Engineer Water Column/Average Depth to Water Report. September 21.

New Mexico Administrative Code (NMAC). Title 19 Natural Resources and Wildlife Chapter 15 Part 29 Table 1.

U.S. Geological Survey (USGS), 1985. Lovington SW Quadrangle, New Mexico-Lea County. 7.5 Minute Series (Topographic).

TABLES

Table 1
Soil Analytical Results and Electrical Conductivity Field Measurements

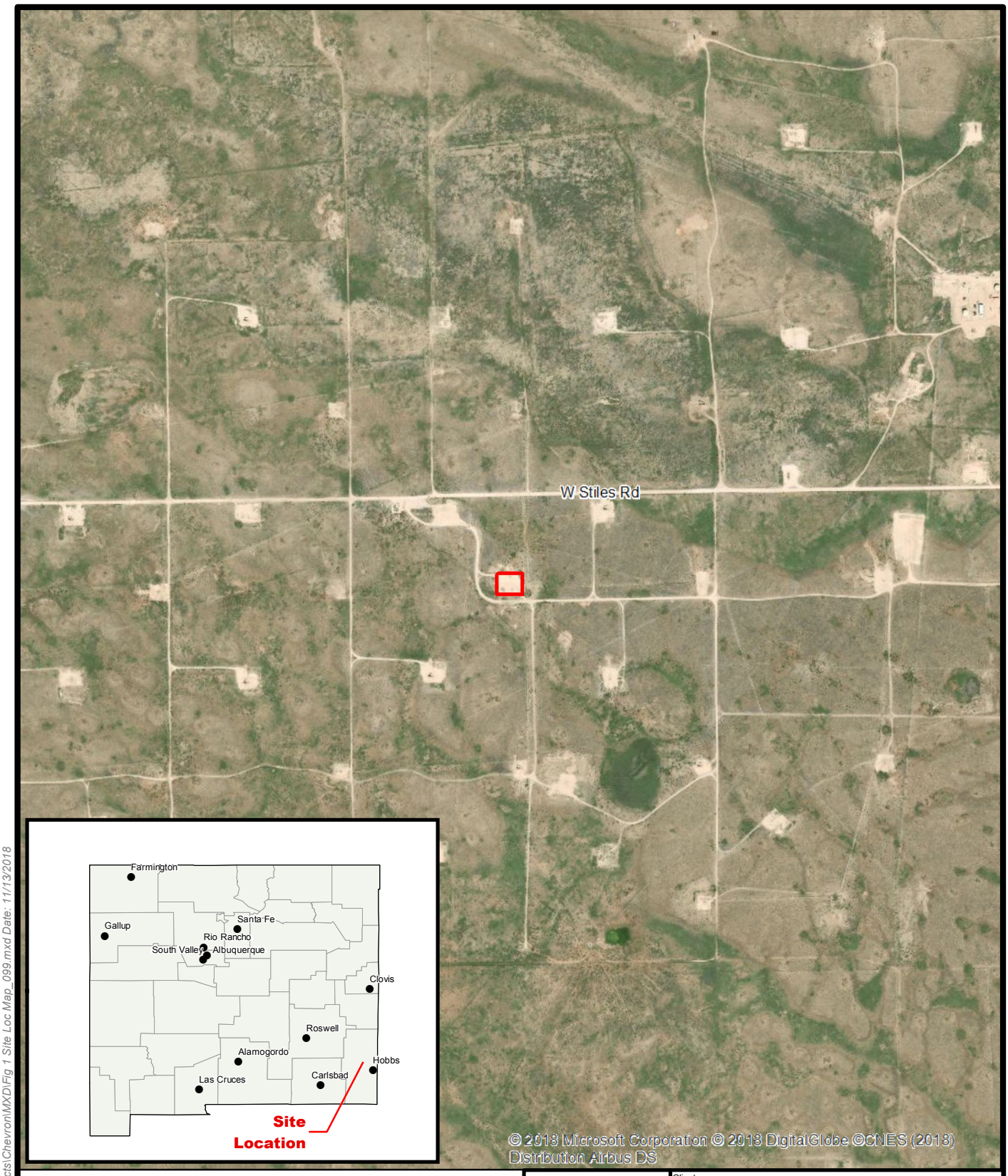
Table 1. Soil Analytical Results and Electrical Conductivity Field Measurements

Sample Location	Depth (ft bgs)	Chloride (mg/kg)	EC (mS/cm)
Soil Boring #1	Surface	<4.95 U	124.5
	5	NS	35.2
	10	21.5	38.4
	15	<4.95 U	31.2
	30	24.2	30.2
Soil Boring #2	Surface	31.3	89.2
	5	NS	84.9
	10	103	36.8
	15	298	172.0
	30	63.2	40.4
Soil Boring #3	Surface	<5.00 U	51.2
	5	NS	21.3
	10	898	432.0
	15	105	211.0
	30	93.4	131.8
Soil Boring #4	Surface	344	1065.0
	5	NS	36.7
	10	24.8	61.8
	15	27.6	33.6
	30	24.4	57.3
Soil Boring #5	Surface	56.2	198.8
	5	NS	40.1
	10	32	33.5
	15	39.7	45.6
	30	26.5	31.4

Notes:
bgs = Below ground surface
cm = Centimeter
EC = Electrical Conductivity
ft = Feet
mg = Milligram
kg = Kilogram
mS = Millisiemen

