October 28,2019
Cardno 013613.R01a

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Mr. Jim Griswold
Environmental Specialist
State of New Mexico Oil Conservation Division, District 1
1625 North French Drive
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SUBJECT **Report for Additional Soil Assessment and Proposed Remediation Plan**
Former State K Tank Battery No. 3
Vacuum Oil Field, Lea County, New Mexico
NMOCD IRP No. 09-7-2239

Mr. Griswold:

At the request of ExxonMobil Environmental and Property Solutions[1], on behalf of ExxonMobil US Production Company, Cardno is submitting this *Report for Additional Soil Assessment and Proposed Remediation Plan* for the subject site. This report documents the field work completed in accordance with Cardno's *Work Plan for Additional Soil Assessment*, dated September 11, 2018, and subsequently approved by the State of New Mexico Oil Conservation Division in electronic correspondence dated September 19, 2018.

This report was originally submitted to Ms. Olivia Yu of the New Mexico Oil Conservation Division (NMOCD) on February 22, 2019. After submittal of the report and attempts to contact Ms. Yu to follow up, Cardno was informed by the NMOCD that Ms. Yu no longer worked for the agency. Following a conversation with Mr. Dylan Rose-Coss and Mr. Jim Griswald of the NMOCD on June 18, 2019, Cardno is resubmitting the report with updated chloride action levels in soil and a proposed remediation plan.

Please call the undersigned at 949.457.8941 if you have questions.

Sincerely,

David M. Purdy
Senior Project Manager
for Cardno
Direct Line: 949.457.8941
Email: dave.purdy@cardno.com

cc: Ms. Marla D. Madden, ExxonMobil Environmental and Property Services Company
Mr. Dylan Rose-Coss, State of New Mexico Oil Conservation Division

[1] ExxonMobil Environmental Services changed its name to ExxonMobil Environmental and Property Solutions.

Report for Additional Soil Assessment and Proposed Remediation Plan

Former State K Tank Battery No. 3

Vacuum Oil Fields
Lea County, New Mexico
OCD No. AP038

Cardno 013613.R01a

Prepared for
ExxonMobil Environmental and Property Solutions Company

October 28, 2019

Cardno®

Report for Additional Soil Assessment and Proposed Remediation Plan

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David M. Purdy
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Table of Contents

Plates

Tables

Appendices

1 Introduction

At the request of ExxonMobil Environmental and Property Services, on behalf ExxonMobil US Production Company (ExxonMobil), Cardno prepared this report and proposed remediation plan for the site. The purpose of the report is to document field observations and laboratory analytical data obtained from the advancement of 13 on-site soil borings to assess the lateral and vertical extent of constituents of concern beneath and surrounding the site, as proposed in Cardno's *Work Plan for Additional Soil Assessment* (Work Plan), dated September 11, 2018 (Cardno, 2018), which was approved by the New Mexico Oil Conservation Division (NMOCD) in electronic correspondence dated September 11, 2018 (Appendix A).

2 Site Description

The former State K Tank Battery No. 3 is located in the Vacuum Oil Field, Lea County, New Mexico. The property is located in the northwest corner of the northeast quarter of the southeast quarter of Section 32, Township 17 South, Range 35 East of the New Mexico Meridian and Baseline (Plate 1). The property is owned by the New Mexico State Land Office (NMSLO). An ExxonMobil Oil Corporation affiliate was the former oil and gas lease holder and operator of the tank battery. Prior to the divestment of the lease, the tank battery was decommissioned and removed from the site property. Chesapeake Energy Corporation currently holds an oil and gas lease for the site. The property is currently unoccupied. Photographs of the site can be found in Appendix B. NMOCD Site Assessment /Characterization Form C-141 is included in Appendix C of this report.

3 Geology and Hydrogeology

The site is located in northeastern Lea County, New Mexico, within the Maljamar-Vacuum field. The Maljamar-Vacuum field belongs to a larger system in the Permian basin. The field sediments are mainly Paleozoic carbonates with periodic siliciclastic and evaporate deposition dating from Ordovician through Permian ages with thicknesses exceeding 9 kilometers in the Southern Delaware Basin (Roche, 1997). Soils encountered during site investigations have included gravel, dense dry silt and clayey silty sand, calcareous silty sand, limestone, and sandstone to 50 feet bgs, the maximum depth investigated.

The primary source of water is the Ogallala Aquifer. The Ogallala formation is comprised of variably cemented calcic sands, silts, caliche, gravel and some clays, and ranges in thickness from 50 to 300 feet. Groundwater is being rapidly depleted in certain areas. Due to intensive groundwater pumping, water levels have declined and the direction of groundwater flow has shifted. In Lea County, groundwater levels have declined 50 to 100 feet (McGuire, 2014), with rates of decline up to 4 feet per year and averaging 0.59 foot per year for wells in Lea County (USGS, 2013).

3.1 Depth to Groundwater

A search of groundwater databases maintained by the New Mexico Office of the State Engineer (NMOSE) and the United States Geological Survey (USGS) was conducted to assess the average DTW within a 1-mile radius of the site and to identify any registered water wells within a ½-mile radius of the site. One water well (32465710329801) was discovered within a 1-mile radius from the site in the USGS National Water Information System (USGS, 2019). The well is listed as currently inactive. The last DTW measurement in the well was 95.01 feet bgs on January 15, 1991. A well location map with DTW information is provided in Appendix D.

3.2 Nearest Karst, Cave, Mine, or Sink Hole

A review of an online geological features map showed that an Erosional Karst exists in the vicinity of the site (Szukalski, 2014). A map of the karst location is included in Appendix E.

A Review of USGS and Bureau of Land Management (BLM) data determined that there are no caves, mines, or sinkholes in the vicinity.

3.3 Regional Floodplain Data

The National Flood Hazard Layer in the Federal Emergency Management Agency's Map Service Center mapping portal does not show a floodplain located near or within the site (FEMA, 2019). A copy of the National Flood Hazard Layer map is included in Appendix F.

