SITE SAMPLING PLAN

VACUUM GLORIETTA WEST UNIT
PRODUCED WATER SPILL SITE
LEA COUNTY, NEW MEXICO

Prepared for:
Chevron Mid-Continent Business Unit (MCBU)

Project No: 60596678
January 25, 2019

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1.0 INTRODUCTION

On behalf of Chevron USA Inc. (Chevron), AECOM Technical Services, Inc. (AECOM) has prepared this Site Sampling Plan (SSP) to describe the assessment activities that will be conducted to characterize potential impacts to environmental media (soil and groundwater) resulting from a produced water spill that occurred at the Vacuum Glorietta West Unit (VGWU) (the Site) on October 26, 2018. The primary objective of the SSP is to assess 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 32.786537, Longitude -103.512692, approximately ½ mile west of the intersection of New Mexico Highway 238 and Texas Camp Road and ¼ mile north on an unnamed lease road, and approximately 14 miles southwest of Lovington, New Mexico (Figure 1).

On October 26, 2018, a release of approximately 155 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 a buried transfer 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 130 bbls of produced water.

A Release Notification, Form C-141 dated November 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 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 1,000 meters (0.6 miles) of the Site, the shallowest potential depth to groundwater beneath the Site is 90 feet below ground surface (ft bgs) and the average depth to groundwater is 129 ft bgs. A copy of the Water Column/Average Depth to Water Report is attached as Appendix B.
- Approximately 155 bbls of produced water were released and 130 bbls were recovered. The underlying soils at the facility are composed of limestone and clay and it is unknown if the remaining 25 bbls of released fluid resulted in

chloride impact to groundwater. Soil borings and soil sampling are proposed to characterize potential chloride impacts to the Site.

- There are no continuously flowing watercourses or other significant watercourses within 300 feet (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 12 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 wells within 1,000 ft of the Site.
- No incorporated municipal boundaries or defined municipal fresh water well fields are located within 12 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 PROPOSED SOIL ASSESSMENT

To define the vertical and horizontal extent of potential chloride-impacted soil resulting from the produced water release, six soil borings will be drilled to a depth of 50 ft bgs. Figure 2 shows the proposed locations for the soil borings. Two soil borings will be placed within the center of the spill area and four additional borings will be placed around the boundary of the spill area Site in each of the cardinal directions. A portable electrical conductivity (EC) meter will be used to field screen the ground surface and final soil boring locations will be determined based on EC screening. Each soil boring location will be cleared for sub-surface utility avoidance with an air knife or hand auger before the start of mechanical drilling. Each soil boring will be drilled with air rotary drilling techniques and a soil core will be collected approximately every 5 ft. The soil core will be logged to identify any visual signs of chloride impacts, and the depth to water saturation, if encountered. The EC meter will be used to field

screen the soil cores and for the potential presence of chloride impacts. Four soil samples will be collected from each borehole; one at ground surface, two at depth intervals identified as most likely to contain chloride-impacted soil, based on visual observations and EC screening, and at the borehole terminus to verify vertical delineation.

Soil samples from each boring will be collected for chloride analysis by U.S. Environmental Protection Agency (EPA) Method 300. Upon collection, the soil samples will be placed into individual sample jars, labeled, and placed on ice in laboratory-provided coolers. Chain of Custody forms will be completed and the samples will be transported to Xenco Laboratories, a National Environmental Laboratory Accreditation Program (NELAP) certified laboratory.

After drilling and soil sampling are complete, the soil borings will be backfilled with bentonite, and investigation derived waste (IDW), including soil cuttings, disposable sampling equipment and disposable personal protective equipment (PPE) such as nitrile gloves, will be placed in 55-gallon drum(s). One composite IDW sample will be collected from the drums for waste characterization. The IDW characterization sample will be analyzed for:

- Total Petroleum Hydrocarbons (TPH): SW-846 Method 8015M; and
- Chloride: Method EPA 300.

Upon receiving the waste characterization analytical results, AECOM will review the laboratory report and complete the appropriate waste characteristic profile. AECOM will coordinate with Chevron to obtain the appropriate signatures from the waste generator (Chevron) on the waste profile and waste manifest. AECOM will then coordinate the pick-up of the drums from the Site for transportation and disposal at a Chevron approved waste disposal facility that accepts oil and gas exploration and production (E&P) exempt wastes.