FIGURES

Figure 1
Site Location Map



Legend

Site Area

N

1,000 500 0 1,000

Feet

AECOM

9400 Amberglen Blvd.
Austin, TX 78729
Phone: (512) 454-4797
Fax: (512) 419-5474

Client: Chevron MCBU
Lea County, New Mexico

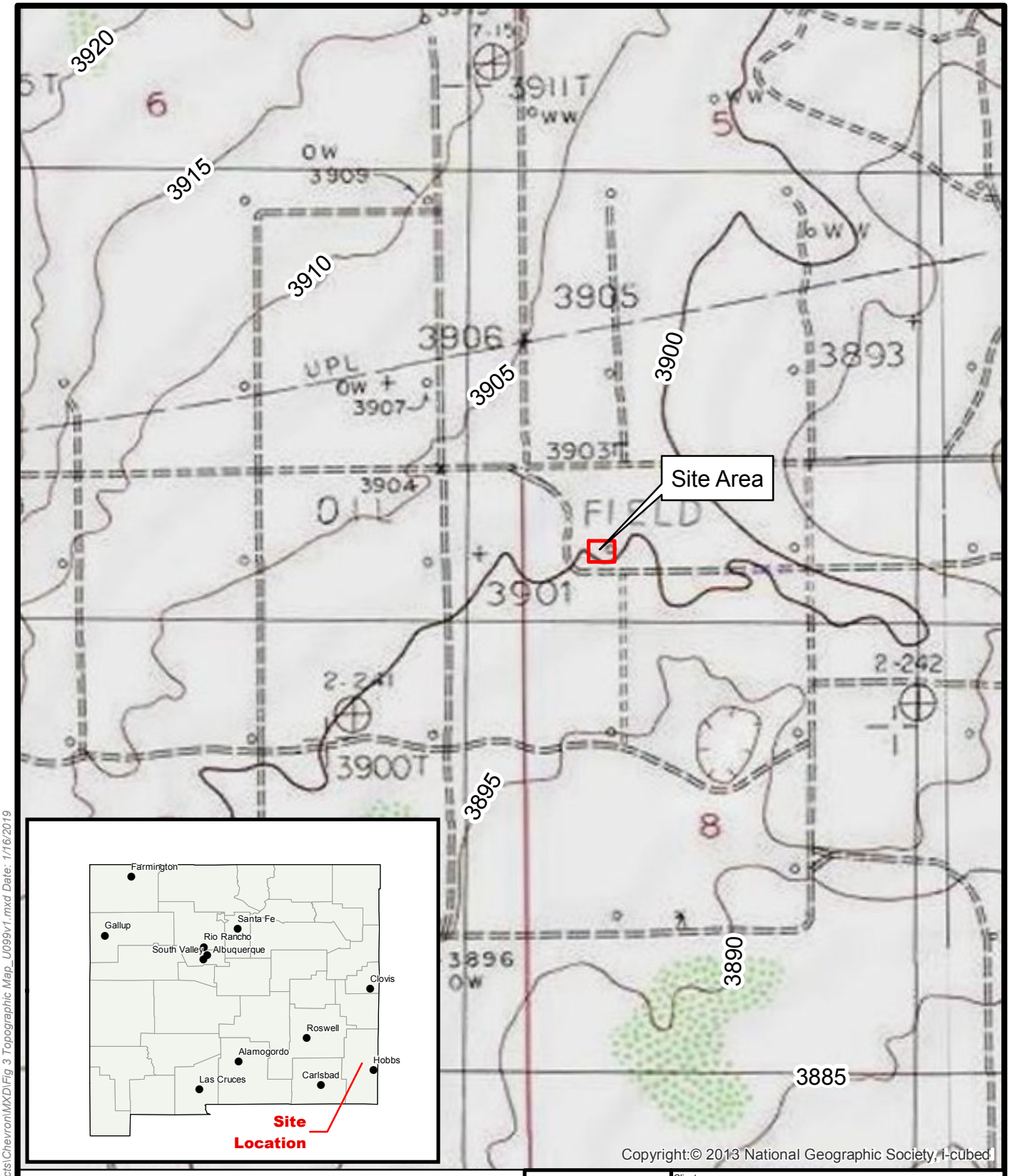
Report: West Lovington
Unit #099

Site Location Map

Drawn by:	Date:	GIS File:	Figure:
GWC/AUS	11/13/2018	Fig 1 Site Loc Map_099	1

Path: L:\AGE\GIS\AUS GIS\GIS_Projects\Chevron\MXD\Fig 1 Site Loc Map_099.mxd Date: 11/13/2018

Figure 2
Topographic Map from 7.5 Minute Series (Topographic) Lovington SW Quadrangle