Based on observations in the general vicinity of the site and review of aerial photographs, there are no surface water bodies located within 1,000 feet of the site.

4 Regulatory Framework and Site Classification

The NMOCD has regulatory jurisdiction over oil and gas production operations in the State of New Mexico. The NMOCD requires that soil impacted by crude oil production activities be remediated in such a manner that the potential for future impacts to groundwater or the environment be minimized. The NMOCD hydrocarbon remediation levels are determined by ranking criteria on a site-by-site basis as outlined in the New Mexico Administrative Code (NMAC) Title 19 – Natural Resources and Wildlife, Chapter 15, Oil and Gas. The ranking criteria are based on three site characteristics: DTW, wellhead protection, and distance to surface water. As detailed in the following table, the site receives a score of 10 based on these critieria.

A copy of the State of New Mexico Energy and Natural Resourse Department C-141 form is completed and attatched in the appendices.

Ranking Criteria and Scoring

Characteristic	Selection	Score
DTW	50-99 feet	10
Wellhead Protection Area	>1,000 feet	0
Distance to Surface Water	>1,000 feet	0
		Total Score = 10

Based on this score, the soil hydrocarbon Recommended Remediation Action Levels (RRALs) in the following table apply to the site.

Soil Remediation Levels

Constituent of Concern	RRALs (mg/kg)
Benzene	10
Total BTEX	50
TPH	1,000

Chloride Limits

Distance between the Chloride in Soil and the DTW	Chloride Limit (mg/kg)
<50 feet	600
50-100 feet	10,000

>100 feet	20,000

5 Previous Work

Soil investigations have been conducted at the site since 2005. Previous work has included the drilling of soil borings, the excavation of soil containing naturally-occurring radioactive material (NORM), and subsurface investigations to assess the lateral and vertical extent of chloride in soil beneath the site. Cumulative soil analytical results are summarized in Table 1.

5.1 Site Assessment and Remediation Activities

May through August 2005. Conestoga-Rovers and Associates (CRA) conducted a NORM survey and excavated and disposed of soils exceeding the NORM remediation action level. Confirmation soil samples collected from remedial excavation areas did not contain NORM above remediation action levels. NORM assessment and remediation at the site has been completed (CRA, 2005).

In addition, CRA advanced 11 soil borings (SB-01 through SB-11) to assess petroleum hydrocarbon and chloride concentrations in soil beneath the site. TPH was reported above the RRAL in one soil sample collected from boring SB-02 (1 to 2 feet bgs). BTEX was not detected above RRALs in the soil samples. Chloride was detected in samples collected from each of the 11 borings up to a maximum concentration of 4,950 mg/kg. Chloride was not detected above reporting limits in a background soil sample collected from an off-site location (CRA, 2005).

The location of boring SB-05 from the 2005 CRA investigation is unknown as the boring does not appear on CRA's site maps.

March 2010. A geophysical survey of the site was conducted to estimate the extent of chloride concentrations and to select boring locations for sampling. The results of the survey indicated that there were three potential areas of increased conductivity (equating to elevated chloride concentrations) between the surface and 18 feet bgs. Three additional potential areas of increased conductivity between the depths of 18 to 49 feet were also identified (EMC, 2010).

April 2010. Kleinfelder performed additional soil investigation activities to assess the extent of chlorides in the subsurface. Based on the geophysical survey data, six soil borings (KSB-01, KSB-02, and KSB-04 through KSB-07) were advanced to 30 feet bgs. BTEX was not detected in soil samples collected from the borings. TPH were detected at concentrations below the RRALs. Chloride concentrations ranged from 43.2 to 4,800 mg/kg (Kleinfelder, 2012a). Previous soil borings are depicted on the Generalized Site Plan (Plate 2).

February 2012. Kleinfelder attended a meeting with the NMOCD to discuss the subsurface investigations previously conducted at the site and to come up with a pathway to environmental case closure. During the meeting, the NMOCD and Kleinfelder determined that based on the anticipated DTW at the site, chloride concentrations in soil must be vertically and horizontally delineated to the cleanup standard of 250 mg/kg. In the event that chloride concentrations do not drop below 250 mg/kg before reaching groundwater, upgradient and downgradient groundwater monitoring wells will be installed to assess chloride in groundwater. In the event that the lateral and vertical extent of chloride beneath the site property is adequately assessed to <250 mg/kg, the top 5 feet of soil will be excavated in the areas deemed to exceed the cleanup standard and will be backfilled with a sealing material (Kleinfelder, 2012b).

6 Subsurface Investigation

To determine the lateral and vertical extent of chloride in soil beneath the site, Cardno conducted additional subsurface investigation activities in October 2018. Cardno performed the fieldwork under the supervision of a professional geologist and in accordance with the Work Plan, the standard field protocols included in Appendix G, a site-specific health and safety plan, and applicable regulatory guidelines.

6.1 Pre-Field Activities

Prior to the onset of field activities, Cardno obtained a well installation permit from the NMOSE and a Right of Entry Remediation Permit from the New Mexico Commissioner of Public Lands (Appendix H). Cardno personnel visited the site to check for obstructions and to mark the proposed locations. New Mexico One Call was contacted and affected utility companies marked any underground lines. The property owner, NMOSE, and NMOCD were notified at least 48 hours prior to the onset of field activities.

6.2 Sampling and Soil Boring Activities

On October 26, 2018, Cardno cleared 13 boreholes for subsurface utilities to 5 feet bgs, or refusal, using an air knife rig. Several boreholes were cleared to less than 5 feet bgs due to the presence of native condensed caliche rock.