5.0 REPORTING

Upon receipt of the laboratory analytical report, AECOM will prepare a report describing field activities and results for submittal to the NMOCD. The report will include:

- Executive Summary;
- Background information;
- Topographic map and aerial photograph of the Site and surrounding area;
- Scaled map showing the impacted area, surface features, and soil boring locations;
- Summary of the field and laboratory analytical data;
- Verification of water sources and significant watercourses within ½ mile of the extent of affected soil;
- Depth to groundwater determination;
- Soil boring logs;

- Data interpretation relative to the extent of chloride-impacted soil; and
- Recommendations for remedial actions to address impacted soil, or identification of any data gaps that will need to be filled before determining the extent of impacts and remediation options.

6.0 SCHEDULE

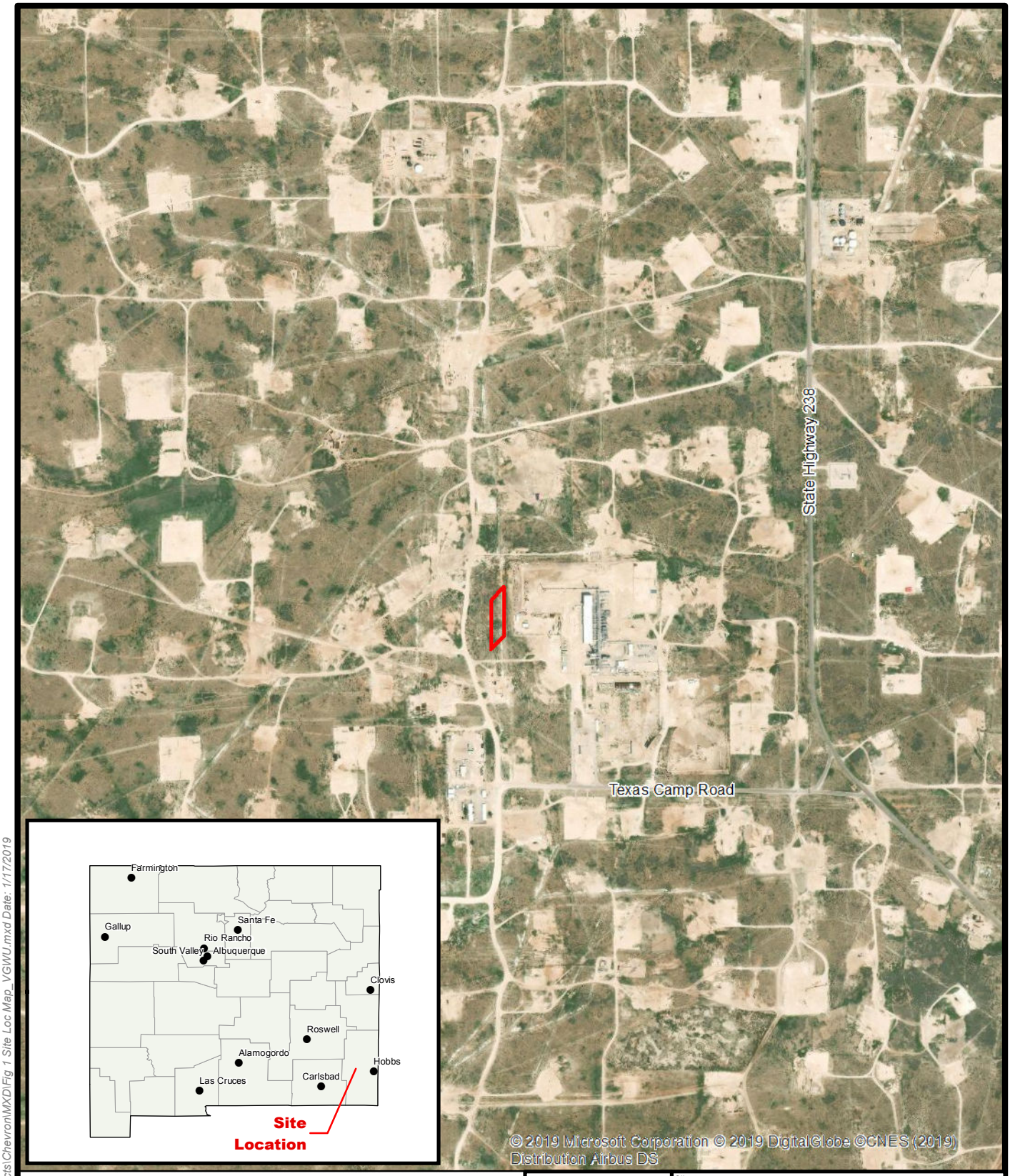
Drilling and soil sampling activities at the Site are tentatively scheduled for February 2019.