Legend

Site Area

Contour Interval 5 feet

N

1,000 500 0 1,000

Feet

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Lea County, New Mexico

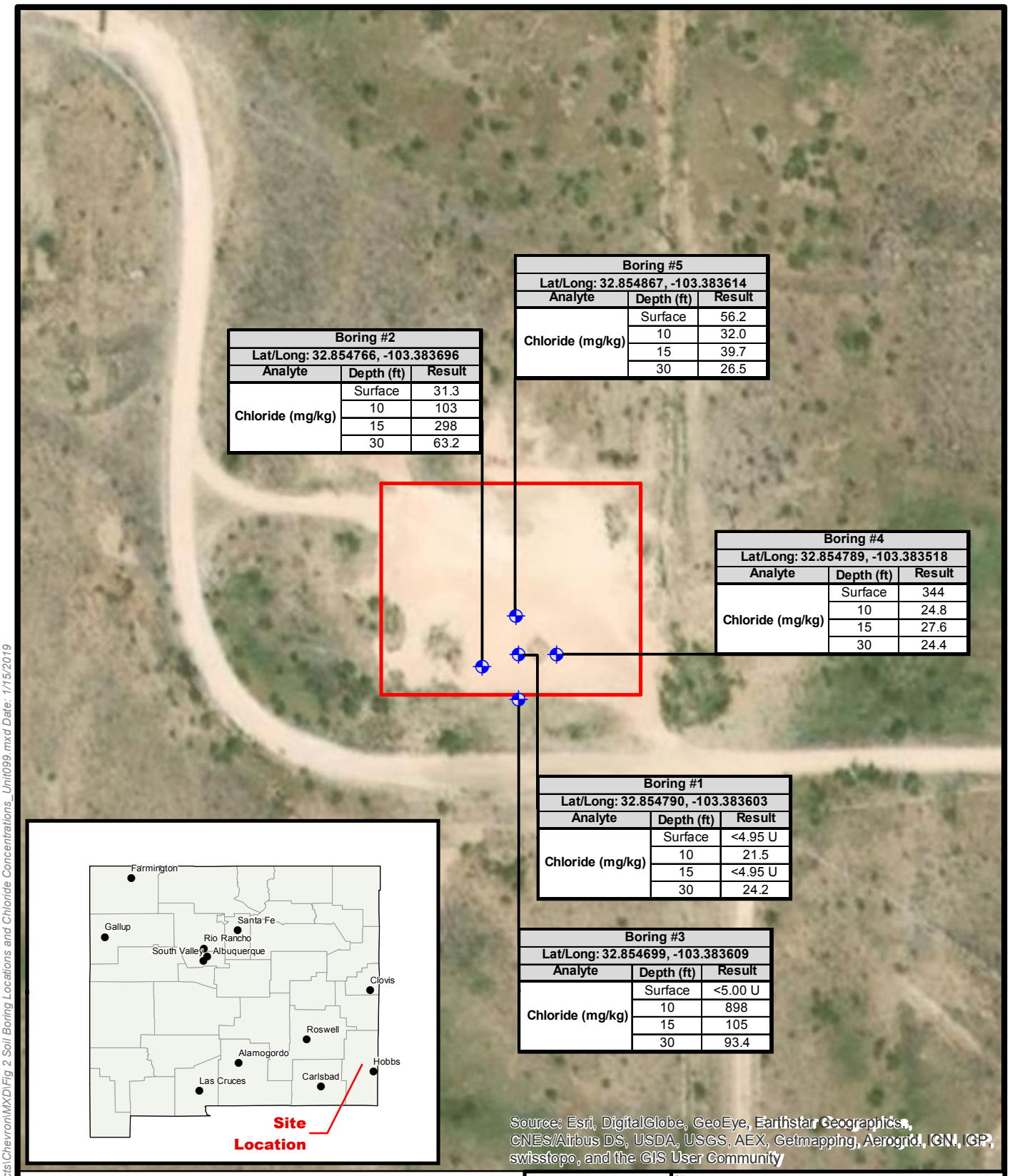
Report: West Lovington
Unit #099

**Topographic Map
from 7.5 Minute Series
(Topographic)
Lovington SW Quadrangle**

Drawn by:	Date:	GIS File:	Figure:
GWC/AUS	1/16/2019	L:\AGE\GIS\AUS GIS\GIS_Projects\Chevron\MXD\Fig 2 Site Produced WaterSpillSite_Unit099.mxd	2

Path: L:\AGE\GIS\AUS GIS\GIS_Projects\Chevron\MXD\Fig 3 Topographic Map_U099v1.mxd Date: 1/16/2019

Figure 3
Soil Boring Locations and Chloride Concentrations



Path: L:\AGE\GIS\AUS GIS\GIS_Projects\Chevron\MXD\Fig 2 Soil Boring Locations and Chloride Concentrations_Unit099.mxd Date: 1/15/2019

AECOM
9400 Amberglen Blvd.
Austin, TX 78729
Phone: (512) 454-4797
Fax: (512) 419-5474

Client: Chevron MCBU
Lea County, New Mexico

Report: West Lovington
Unit #099

Soil Boring Locations and Chloride Concentrations

Drawn by:	Date:	GIS File:	Figure:
GWC/AUS	1/15/2019	L:\AGE\GIS\AUS GIS\GIS_Projects\Chevron\MXD\Fig 2 Site Produced WaterSpillSite_Unit099.mxd	3

APPENDICES

Appendix A
Form C-141, West Lovington Unit #099

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

State of New Mexico
Energy Minerals and Natural Resources Department

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

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

Incident ID	
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party: **Chevron USA Inc.**	OGRID
Contact Name: **Josepha DeLeon**	Contact Telephone: **575-263-0424**
Contact email: **jdxd@chevron.com**	Incident # *(assigned by OCD)*
Contact mailing address: **1616 Bender Blvd., Hobbs, NM 88240**	

Location of Release Source

Latitude **32.8548012** Longitude **-103.3835907**
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: **West Lovington Unit #099**	Site Type: **Injection**
Date Release Discovered: **08/24/2018**	API# *(if applicable):* ***30-025-31521***

Unit Letter	Section	Township	Range	County
D	08	17S	36E	Lea

Surface Owner: ☐ State ☐ Federal ☐ Tribal ☒ Private (*Name:* _____)

Nature and Volume of Release

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

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☒ Produced Water	Volume Released (bbls): **19.50**	Volume Recovered (bbls): **12**
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☒ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)
Cause of Release **Internal corrosion on injection line.**		

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☐ Yes ☒ No	If YES, for what reason(s) does the responsible party consider this a major release? **N/A**
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? **N/A**	

Initial Response

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

☒ The source of the release has been stopped.

☒ The impacted area has been secured to protect human health and the environment.

☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.

☒ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:
N/A

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

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

Printed Name: **Josepha DeLeon** Title: **Environmental Compliance Specialist**

Signature: JdeLeon Date: September 6, 2018

email: jdxd@chevron.com Telephone: 575-263-0424

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

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

What is the shallowest depth to groundwater beneath the area affected by the release?	86 (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☐ Yes ☒ No

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

Characterization Report Checklist: ***Each of the following items must be included in the report.***

- ☐ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☐ Field data
- ☐ Data table of soil contaminant concentration data
- ☐ Depth to water determination
- ☐ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☐ Boring or excavation logs
- ☐ Photographs including date and GIS information
- ☐ Topographic/Aerial maps
- ☐ Laboratory data including chain of custody

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

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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

Printed Name: Amy Barnhill Title: Waste + Water Specialist

Signature: Amy Barnhill Date: 2-5-19

email: ABarnhill@Chevron.com Telephone: 432-687-7108

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

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Remediation Plan

Remediation Plan Checklist: ***Each of the following items must be included in the plan.***

- ☐ Detailed description of proposed remediation technique
- ☐ Scaled sitemap with GPS coordinates showing delineation points
- ☐ Estimated volume of material to be remediated
- ☐ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- ☐ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: ***Each of the following items must be confirmed as part of any request for deferral of remediation.***

☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.

☐ Extents of contamination must be fully delineated.

☐ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

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

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

☐ Approved ☐ Approved with Attached Conditions of Approval ☐ Denied ☐ Deferral Approved

Signature: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

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

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

☐ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☐ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☐ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Amy Barnhill Title: Waste & Water Specialist

Signature: Amy Barnhill Date: 2-5-19

email: ABarnhill@chevron.com Telephone: 432-687-7108

OCD Only

Received by: _____ Date: _____

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

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

Appendix B
Water Column/Average Depth to Water Report

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

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

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

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
L 00381	L	LE	1	4	1	08	17S	36E	651586	3636052*	445	110		
L 01723 S	L	LE	4	2	3	05	17S	36E	651767	3637060*	877	162	86	76
L 01723	L	LE	1	1	3	05	17S	36E	651164	3637252*	908	162	120	42
L 01723 S2	L	LE	1	2	3	05	17S	36E	651567	3637260*	964	140	120	20
L 01723 S3	L	LE	2	1	4	05	17S	36E	652170	3637268*	1298	140	118	22