From October 27 through 29, 2018, Cardno supervised Yellow Jacket Drilling advance borings B1 through B13 using a Speedstar 50K CH air rotary drill rig equipped with 10-inch diameter rods. Soil samples were collected at 5-foot intervals to the total depth of each boring and were preserved for laboratory analysis. Groundwater was not encountered in any of the borings. Lithologic descriptions of the soil cuttings are presented on the boring logs included in Appendix I. Borings were advanced until field measurements indicated that chloride concentrations were below the NMOCD Chloride Limit established at the time of drilling (250 mg/kg).

6.3 Laboratory Analyses

Cardno submitted soil samples for analysis to Eurofins Calscience for the analyses and methods detailed in the laboratory analytical reports included in Appendix J and summarized in Tables 1 and 2.

6.4 Site Survey

On October 30, 2018, Cardno supervised John West Surveying Company survey the location and elevation of the soil borings. The survey data is included in Appendix K.

6.5 Waste Management Plan

The soil generated during drilling activities was temporarily stored on site in DOT-approved, 55-gallon drums. Soil cuttings were transported for recycling to Republic Tessman Landfill disposal facility in San Antonio, Texas. A copy of the waste manifests for the disposal of soil is included in Appendix L.

7 Results of Investigation

7.1 Site Lithology

During this investigation, soil cuttings observed consisted of poorly-graded sand, silt, and gravel with varying caliche, limestone, and sandstone rock layers, which is consistent with past investigations conducted at the site. Soil observed in borings B1 through B13 consisted of sand, silt, and mixtures of sand, silt, and gravel from the

surface to 50 feet bgs, the maximum depth investigated. Groundwater was not encountered during this investigation.

7.2 Chloride In Soils

Chloride was detected in each soil sample collected during this investigation. The maximum chloride concentration detected was 1,600 mg/kg in boring B2 at 20 feet bgs. Chloride concentrations were detected above the current NMOCD Chloride Limit of 600 mg/kg in borings B1, B2, B3, B5, B8, and B11. Seven plume zones have been characterized as a result of this investigation. Cumulative chloride concentrations in soil are illustrated on Plate 3.

7.3 Hydrocarbons In Soil

Select soil samples were also analyzed for TPH and BTEX. TPH and BTEX were not detected above reporting limits in any of these samples.

7.4 Conclusions

The lithology observed in borings B1 through B13 was consistent with observations made during previous investigations at the site. Groundwater was not encountered in any of the borings, which were drilled to a maximum depth of 50 feet bgs.

The vertical extent of chloride in soil appears to have been adequately delineated, as the deepest soil sample from each boring did not contain chloride concentrations above the limit of 600 mg/kg, with the exception of the bottom sample collected from boring B5 at 25 feet bgs.

The lateral extent of chloride in soil has not been delineated in all directions; however, for the purposes of conducting a limited remedial excavation of shallow soil, a sufficient data set has been obtained to reasonably estimate the area of soil required for excavation. Additional delineation can be achieved during excavation activities by collecting selected excavation sidewall soil samples.

7.5 Recommendations

As groundwater was not encountered during this or previous investigations and the vertical extent of chloride in soil appears to have been adequately delineated, Cardno does not recommend further groundwater investigations. To remediate shallow soil with chloride concentrations exceeding 600 mg/kg, Cardno recommends preparation of a remediation plan for the site.

8 Proposed Remediation Plan

8.1 Detailed Description of Proposed Remediation Technique

NMOCD Remediation Plan Form C-141 is included in Appendix C of this report. Based on laboratory analytical results, site characteristics and field observations made during previous site assessment activities, Cardno proposes to remediate chloride in soil at concentrations greater than NMOCD action levels to advance the site toward closure. Cardno proposes to excavate and remove chloride containing soil to a depth of 4 feet bgs in the vicinity of the following seven plume zones:

- Excavation Area No. 1: Soil borings KSB-01, SB-01, B1, B2, and B3.
- Excavation Area No. 2: Soil borings B5, KSB-06, and SB-10.
- Excavation Area No. 3: Soil borings KSB-07, SB-03, and SB-04.
- Excavation Area No. 4: Soil borings KSB-02, SB-08, and B8.
- Excavation Area No. 5: Soil boring KSB-05.
- Excavation Area No. 6: Soil boring B11.
- Excavation Area No. 7: Soil boring KSB-04.

8.2 Pre-Field Activities

Prior to conducting the remedial excavation, Cardno will obtain a Right of Entry Remediation Permit from the New Mexico Commissioner of Public Lands and will notify the current lease holder of our intent to conduct this work scope. New Mexico One Call will be contacted and affected utility companies will mark any underground lines. Cardno will then conduct a geophysical survey to check for subsurface utiliites or obstructions. Any subsurface pipeline or structure will be excavated using non-intrusive air knifing tools to confirm the location and depth and the subsurface object's location will be surveyed. Cardno will then locate by survey previously advanced boring locations and delineate each proposed excavaton area. The NMOSE and NMOCD will be notified at least 48 hours prior to the onset of field activities.

8.3 Soil Excavation and Sampling Activities

The proposed excavation locations are depicted on Plates 3 and 4. The procedures for excavating and soil sampling are described in the field protocol contained in Appendix G. The fieldwork will be conducted under the advisement of a professional geologist and in accordance with applicable regulatory guidelines.

Soil samples will be collected from select excavation sidewalls at locations indicated on Plates 3 and 4. Areas outside of the proposed excavation areas will be monitored for vegetation loss and excavated to a depth of approximate 6 inches to 1 foot bgs. It is estimated that approximately 3,787 cubic yards of impacted soil will be removed during remedial excavation activities.

8.4 Timeline and Estimated Volume of Soil to be Remediated

Based on soil sample analytical results from previous subsurface investigations conducted at the site, it is estimated that approximately 3,787 cubic yards of soil will be removed during remedial excavation activities. Remediation activities will be conducted within 90 days of receiving approval of the remediaton plan from the NMOCD.