7.0 REFERENCES

New Mexico Water Rights Reporting System (NMWRRS), Water Column/Average Depth To Water Report. http://nmwrrs.ose.state.nm.us/nmwrrs/waterColumn.html.

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: Vac Gloriettta
West Unit

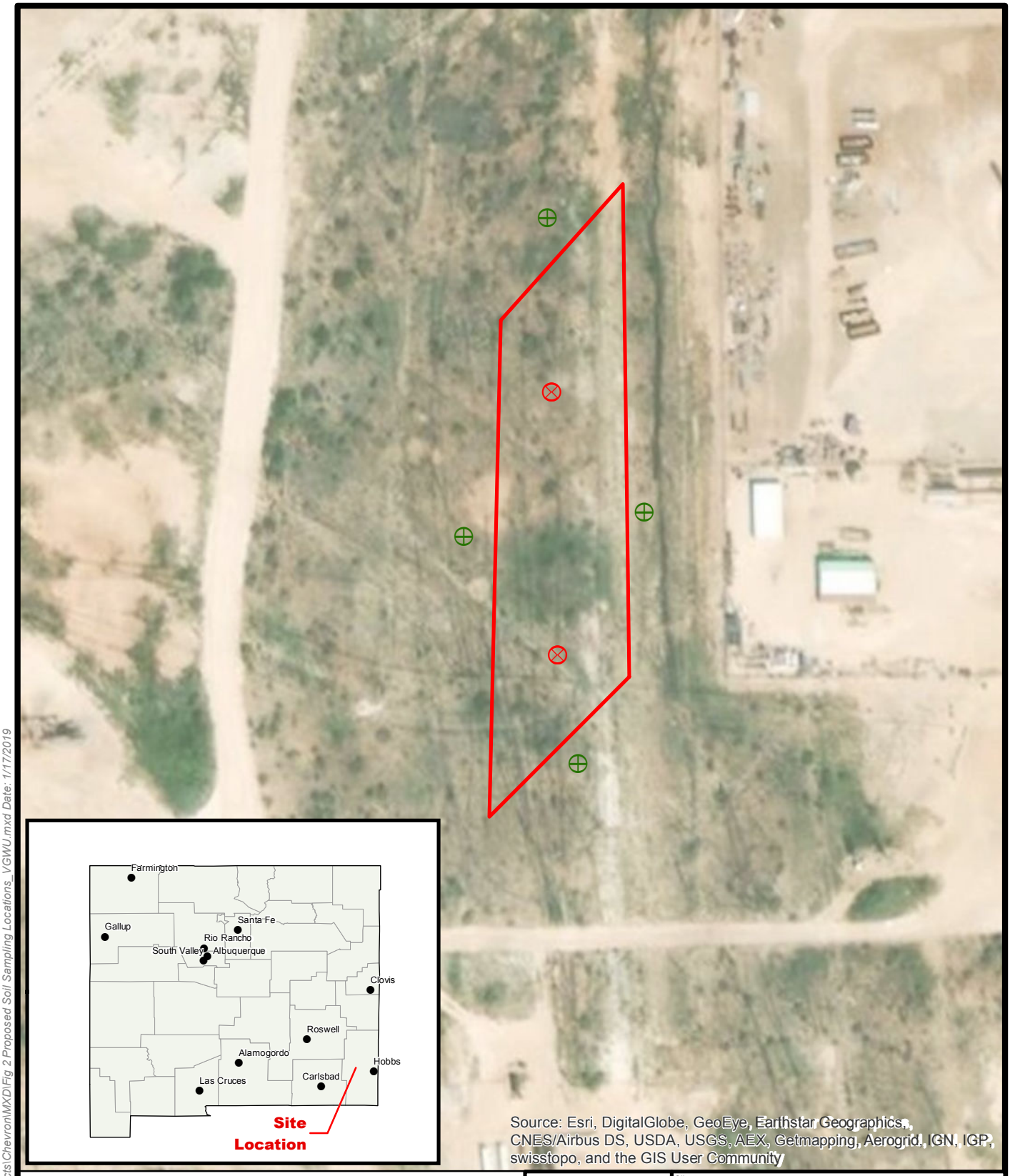
Site Location Map

Drawn by:	Date:	GIS File:	Figure:
GWC/AUS	1/17/2019	Fig 1 Site Loc Map_VGWU	1

Path: L:\AGE\GIS\AUS GIS\GIS_Projects\Chevron\MXD\Fig 1 Site Loc Map_VGWU.mxd Date: 1/17/2019