Average Depth to Water: **111 feet**

Minimum Depth: **86 feet**

Maximum Depth: **120 feet**

Record Count: 5

UTMNAD83 Radius Search (in meters):

Easting (X): 651253.36 **Northing (Y):** 3636348 **Radius:** 1500

***UTM location was derived from PLSS - see Help**

Appendix C
Laboratory Report

Certificate of Analysis Summary 609121

AECOM, Austin, TX

Project Name: WLU 99

Project Id: 60591818
Contact: Kevin Pasternak
Project Location:

Date Received in Lab: Tue Dec-18-18 03:50 pm
Report Date: 27-DEC-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	609121-001		609121-002		609121-003		609121-004		609121-005		609121-006	
	Field Id:	Hole1-Surface		Hole1-10		Hole1-15		Hole1-30		Hole2-Surface		Hole2-10	
	Depth:	0-		10-		15-		30-		0-		10-	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Dec-14-18 09:32		Dec-14-18 09:35		Dec-14-18 09:37		Dec-14-18 09:40		Dec-14-18 09:52		Dec-14-18 09:53	
Chloride by EPA 300	***Extracted:***	Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45	
	Analyzed:	Dec-20-18 21:46		Dec-20-18 21:53		Dec-20-18 21:59		Dec-20-18 22:05		Dec-20-18 22:27		Dec-20-18 22:33	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		<4.95	4.95	21.5	4.99	<4.95	4.95	24.2	4.95	31.3	4.99	103	5.00

Jessica Kramer
Project Assistant

Certificate of Analysis Summary 609121

AECOM, Austin, TX

Project Name: WLU 99

Project Id: 60591818
Contact: Kevin Pasternak
Project Location:

Date Received in Lab: Tue Dec-18-18 03:50 pm
Report Date: 27-DEC-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	609121-007		609121-008		609121-009		609121-010		609121-011		609121-012	
	Field Id:	Hole2-15		Hole2-30		Hole3-Surface		Hole3-10		Hole3-15		Hole3-30	
	Depth:	15-		30-		0-		10-		15-		30-	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Dec-14-18 09:55		Dec-14-18 09:57		Dec-14-18 10:08		Dec-14-18 10:10		Dec-14-18 10:11		Dec-14-18 10:12	
Chloride by EPA 300	***Extracted:***	Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45		Dec-20-18 12:45	
	Analyzed:	Dec-20-18 22:54		Dec-20-18 23:00		Dec-20-18 23:07		Dec-20-18 23:13		Dec-20-18 23:19		Dec-20-18 23:25	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		298	4.95	63.2	5.00	<5.00	5.00	898	5.00	105	5.00	93.4	5.00

Jessica Kramer
Project Assistant

Certificate of Analysis Summary 609121

AECOM, Austin, TX

Project Name: WLU 99

Project Id: 60591818
Contact: Kevin Pasternak
Project Location:

Date Received in Lab: Tue Dec-18-18 03:50 pm
Report Date: 27-DEC-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	609121-013		609121-014		609121-015		609121-016		609121-017		609121-018	
	Field Id:	Hole4-Surface		Hole4-10		Hole4-15		Hole4-30		Hole5-Surface		Hole5-10	
	Depth:	0-		10-		15-		30-		0-		10-	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Dec-14-18 10:27		Dec-14-18 10:30		Dec-14-18 10:32		Dec-14-18 10:33		Dec-14-18 10:40		Dec-14-18 10:43	
Chloride by EPA 300	***Extracted:***	Dec-20-18 12:45		Dec-20-18 13:30		Dec-20-18 13:30		Dec-20-18 13:30		Dec-20-18 13:30		Dec-20-18 13:30	
	Analyzed:	Dec-20-18 23:31		Dec-20-18 21:09		Dec-20-18 21:40		Dec-20-18 21:50		Dec-20-18 22:21		Dec-20-18 22:32	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		344	4.95	24.8	5.00	27.6	5.00	24.4	4.95	56.2	4.95	32.0	4.95

Jessica Kramer
Project Assistant

Certificate of Analysis Summary 609121

AECOM, Austin, TX

Project Name: WLU 99

Project Id: 60591818
Contact: Kevin Pasternak
Project Location:

Date Received in Lab: Tue Dec-18-18 03:50 pm
Report Date: 27-DEC-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	609121-019		609121-020									
	Field Id:	Hole5-15		Hole5-30									
	Depth:	15-		30-									
	Matrix:	SOIL		SOIL									
	Sampled:	Dec-14-18 10:45		Dec-14-18 10:47									
Chloride by EPA 300	***Extracted:***	Dec-20-18 13:30		Dec-20-18 13:30									
	Analyzed:	Dec-20-18 22:42		Dec-20-18 22:52									
	Units/RL:	mg/kg	RL	mg/kg	RL								
Chloride		39.7	4.95	26.5	5.00								

Jessica Kramer
Project Assistant

Analytical Report 609121

for

AECOM

Project Manager: Kevin Pasternak

WLU 99

60591818

27-DEC-18

Collected By: Client

1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-18-28), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2017-142)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (T104704295-18-17), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-18-14)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-18-18)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-18-18)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-18-4)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Phoenix Mobile (EPA Lab Code: AZ00901): Arizona (AZM757)
Xenco-Atlanta (LELAP Lab ID #04176)
Xenco-Tampa: Florida (E87429)
Xenco-Lakeland: Florida (E84098)

27-DEC-18

Project Manager: **Kevin Pasternak**
AECOM
9400 Amberglen Blvd.
Austin, TX 78729

Reference: XENCO Report No(s): **609121**
WLU 99
Project Address:

Kevin Pasternak:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 609121. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 609121 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Jessica Kramer

Jessica Kramer
Project Assistant

Sample Cross Reference 609121

AECOM, Austin, TX

WLU 99

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
Hole1-Surface	S	12-14-18 09:32	0	609121-001
Hole1-10	S	12-14-18 09:35	10	609121-002
Hole1-15	S	12-14-18 09:37	15	609121-003
Hole1-30	S	12-14-18 09:40	30	609121-004
Hole2-Surface	S	12-14-18 09:52	0	609121-005
Hole2-10	S	12-14-18 09:53	10	609121-006
Hole2-15	S	12-14-18 09:55	15	609121-007
Hole2-30	S	12-14-18 09:57	30	609121-008
Hole3-Surface	S	12-14-18 10:08	0	609121-009
Hole3-10	S	12-14-18 10:10	10	609121-010
Hole3-15	S	12-14-18 10:11	15	609121-011
Hole3-30	S	12-14-18 10:12	30	609121-012
Hole4-Surface	S	12-14-18 10:27	0	609121-013
Hole4-10	S	12-14-18 10:30	10	609121-014
Hole4-15	S	12-14-18 10:32	15	609121-015
Hole4-30	S	12-14-18 10:33	30	609121-016
Hole5-Surface	S	12-14-18 10:40	0	609121-017
Hole5-10	S	12-14-18 10:43	10	609121-018
Hole5-15	S	12-14-18 10:45	15	609121-019
Hole5-30	S	12-14-18 10:47	30	609121-020

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3074055 Chloride by EPA 300

Lab Sample ID 609123-004 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered below QC limits in the Matrix Spike. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 609121-014, -015, -016, -017, -018, -019, -020.