8.5 Laboratory Analyses

Soil samples will be submitted for analysis to Eurofins Laboratories, Inc., a state-certified analytical laboratory, under COC protocol. Soil samples collected from the excavation sidewalls will be analyzed for chloride using EPA Method 300 and for chloride synthetic precipitation leaching procedure (SPLP) using EPA Method 9056.

8.6 Restoration, Reclamation and Re-Vegetation Plan

To the extent practicable, the areas affected by the remedial excavation will be restored to the condition that existed prior to the release. Following soil removal, the excavated areas will be backfilled with clean, locally sourced, "like" material. The backfilled areas will be contoured and/or compacted to obtain preservation of surface water flow, erosion control and stability. Affected areas associated with the remedial excavation will be reseeded with an agency-approved seed mixture during the first favourable growing season following remedial activities.

8.7 Waste Management Plan

The soil generated during excavation activities will be temporarily stored on site on an impermeable plastic membrane. The soil will be transported under non-hazardous waste manifest or bill of lading to Sundance Services, Inc., Eunice, New Mexico, an ExxonMobil and state – approved soil recycling facility. Copies of the manifests will be provided in the excavation closure report.

8.8 Site Safety Plan

The fieldwork will be performed in accordance with the site-specific safety plan.

8.9 Report

After completion of the proposed field activities, a report summarizing field and laboratory procedures, and laboratory results will be submitted to the NMOCD.

9 Contact Information

The responsible party contact is Ms. Marla D. Madden, ExxonMobil Environmental and Property Services Company, 18685 Main Street, Suite 101 PMB 601, Huntington Beach, California, 92648-1719.

The consultant contact is Mr. David M. Purdy, Cardno, 20505 Crescent Bay Drive, Lake Forest, California, 92630.

The agency contact is Mr. Jim Griswold, NMOCD, State of New Mexico Oil Conservation Division, 1625 North French Drive, Hobbs, New Mexico 88240.

10 Limitations

For documents cited that were not generated by Cardno, the data taken from those documents is used “as is” and is assumed to be accurate. Cardno does not guarantee the accuracy of this data and makes no warranties for the referenced work performed nor the inferences or conclusions stated in these documents.

This document and the work performed have been undertaken in good faith, with due diligence and with the expertise, experience, capability and specialized knowledge necessary to perform the work in a good and workmanlike manner and within all accepted standards pertaining to providers of environmental services in New Mexico at the time of investigation. No soil engineering or geotechnical references are implied or should be inferred. The evaluation of the geologic conditions at the site for this investigation is made from a limited number of data points. Subsurface conditions may vary away from these data points.

11 References

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12 Acronym List

µg/L	Micrograms per liter
µg/m^3	Micrograms per cubic meter
µs	Microsiemens
1,2-DCA	1,2-dichloroethane
acfm	Actual cubic feet per minute
AS	Air sparge
AST	Aboveground storage tank
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
cfm	Cubic feet per minute
COC	Chain-of-Custody
CPT	Cone Penetration (Penetrometer) Test
DIPE	Di-isopropyl ether
DO	Dissolved oxygen
DOT	Department of Transportation
DPE	Dual-phase extraction
DTW	Depth to water
EDB	1,2-dibromoethane
EPA	Environmental Protection Agency
ESL	Environmental screening level
ETBE	Ethyl tertiary butyl ether
FID	Flame-ionization detector
fpm	Feet per minute
GAC	Granular activated carbon
gpd	Gallons per day
gpm	Gallons per minute
GWPTS	Groundwater pump and treat system
HIT	High-intensity targeted
HVOC	Halogenated volatile organic compound
J	Estimated value between MDL and PQL (RL)
LEL	Lower explosive limit
LPC	Liquid-phase carbon
LRP	Liquid-ring pump
LUFT	Leaking underground fuel tank
LUST	Leaking underground storage tank
MCL	Maximum contaminant level
MDL	Method detection limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m^3	Milligrams per cubic meter
MPE	Multi-phase extraction
MRL	Method reporting limit
msl	Mean sea level
MTBE	Methyl tertiary butyl ether
MTCA	Model Toxics Control Act
NAI	Natural attenuation indicators
NAPL	Non-aqueous phase liquid
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
ORP	Oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OVA	Organic vapor analyzer
P&ID	Process and Instrumentation Diagram
PAH	Polycyclic aromatic (or polyaromatic) hydrocarbon
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene or perchloroethylene
PID	Photo-ionization detector
PLC	Programmable logic control
POTW	Publicly-owned treatment works
ppmv	Parts per million by volume
PQL	Practical quantitation limit
psi	Pounds per square inch
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
RBSL	Risk-based screening levels
RCRA	Resource Conservation and Recovery Act
RL	Reporting limit
scfm	Standard cubic feet per minute
SSTL	Site-specific target level
STLC	Soluble threshold limit concentration
SVE	Soil vapor extraction
SVOC	Semi-volatile organic compound
TAME	Tertiary amyl methyl ether
TBA	Tertiary butyl alcohol
TCE	Trichloroethene
TOC	Top of well casing elevation; datum is msl
TOG	Total oil and grease
TPH	Total petroleum hydrocarbons
TPHd	Total petroleum hydrocarbons as diesel
TPHg	Total petroleum hydrocarbons as gasoline
TPHmo	Total petroleum hydrocarbons as motor oil
TPHs	Total petroleum hydrocarbons as stoddard solvent
TRPH	Total recoverable petroleum hydrocarbons
UCL	Upper confidence level
USCS	Unified Soil Classification System
USGS	United States Geologic Survey
UST	Underground storage tank
VCP	Voluntary Cleanup Program
VOC	Volatile organic compound
VPC	Vapor-phase carbon