Figure 2

Proposed Soil Sampling Locations



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

- Site Area
- Spill Location and Proposed Soil Sampling Location for Vertical Delineation
- Proposed Soil Sample Locations for Vertical and Lateral Delineation

N

100 50 0 100

Feet

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

Client: Chevron MCBU
Lea County, New Mexico

Report: Vac Glorietta West Unit

Proposed Soil Sampling Locations

Drawn by:	Date:	GIS File:	Figure:
GWC/AUS	1/17/2019	Fig 2 Proposed Soil Sampling Locations_VGWU.mxd	2

Path: L:\AGE\GIS\AUS GIS\GIS_Projects\ChevronMXD\Fig 2 Proposed Soil Sampling Locations_VGWU.mxd Date: 1/17/2019

Appendix A

Form C-141, Vacuum Glorietta Unit

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	NCH1832058269
District RP	1RP-5266
Facility ID	fCH1832057923
Application ID	pCH1832058382

Release Notification

Responsible Party

Responsible Party: Chevron USA Inc.	OGRID: 4323
Contact Name: Josepha DeLeon	Contact Telephone: 575-263-0424
Contact email: jdxd@chevron.com	Incident # NCH1832058269 VACUUM GLORIETTA WEST UNIT @ FCH1832057923
Contact mailing address: 1616 W. Bender Blvd., Hobbs, NM 88240	

Location of Release Source

Latitude: 32.786537 Longitude: -103.512692
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: Vacuum Glorietta West Unit	Site Type: Battery
Date Release Discovered: 10/26/2018	API# *(if applicable): N/A*

Unit Letter	Section	Township	Range	County
B	1	18S	34E	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): 155.1 barrels	Volume Recovered (bbls): 130 barrels
	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:

Buried transfer line leak due to corrosion.

3 areas measured and calculations were:
210x80 with 0.0208 standing liquid = 127.07 barrels
70x10 with 0.0208 standing liquid = 2.59 barrels
350x98 with 0.0833 in soil = 25.44 barrels

State of New Mexico
Oil Conservation Division

Incident ID	NCH1832058269
District RP	1RP-5266
Facility ID	fCH1832057923
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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? "greater than 25 barrels"
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Yes, by Josepha DeLeon to Maxey Brown, Olivia Yu, via email 10/27/2018.	

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:

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: 11/6/2018

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	

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?	90 (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: _____ Title: _____

Signature:_____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

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

NMWRRS 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	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
L 13820 POD1		L	LE	3	1	3	01	18S	34E	639472	3628296	352	150	131	19
L 13820 POD2		L	LE	3	1	3	01	18S	34E	639472	3628296	352	150	131	19
L 10467		L	LE		1	2	01	18S	34E	639365	3628137*	460	231	115	116
L 05288		L	LE		4	4	36	17S	34E	639760	3628552*	488	231	90	141
L 05288	R	L	LE		4	4	36	17S	34E	639760	3628552*	488	231	90	141
L 02722 S4		L	LE	1	2	2	01	18S	34E	639666	3628246*	521	234		
L 05843		L	LE			3	36	17S	34E	638753	3628731*	539		240	
L 02722 S5		L	LE	2	2	2	01	18S	34E	639866	3628246*	684	232		
L 06030		L	LE		3	3	36	17S	34E	638552	3628530*	723	230	102	128
L 04247 POD5		L	LE	3	1	3	31	17S	35E	640040	3628781	791	235	95	140
L 04247 POD7		L	LE	1	3	3	31	17S	35E	640054	3628747	797		240	
L 02724 S4		L	LE	3	3	3	36	17S	34E	638451	3628429*	837	230	140	90
L 07119		L	LE	1	1	1	06	18S	35E	640068	3628255*	862	233	95	138
L 06115		L	LE	1	1	1	01	18S	34E	638460	3628217*	893	230	110	120
L 02722		L	LE	3	1	1	01	18S	34E	638460	3628017*	993	229	105	124

Average Depth to Water: **129 feet**

Minimum Depth: **90 feet**

Maximum Depth: **240 feet**

Record Count: 15

UTMNAD83 Radius Search (in meters):

Easting (X): 639272.99 **Northing (Y):** 3628588.44 **Radius:** 1000

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