The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole1-Surface**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-001	Date Collected:	12.14.18 09.32	Sample Depth:	0
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<4.95	4.95	mg/kg	12.20.18 21.46	U	1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole1-10**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-002	Date Collected:	12.14.18 09.35	Sample Depth:	10
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**21.5**	4.99	mg/kg	12.20.18 21.53		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole1-15**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-003	Date Collected:	12.14.18 09.37	Sample Depth:	15
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<4.95	4.95	mg/kg	12.20.18 21.59	U	1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole1-30**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-004	Date Collected:	12.14.18 09.40	Sample Depth:	30
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**24.2**	4.95	mg/kg	12.20.18 22.05		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole2-Surface**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-005	Date Collected:	12.14.18 09.52	Sample Depth:	0
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**31.3**	4.99	mg/kg	12.20.18 22.27		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole2-10**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-006	Date Collected:	12.14.18 09.53	Sample Depth:	10
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**103**	5.00	mg/kg	12.20.18 22.33		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole2-15**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-007	Date Collected:	12.14.18 09.55	Sample Depth:	15
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**298**	4.95	mg/kg	12.20.18 22.54		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole2-30**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-008	Date Collected:	12.14.18 09.57	Sample Depth:	30
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**63.2**	5.00	mg/kg	12.20.18 23.00		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole3-Surface**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-009	Date Collected:	12.14.18 10.08	Sample Depth:	0
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<5.00	5.00	mg/kg	12.20.18 23.07	U	1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole3-10**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-010	Date Collected:	12.14.18 10.10	Sample Depth:	10
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**898**	5.00	mg/kg	12.20.18 23.13		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole3-15**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-011	Date Collected:	12.14.18 10.11	Sample Depth:	15
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**105**	5.00	mg/kg	12.20.18 23.19		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole3-30**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-012	Date Collected:	12.14.18 10.12	Sample Depth:	30
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**93.4**	5.00	mg/kg	12.20.18 23.25		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole4-Surface**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-013	Date Collected:	12.14.18 10.27	Sample Depth:	0
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 12.45	Basis:	Wet Weight
Seq Number:	3073880				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**344**	4.95	mg/kg	12.20.18 23.31		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole4-10**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-014	Date Collected:	12.14.18 10.30	Sample Depth:	10
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 13.30	Basis:	Wet Weight
Seq Number:	3074055				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**24.8**	5.00	mg/kg	12.20.18 21.09		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole4-15**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-015	Date Collected:	12.14.18 10.32	Sample Depth:	15
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 13.30	Basis:	Wet Weight
Seq Number:	3074055				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**27.6**	5.00	mg/kg	12.20.18 21.40		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole4-30**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-016	Date Collected:	12.14.18 10.33	Sample Depth:	30
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 13.30	Basis:	Wet Weight
Seq Number:	3074055				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**24.4**	4.95	mg/kg	12.20.18 21.50		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole5-Surface**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-017	Date Collected:	12.14.18 10.40	Sample Depth:	0
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 13.30	Basis:	Wet Weight
Seq Number:	3074055				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**56.2**	4.95	mg/kg	12.20.18 22.21		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole5-10**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-018	Date Collected:	12.14.18 10.43	Sample Depth:	10
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 13.30	Basis:	Wet Weight
Seq Number:	3074055				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**32.0**	4.95	mg/kg	12.20.18 22.32		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole5-15**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-019	Date Collected:	12.14.18 10.45	Sample Depth:	15
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 13.30	Basis:	Wet Weight
Seq Number:	3074055				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**39.7**	4.95	mg/kg	12.20.18 22.42		1

Certificate of Analytical Results 609121

AECOM, Austin, TX

WLU 99

Sample Id:	**Hole5-30**	Matrix:	Soil	Date Received:	12.18.18 15.50
Lab Sample Id:	609121-020	Date Collected:	12.14.18 10.47	Sample Depth:	30
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	CHE			% Moisture:	
Analyst:	CHE	Date Prep:	12.20.18 13.30	Basis:	Wet Weight
Seq Number:	3074055				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**26.5**	5.00	mg/kg	12.20.18 22.52		1

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the quantitation limit and above the detection limit.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

SMP Client Sample **BLK** Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample **BKSD/LCSD** Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate **MS** Matrix Spike **MSD:** Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

QC Summary 609121

AECOM

WLU 99

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3073880 Matrix: Solid Date Prep: 12.20.18
MB Sample Id: 7668457-1-BLK LCS Sample Id: 7668457-1-BKS LCSD Sample Id: 7668457-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	262	105	272	109	90-110	4	20	mg/kg	12.20.18 20:19	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3074055 Matrix: Solid Date Prep: 12.20.18
MB Sample Id: 7668540-1-BLK LCS Sample Id: 7668540-1-BKS LCSD Sample Id: 7668540-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	236	94	236	94	90-110	0	20	mg/kg	12.20.18 20:48	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3073880 Matrix: Soil Date Prep: 12.20.18
Parent Sample Id: 608987-025 MS Sample Id: 608987-025 S MSD Sample Id: 608987-025 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	1.59	250	260	103	271	108	90-110	4	20	mg/kg	12.20.18 20:39	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3073880 Matrix: Soil Date Prep: 12.20.18
Parent Sample Id: 609121-004 MS Sample Id: 609121-004 S MSD Sample Id: 609121-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	24.2	248	272	100	281	104	90-110	3	20	mg/kg	12.20.18 22:11	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3074055 Matrix: Soil Date Prep: 12.20.18
Parent Sample Id: 609121-014 MS Sample Id: 609121-014 S MSD Sample Id: 609121-014 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	24.8	250	240	86	251	90	90-110	4	20	mg/kg	12.20.18 21:19	X