EXPLANATION

N

SOURCE:
Modified from maps provided by
Google Earth Pro

APPROXIMATE SCALE

0 600 1200
FEET

FN 013613U118.R01.P1-REVISED

SITE VICINITY MAP

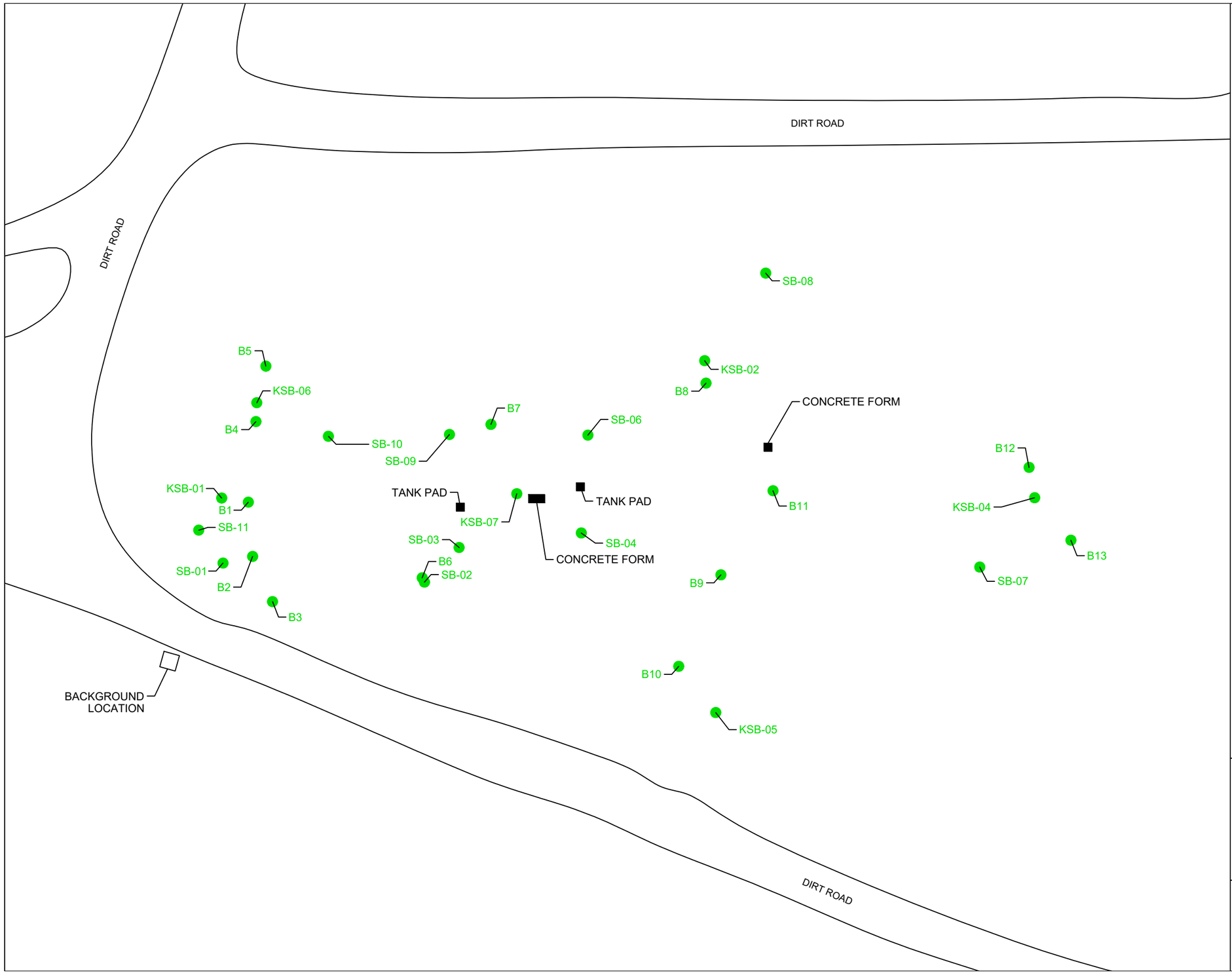
FORMER STATE K TANK BATTERY NO. 3
Vacuum Oil Field
Lea County, New Mexico

Cardno

PROJECT NO.
3613

PLATE
1

DATE: 09/04/19



EXPLANATION

SB-11 Soil boring

N

SOURCE:
Modified from maps provided by
CONESTOGA-ROVERS & ASSOCIATES
Google Earth Pro, KLEINFELDER

APPROXIMATE SCALE

0 50 100
FEET

FN 013613U118.R01.P2, P3, P3-REVISED

GENERALIZED SITE PLAN

FORMER STATE K TANK BATTERY NO. 3
Vacuum Oil Field
Lea County, New Mexico

Cardno

PROJECT NO. 3613

PLATE 2

DATE: 09/04/19

DIRT ROAD

DIRT ROAD

B5

Date	Depth	Chloride
10/27/18	5'	90
10/27/18	10'	64
10/27/18	15'	46
10/27/18	20'	880
10/27/18	25'	740

B7

Date	Depth	Chloride
10/27/18	5'	28
10/27/18	10'	14
10/27/18	20'	8.8J
10/27/18	25'	5.3J
10/27/18	30'	8.2J

KSB-07

Date	Depth	Chloride
04/14/10	0-1'	521
04/14/10	4'-5'	349
04/14/10	9'-10'	94.6
04/14/10	14'-15'	1150
04/14/10	19'-20'	1450
04/14/10	24'-25'	155
04/14/10	29'-30'	110

KSB-02

Date	Depth	Chloride
04/14/10	0-1'	1146
04/14/10	4'-5'	821
04/14/10	9'-10'	705
04/14/10	14'-15'	283
04/14/10	19'-20'	292
04/14/10	24'-25'	64.3
04/14/10	29'-30'	289

SB-08

Date	Depth	Chloride
08/23/05	1'-2'	940
08/23/05	15'-16'	84
08/23/05	20'-21'	41.7

B12

Date	Depth	Chloride
10/28/18	5'	270
10/28/18	10'	180
10/28/18	15'	200
10/28/18	20'	74
10/28/18	25'	390
10/28/18	35'	140
10/28/18	40'	110