MS/MSD Percent Recovery [D] = 100*(C-A) / B LCS = Laboratory Control Sample MS = Matrix Spike
Relative Percent Difference RPD = 200* | (C-E) / (C+E) | A = Parent Result B = Spike Added
LCS/LCSD Recovery [D] = 100 * (C) / [B] C = MS/LCS Result D = MSD/LCSD % Rec
Log Difference Log Diff. = Log(Sample Duplicate) - Log(Original Sample) E = MSD/LCSD Result

QC Summary 609121

AECOM

WLU 99

Analytical Method: **Chloride by EPA 300** Prep Method: E300P

Seq Number: 3074055 Matrix: Soil Date Prep: 12.20.18

Parent Sample Id: 609123-004 MS Sample Id: 609123-004 S MSD Sample Id: 609123-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	32.0	250	244	85	243	84	90-110	0	20	mg/kg	12.20.18 23:44	X

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

[D] = 100*(C-A) / B
RPD = 200* | (C-E) / (C+E) |
[D] = 100 * (C) / [B]
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Chain of Custody

Work Order No: 609121

XENCO LABORATORIES
Houston,TX (281) 240-4200 Dallas,TX (214) 902-0300 San Antonio,TX (210) 509-3334
Midland,TX (432-704-5440) EL Paso,TX (915)585-3443 Lubbock,TX (806)794-1296
Hobbs,NM (575-392-7550) Phoenix,AZ (480-355-0900) Atlanta,GA (770-449-8800) Tampa,FL (813-620-2000)
www.xenco.com Page 1 of 2

Project Manager:	Kevin Pasternak	Bill to: (if different)	
Company Name:	AECOM	Company Name:	
Address:	9400 Amberglen Blvd	Address:	
City, State ZIP:	Austin, Tx,	City, State ZIP:	
Phone:	(512) 419-5293 Email: Kevin.Pasternak@aecom.com		

Work Order Comments

Program: UST/PST ☐ PRP ☐ Brownfields ☐ RRC ☐ Superfund ☐
State of Project: NM
Reporting: Level II ☐ Level III ☐ PST/UST ☐ TRRP ☐ Level IV ☐
Deliverables: EDD ☐ ADaPT ☐ Other:

Project Name:	WLW 99	Turn Around	
Project Number:	60591818	Routine ☑	
P.O. Number:		Rush:	
Sampler's Name:	Sam Whipkey	Due Date:	

SAMPLE RECEIPT			
Temp Blank:	Yes (No)	Wet Ice:	(Yes) No
Temperature (°C):	1.4 | 1.3	Thermometer ID	R8
Received Intact:	(Yes) No		
Cooler Custody Seals:	Yes No (N/A)	Correction Factor:	-0.1
Sample Custody Seals:	Yes No (N/A)	Total Containers:	

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers	TPH	Chlorides
Hole 1 - Surface	S	12/14/18	932	-	1	✓	✓
Hole 1 - 10	S	12/14/18	935	10		✓	✓
Hole 1 - 15	S	12/14/18	937	15		✓	✓
Hole 1 - 30	S	12/14/18	940	30		✓	✓
Hole 2 - Surface	S	12/14/18	952	-		✓	✓
Hole 2 - 10	S	12/14/18	953	10		✓	✓
Hole 2 - 15	S	12/14/18	955	15		✓	✓
Hole 2 - 30	S	12/14/18	957	30		✓	✓
Hole 3 - Surface	S	12/14/18	1008	-		✓	✓
Hole 3 - 10	S	12/14/18	1010	10		✓	✓

Work Order Notes

TAT starts the day recevied by the lab, if received by 4:30pm

Sample Comments

Total 200.7 / 6010 200.8 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr Tl Sn U V Zn

Circle Method(s) and Metal(s) to be analyzed **TCLP / SPLP 6010**: 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Tl U **1631 / 245.1 / 7470 / 7471** : Hg

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
1 Sam Whipkey	[illegible] 12/18/18 1550	12/16/18 1980	2		
3			4		
5			6		

Revised Date 051418 Rev. 2018.1

7845 0143 3277

Final 1.000

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Chain of Custody

Work Order No: 6091121

XENCO LABORATORIES

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Midland,TX (432-704-5440) EL Paso,TX (915)585-3443 Lubbock,TX (806)794-1296
Hobbs,NM (575-392-7550) Phoenix,AZ (480-355-0900) Atlanta,GA (770-449-8800) Tampa,FL (813-620-2000)

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Project Manager:	Kevin Pasternak	Bill to: (if different)	
Company Name:	AECOM	Company Name:	
Address:	9400 Amberglen BLVD	Address:	
City, State ZIP:	Austin, TX,	City, State ZIP:	
Phone:	(512) 419-5293	Email:	Kevin.Pasternak@aecom.com

Work Order Comments

Program: UST/PST ☐ PRP ☐ Brownfields ☐ RRC ☐ Superfund ☐
State of Project:
Reporting: Level II ☐ Level III ☐ PST/UST ☐ TRRP ☐ Level IV ☐
Deliverables: EDD ☐ ADaPT ☐ Other:

Project Name:	WCU 99	Turn Around	
Project Number:	605918 88	Routine ☑	
P.O. Number:		Rush:	
Sampler's Name:	Sam Whipkey,	Due Date:	

SAMPLE RECEIPT			
Temp Blank:	Yes (No)	Wet Ice:	(Yes) No
Temperature (°C):	1.4/1.3	Thermometer ID	
Received Intact:	(Yes) No	R8	
Cooler Custody Seals:	Yes No (N/A)	Correction Factor:	-0.1
Sample Custody Seals:	Yes No (N/A)	Total Containers:	

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers	TPH	Chlorides
Hole 3 - 15	S	12/14/18	1011	15	1	✓	✓
Hole 3 - 30	S	12/14/18	1012	30	1	✓	✓
Hole 4 - Surface	S	12/14/18	1027	-	1	✓	✓
Hole 4 - 10	S	12/14/18	1030	10	1	✓	✓
Hole 4 - 15	S	12/14/18	1032	15	1	✓	✓
Hole 4 - 30	S	12/14/18	1033	30	1	✓	✓
Hole 5 - Surface	S	12/14/18	1040	-	1	✓	✓
Hole 5 - 10	S	12/14/18	1043	10	1	✓	✓
Hole 5 - 15	S	12/14/18	1045	15	1	✓	✓
Hole 5 - 30	S	12/14/18	1047	30	1	✓	✓

ANALYSIS REQUEST

Work Order Notes

TAT starts the day recevied by the lab, if received by 4:30pm

Sample Comments

Total 200.7 / 6010 200.8 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr Tl Sn U V Zn

Circle Method(s) and Metal(s) to be analyzed **TCLP / SPLP 6010**: 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Tl U **1631 / 245.1 / 7470 / 7471** : Hg

	Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
1	Sam Whipkey		12/16/18/1800	2	Katie Lee	12/18/18 1550
3				4		
5				6		

Revised Date 051418 Rev. 2018.1

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Final 1.000

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ORIGIN ID:BSMA (000) 000-0000
AECOM

9400 AMBERGLEN BLVD

AUSTIN, TX 78729
UNITED STATES US

SHIP DATE: 17DEC18
ACTWGT: 54.80 LB
CAD: 6990515/SSF01922
DIMS: 26x15x14 IN

BILL THIRD PARTY

Part # 156297-435 RRDB EXP 11/19

TO

XENCO LABORATORIES
1211 W FLORIDA AVE

MIDLAND TX 79701
(000) 000-0000
INV:
PO:
REF:
DEPT:

FedEx
Express

E

J122118081501uv

TRK# 0201 **7845 0143 3277**

TUE - 18 DEC 10:30A
PRIORITY OVERNIGHT

DSR AHS
79701
TX-US **LBB**

AL MAFA

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: AECOM

Date/ Time Received: 12/18/2018 03:50:00 PM

Work Order #: 609121

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R8

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	1.3
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seals intact on shipping container/ cooler?	**N/A**
#5 Custody Seals intact on sample bottles?	**N/A**
#6*Custody Seals Signed and dated?	**N/A**
#7 *Chain of Custody present?	**Yes**
#8 Any missing/extra samples?	**Yes**
#9 Chain of Custody signed when relinquished/ received?	**Yes**
#10 Chain of Custody agrees with sample labels/matrix?	**Yes**
#11 Container label(s) legible and intact?	**Yes**
#12 Samples in proper container/ bottle?	**Yes**
#13 Samples properly preserved?	**Yes**
#14 Sample container(s) intact?	**Yes**
#15 Sufficient sample amount for indicated test(s)?	**Yes**
#16 All samples received within hold time?	**Yes**
#17 Subcontract of sample(s)?	**No**
#18 Water VOC samples have zero headspace?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: PH Device/Lot#:

Checklist completed by: Katie Lowe Date: 12/18/2018

Checklist reviewed by: Kelsey Brooks Date: 12/19/2018

Appendix D
Soil Boring Logs and Field Notes

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced water Spill Sites WLU 99
Project No.: 60591818
Project Location: Lea County, NM, West Lovington Unit 99
Logged By: Samuel Whipkey

Borehole ID: Hole 1	Drilling Company: HCI	Total Depth: 30 ft
Location: WLU 99	Driller Name: Kenny Cooper	Completed Depth: 30 ft
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter:
Completion Date: 12/14/18	Sampling Device: N/A	Static Water Level: N/A

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
0		Hole1-Surface	N/A		Med-Dark Brown Calicle & Top soil.				EC - 124.5
5					Tan to white, Limestone & calicle, fine grained dry, powder.				5' EC-35.2
10		Hole1-10							10' EC- 38.4
15		Hole1-15			Tan, Limestone, fin grained, silty, Dry powder.				15' EC = 31.2
20									

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced Water Spill Sites WLU 99
Project No.: 60591020
Project Location: Lea County, NM, West Coalgate Unit 99
Logged By: Samuel Whipkey

Borehole ID:	Drilling Company: HCI	Total Depth: 30
Location: WLU 99 ~~CVU #84~~	Driller Name: Kenny Cooper	Completed Depth: 30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter: —
Completion Date: 12/14/18	Sampling Device:	Static Water Level: —

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
30		Hold-30	N/A		~~Med Dark B~~ Tan to white, Limestone, Dry Powder				EC = 30.12
40									
50									
15									
60									

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced water Spill sites WLU 99
Project No.: Lea County, NM West Lovington Unit 99
Project Location: 60591818
Logged By: Samuel Whipkey

Borehole ID: Hole 2	Drilling Company: HCI	Total Depth:	30
Location: WLU 99	Driller Name: Kenny Cooper	Completed Depth:	30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter:	—
Completion Date: 12/14/18	Sampling Device:	Static Water Level:	—

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
0		Hole 2 Surface	N/A		Mud to dark brown Top soil, Caliche,				EC = 89.2
5					Tan to White, Limestone & caliche, fine grained dry powder.				5' EC 84.9
10		Hole 2-10							10' EC 36.8
15		Hole 3-15							15' EC = 172
20									

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced water Spill Sites WL U 99
Project No.: 60599181818
Project Location: Lea County, NM, West Lovington Unit 99
Logged By: Samuel Whipkey

Borehole ID: Hole2	Drilling Company: HCI	Total Depth: 30
Location: WL U 99 C~~70 #84~~	Driller Name: Kenny Cooper	Completed Depth: 30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter: —
Completion Date: 12/14/18	Sampling Device:	Static Water Level: —

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
30		Hole2-30	N/A		Tan to white Limestone, Dry powder, fine grained				
40									
50									
15									
60									

SW

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced Water Spill Site WLU99
Project No.: 60591818
Project Location: Lea County, NM, West Covington Unit 99
Logged By: Samuel Whipkey

Borehole ID: Hole 3	Drilling Company: HCI	Total Depth:	30
Location: WLU 99	Driller Name: Kenny Cooper	Completed Depth:	30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter:	
Completion Date: 12/14/18	Sampling Device:	Static Water Level:	

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
0		Hole 3 Surface	N/A		Med Brown, Top Soil & Caliche.				EC - 51.2
5					Tan to white Limestone, Caliche, fine grained Dry powder				5' EC = 21.3
10									10' EC = 432
15									15' EC = 211
20					Tan Limestone, fine grained, Dry powder				

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced Water Spill site WLU99
Project No.: 60591818
Project Location: Lea County, NM WLU 99
Logged By: Samuel Whipkey