SB-10

Date	Depth	Chloride
08/23/05	1'-2'	2080
08/23/05	15'-16'	887
08/23/05	20'-21'	62

SB-06

Date	Depth	Chloride
08/22/05	1'-2'	49.4
08/22/05	15'-16'	35
08/22/05	20'-21'	31.9

B8

Date	Depth	Chloride
10/28/18	5'	690
10/28/18	10'	900
10/28/18	15'	180
10/28/18	25'	310
10/28/18	30'	110
10/28/18	40'	74

KSB-06

Date	Depth	Chloride
04/14/10	1'	1632

B4

Date	Depth	Chloride
10/27/18	5'	35
10/27/18	10'	63
10/27/18	15'	23
10/27/18	20'	100

SB-09

Date	Depth	Chloride
08/23/05	1'-2'	<12.4
08/23/05	15'-16'	19.5
08/23/05	DUP	15.9
08/23/05	20'-21'	<11.5

KSB-04

Date	Depth	Chloride
04/14/10	0-1'	643
04/14/10	4'-5'	880
04/14/10	9'-10'	732
04/14/10	14'-15'	958
04/14/10	19'-20'	163
04/14/10	24'-25'	552
04/14/10	29'-30'	520

KSB-01

Date	Depth	Chloride
04/14/10	0-1'	1200
04/14/10	4'-5'	895
04/14/10	9'-10'	866
04/14/10	14'-15'	962
04/14/10	19'-20'	4800
04/14/10	24'-25'	4420
04/14/10	29'-30'	2220

B1

Date	Depth	Chloride
10/27/18	10'	260
10/27/18	15'	120
10/27/18	20'	330
10/27/18	25'	670
10/27/18	30'	1200
10/27/18	35'	180

B11

Date	Depth	Chloride
10/28/18	5'	950
10/28/18	10'	40
10/28/18	15'	630
10/28/18	20'	930
10/28/18	25'	870
10/28/18	30'	830
10/28/18	35'	40
10/28/18	40'	110

SB-04

Date	Depth	Chloride
08/22/05	1'-2'	1930
08/22/05	14'-15'	877
08/22/05	20'-21'	1220

B13

Date	Depth	Chloride
10/29/18	5'	92
10/29/18	10'	340
10/29/18	15'	450
10/29/18	20'	21

SB-11

Date	Depth	Chloride
08/23/05	1'-2'	203
08/23/05	15'-16'	300
08/23/05	20'-21'	269

SB-03

Date	Depth	Chloride
08/22/05	1'-2'	4590
08/22/05	14'-15'	1050
08/22/05	20'-21'	1470

B9

Date	Depth	Chloride
10/29/18	5'	28
10/29/18	10'	34
10/29/18	15'	54
10/29/18	20'	9.1J

SB-07

Date	Depth	Chloride
08/23/05	1'-2'	46.5
08/23/05	15'-16'	117
08/23/05	20'-21'	128

BACKGROUND LOCATION

Date	Depth	Chloride
08/23/05	1'-2'	<12.6

SB-01

Date	Depth	Chloride
08/22/05	0-2'	<12
08/22/05	14'-15'	132
08/22/05	19'-20'	955

B6

Date	Depth	Chloride
10/27/18	5'	67
10/27/18	10'	7.0J
10/27/18	15'	26
10/27/18	20'	33
10/27/18	25'	4.8J
10/27/18	30'	11

SB-02

Date	Depth	Chloride
08/22/05	1'-2'	91.9
08/22/05	15'-16'	25.6
08/22/05	20'-21'	91.3

B10

Date	Depth	Chloride
10/29/18	5'	29
10/29/18	10'	13
10/29/18	15'	17
10/29/18	20'	30

KSB-05

Date	Depth	Chloride
04/14/10	1'	5223

B2

Date	Depth	Chloride
10/29/18	5'	560
10/29/18	10'	890
10/29/18	15'	840
10/29/18	20'	1600
10/29/18	30'	260
10/29/18	35'	320
10/29/18	40'	340
10/29/18	45'	120
10/29/18	50'	56

B3

Date	Depth	Chloride
10/27/18	5'	300
10/27/18	10'	1000
10/27/18	15'	510
10/27/18	20'	63

600

EXCAVATION AREA 1

EXCAVATION AREA 2

CONCRETE FORM

TANK PAD

EXCAVATION AREA 3

EXCAVATION AREA 4

CONCRETE FORM

EXCAVATION AREA 6

EXCAVATION AREA 7

EXCAVATION AREA 5

DIRT ROAD

EXPLANATION

- SB-11 — Soil boring
- Proposed sidewall sample locations
- Chloride concentration in mg/kg
- < — Less than the stated laoratory reporting limit
- J — Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
- NA — Not analyzed
- 5223 — Highlighted values equal or exceed 600 mg/kg
- 0-10' bgs interval with chloride concentrations >600 mg/kg
- 11-50' bgs interval with chloride concentrations >600 mg/kg
- Limits of proposed excavation

N

SOURCE:
Modified from maps provided by
CONESTOGA-ROVERS & ASSOCIATES
Google Earth Pro, KLEINFELDER