Borehole ID: Hole 3	Drilling Company: HCI	Total Depth: 30
Location: WLU99 ~~GWU #84~~	Driller Name: Kenny Cooper	Completed Depth: 30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter:
Completion Date: 12/14/18	Sampling Device:	Static Water Level:

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
30		Hole3-30	N/A		Tan Limestone, Fine grained, Dry powder				EC = 1311.8
40									
50									
15									
60									

SW

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced Water Spill Site WLU 99
Project No.: 60591818
Project Location: Lea County, NM, West Lovington Unit 99
Logged By: Samuel Whipkey

Borehole ID: Hole 4	Drilling Company: HCI	Total Depth:	30
Location: WLU 99	Driller Name: Kenny Cooper	Completed Depth:	30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter:	6
Completion Date: 12/14/18	Sampling Device: —	Static Water Level:	

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
0		Hole 4 Surface	N/A		Med - Dark brown Top Soil & Caliche.				EC = 1065
					Tan to White Limestone & Caliche, Dry powder				5' EC = 36.7
5									
									10' EC = 61.8
10									
					Tan to white Limestone, fine grained, Dry powder.				15' EC = 33.6
15									
20									

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced Water Spill sites WLU 99
Project No.: 60599818
Project Location: ~~Lea~~ Lea County, NM West Lovington Unit 99
Logged By: Samuel Whipkey

Borehole ID: Hole 11	Drilling Company: HCI	Total Depth: 30
Location: WLU 99 ~~CVU #84~~	Driller Name: Kenny Cooper	Completed Depth: 30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter:
Completion Date: 12/14/18	Sampling Device:	Static Water Level:

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
30		Hole-D	N/A		Tan to White, Limestone fine grained dry powder				EC = 57.3
40									
50									
15									
60									

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced Water Spill site WLU 99
Project No.: 60591818
Project Location: Lea County, NM, West Lovington Unit 99
Logged By: Samuel Whipkey

Borehole ID: Hole 5	Drilling Company: HCI	Total Depth: 30
Location: WLU 99	Driller Name: Kenny Cooper	Completed Depth: 30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter: —
Completion Date: 12/14/18	Sampling Device: —	Static Water Level:

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
0		Hole 5 Surface	N/A		Mod Brown Top soil & caliche.				EC = 198.8
5					Tan to white, Limestone, fine & caliche. fined grained, powder.				5' EC = 40.1
10									10' EC = 33.5
15					Tan, Limestone, fined grained, powder.				15' EC = 45.6
20									

AECOM
9400 Amberglen BLVD
Austin, TX, 78729

Client: Chevron
Project Name: Chevron Produced Water Spill Site WLU 99
Project No.: 60591818
Project Location: Lea County, NM / West Lovington Unit 99
Logged By: Samuel Whipkey

Borehole ID: Hole 5	Drilling Company: HCI	Total Depth: 30
Location: WLU99 ~~CVU #84~~	Driller Name: Kenny Cooper	Completed Depth: 30
Start Date: 12/14/18	Drilling Method: Air Rotary	Borehole Diameter:
Completion Date: 12/14/18	Sampling Device: —	Static Water Level:

Depth (ft)	Recovery (%)	Sample No. & Depth Interval (ft)	Blow Count	Classification USCS	Lithologic Description (Include lithology, grain size, sorting, anularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	Screening VOCs	Lithology	Well Construction	Additional Remarks
30		Hole 5 30	N/A		Tanto White, Limestone, fine grained, Powdr				EC= 31.4
40									
50									
15									
60									

Location Buckeye Location, NM Date 12/13/18

Project / Client Chevron.

0730	Leave hotel for Buckeye office
0800	Arrive at the office and begin site specific MCBU training.
~~0850~~	Submit Dig pla for approval to Austin Bats.
0850	Leave office for WLU 99.
0930	Arrive at WLU99, Met with HCI Winds NNW 30 mph w/ 40+ mph gusts Stop work and go to hotel. Will resume tomorrow morning.
1000	Arrive at Motel.

Location WLU 99 Date 12/14/18

Project / Client Chevron

0800	Leave hotel. Stop at Wal-Mart for Ice & Supplies.		
0835	Arrive on site. Conduct Review of HASP & JSA. Received Excavation permit from		
0910	Jon at Chevron		
0920	Setting up to begin boring.		
0930	Clear hole 1 (32.854790, -103.583603		
0932	Surface	124 us EC	
0935	10' Sample	38.4 us	5' 35.2
0937	15' Sample	31.2 us	
0940	30' Sample.	30.2 us	
0950	Clear hole 2 (32.854766, -103.583696		
0952	Surface	~~89.2~~	5' 84.9
0953	10' Sample	36.8	
0955	15' Sample	172.0	
0957	30' Sample	40.4	
1005	Clear hole 3	32.854699, -103.383605	
1008	Surface	51.2	
1009	5'	21.3	
1010	10'	432	
1011	15'	211	
1012	30'	131.9	

Location WCU99 60591818 Date 12/14/16

Project / Client Chevron

Cont'd.

1025	Clear hole. 4 (32.854789, -103.383518)	
1027	Surface	1065
1029	5'	36.7
1030	10'	61.8
1032	15'	33.6
1033	30'	57.3
1040	Clear hole 5 (32.854867, -103.383614)	
1040	Surface	188
1042	5'	40.1
1043	10	33.5
1045	15'	45.6.
1047	30'	31.4
1300	Offsite.	
1315	Meet Jsa to ~~get~~ turn in Work Permits	

05

02 10 Well 04

03

Appendix E
Photo Log

AECOM

PHOTO LOG

Facility Name:	Site Location:	Project No.
West Lovington Unit #099	Lea County, NM	60591818

Photo No.	Date:
1	12/14/18

Direction Photo Taken:

South

Description:

West Lovington Unit #99 well information sign.

Photo No.	Date:
2	12/14/18

Direction Photo Taken:

North

Description:

Image of WLU #99 injection well. Boreholes locations are visible and drill cutting waste drums are located on the north side of the injection well.

AECOM

PHOTO LOG

Facility Name:	Site Location:	Project No.
West Lovington Unit #099	Lea County, NM	60591818

Photo No.	Date:
3	12/14/18

Direction Photo Taken:

Northwest

Description:

Image of soil boring #1 after backfilling with Bentonite.