APPROXIMATE SCALE

0 50 100
FEET

FN 013613U118.R01.P2, P3, P3-REVISED

CHLORIDE SOIL SAMPLE ANALYSES MAP

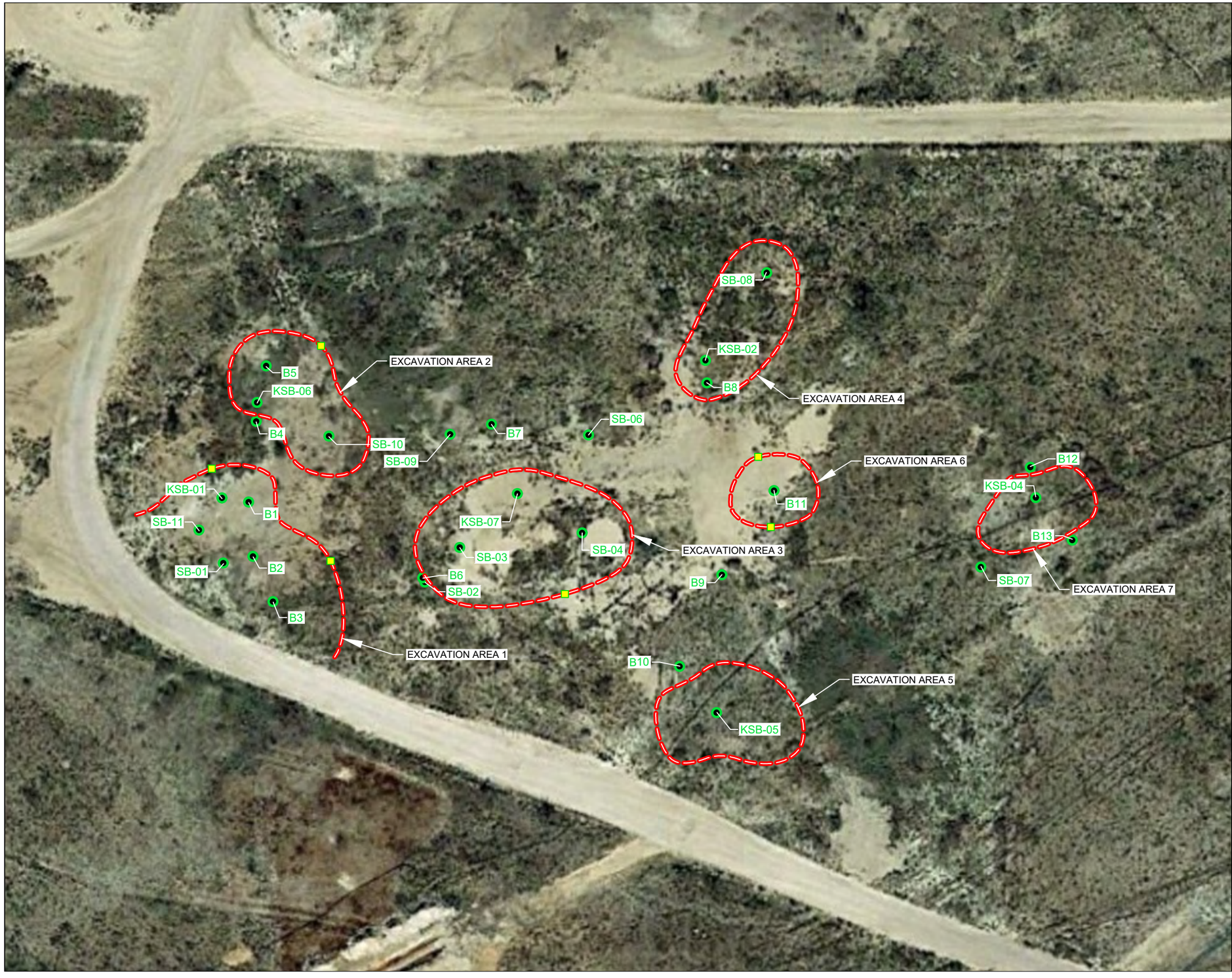
FORMER STATE K TANK BATTERY NO. 3
Vacuum Oil Field
Lea County, New Mexico

Cardno

PROJECT NO. 3613

PLATE 3

DATE: 09/04/19



EXPLANATION

SB-11 Soil boring

Proposed sidewall sample locations

Limits of proposed excavation

N

SOURCE:
Modified from maps provided by
CONESTOGA-ROVERS & ASSOCIATES
Google Earth Pro, KLEINFELDER

APPROXIMATE SCALE

0 50 100
FEET

FN 013613U118.R01.P4

AERIAL EXCAVATION AREA MAP

FORMER STATE K TANK BATTERY NO. 3
Vacuum Oil Field
Lea County, New Mexico

Cardno

PROJECT NO. 3613

PLATE 4

DATE: 09/04/19

TABLE 1
CUMULATIVE SOIL ANALYTICAL RESULTS
New Mexico State K Tank Battery No. 3
Lea County, New Mexico
Cardno 3613

Sampling Method				EPA 8021B					EPA 8015B			EPA 525.2	EPA 9056	Saturated Paste	SM 4500-Cl C
Sample ID	Boring	Sampling Date	Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH as Diesel (mg/kg)	TPH as Gasoline (mg/kg)	Total TPH (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/L)
NMOCD RRALs				**10**	**---**	**---**	**---**	**50**	**---**	**---**	**1,000**	**---**	**---**	**---**	---
NMOCD Chloride Limits				---	**---**	**---**	**---**	---	**---**	**---**	---	**600**	**600**	**600**	**600**
2005 Subsurface Investigation															
SB1-0-2'	SB-01	08/22/05	0-2	<0.0012	<0.0012	<0.0012	<0.0012	BDL	<0.12	870	870	<12	---	---	---
SB1-14-15'	SB-01	08/22/05	14-15	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<5.3	BDL	132	---	---	---
SB1-19-20'	SB-01	08/22/05	19-20	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	<5.2	BDL	**955**	---	---	---
SB2-1-2'	SB-02	08/22/05	1-2	<0.001	0.0075	<0.001	0.002	0.0095	<0.1	4,200	**4,200**	91.9	---	---	---
SB2-15-16'	SB-02	08/22/05	15-16	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	32	32	25.6	---	---	---
SB2-20-21'	SB-02	08/22/05	20-21	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	19	19	91.3	---	---	---
SB3-1-2'	SB-03	08/22/05	1-2	<0.0012	0.0073	<0.0012	<0.0012	0.0073	<0.12	160	160	**4,590**	---	---	---
SB3-14-15'	SB-03	08/22/05	14-15	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<0.54	BDL	**1,050**	---	---	---
SB3-20-21'	SB-03	08/22/05	20-21	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<0.53	BDL	**1,470**	---	---	---
SB4-1-2'	SB-04	08/22/05	1-2	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	250	250	**1,930**	---	---	---
SB4-14-15'	SB-04	08/22/05	14-15	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	11	11	**877**	---	---	---
SB4-20-21'	SB-04	08/22/05	20-21	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	14	14	**1,220**	---	---	---
SB5-1-2'	SB-05	08/22/05	1-2	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<11	BDL	<10.6	---	---	---
SB5-15-16'	SB-05	08/22/05	15-16	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	<5.2	BDL	104	---	---	---
SB5-20-21'	SB-05	08/22/05	20-21	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<5.3	BDL	138	---	---	---
SB6-1-2'	SB-06	08/22/05	1-2	<0.0012	0.039	0.0018	0.0055	0.0463	<0.12	410	410	49.4	---	---	---
SB6-15-16'	SB-06	08/22/05	15-16	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	<5.1	BDL	35	---	---	---
SB6-20-21'	SB-06	08/22/05	20-21	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	<5.1	BDL	31.9	---	---	---
SB7-1-2'	SB-07	08/23/05	1-2	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<5.6	BDL	46.5	---	---	---
SB7-15-16'	SB-07	08/23/05	15-16	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<5.6	BDL	117	---	---	---
SB7-20-21'	SB-07	08/23/05	20-21	<0.0012	<0.0012	<0.0012	<0.0012	BDL	<0.12	<5.8	BDL	128	---	---	---
SB8-1-2'	SB-08	08/23/05	1-2	<0.0013	<0.0013	<0.0013	<0.0013	BDL	<0.13	530	530	**940**	---	---	---
SB8-15-16'	SB-08	08/23/05	15-16	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	17	17	84	---	---	---
SB8-20-21'	SB-08	08/23/05	20-21	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	<5.2	BDL	41.7	---	---	---

TABLE 1
CUMULATIVE SOIL ANALYTICAL RESULTS
New Mexico State K Tank Battery No. 3
Lea County, New Mexico
Cardno 3613

Sampling Method				EPA 8021B					EPA 8015B			EPA 525.2	EPA 9056	Saturated Paste	SM 4500-Cl C
Sample ID	Boring	Sampling Date	Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH as Diesel (mg/kg)	TPH as Gasoline (mg/kg)	Total TPH (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/L)
NMOCD RRALs				**10**	**---**	**---**	**---**	**50**	**---**	**---**	**1,000**	**---**	**---**	**---**	---
NMOCD Chloride Limits				---	**---**	**---**	**---**	---	**---**	**---**	---	**600**	**600**	**600**	**600**
SB9-1-2'	SB-09	08/23/05	1-2	<0.0012	<0.0012	<0.0012	<0.0012	BDL	<0.12	<6.2	BDL	<12.4	---	---	---
SB9-15-16'	SB-09	08/23/05	15-16	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<5.3	BDL	19.5	---	---	---
SB9-15-16' Dup	SB-09	08/23/05	15-16	<0.001	<0.001	<0.001	<0.001	BDL	<0.1	<5.2	BDL	15.9			
SB9-21-21'	SB-09	08/23/05	21-21	<0.0012	<0.0012	<0.0012	<0.0012	BDL	<0.12	<6.2	BDL	<11.5	---	---	---
SB10-1-2'	SB-10	08/23/05	1-2	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	50	50	**2,080**	---	---	---
SB10-15-16'	SB-10	08/23/05	15-16	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<5.3	BDL	**887**	---	---	---
SB10-20-21'	SB-10	08/23/05	20-21	<0.0011	<0.0011	<0.0011	<0.0011	BDL	<0.11	<5.6	BDL	62	---	---	---
SB11-1-2'	SB-11	08/23/05	1-2	<0.0012	<0.0012	<0.0012	<0.0012	BDL	<0.12	<61	BDL	203	---	---	---
SB11-15-16'	SB-11	08/23/05	15-16	<0.001	<0.001	<0.001	0.0014	0.0014	<0.1	<5.2	BDL	**300**	---	---	---
SB11-20-21'	SB-11	08/23/05	20-21	<0.0011	<0.0011	<0.0011	0.0016	0.0016	<0.11	<0.53	BDL	**269**	---	---	---
Background	---	08/23/05	1-2	---	---	---	---	---	---	---	---	<12.6	---	---	---
2010 Subsurface Investigation															
SB1 0-1	KSB-01	04/14/10	0-1	---	---	---	---	---	---	---	---	---	**1,200 B1**	**1,207**	---
SB1 4-5	KSB-01	04/14/10	4-5	---	---	---	---	---	---	---	---	---	**895 B1**	**1,793**	---
SB1 9-10	KSB-01	04/14/10	9-10	<0.000929	<0.000929	<0.000929	<0.000929	BDL	<4.84	<0.0929	BDL	---	**866 B1**	---	---
SB1 14-15	KSB-01	04/14/10	14-15	---	---	---	---	---	---	---	---	---	**962 B1**	---	---
SB1 19-20	KSB-01	04/14/10	19-20	---	---	---	---	---	---	---	---	---	**4,800 B1**	---	---
SB1 24-5	KSB-01	04/14/10	24-25	---	---	---	---	---	---	---	---	---	**4,420 B1**	---	---
SB1 29-30	KSB-01	04/14/10	29-30	<0.000931	<0.000931	<0.000931	<0.000931	BDL	<4.84	<0.0931	BDL	---	**2,220 B1**	---	---
SB2 0-1	KSB-02	04/14/10	0-1	---	---	---	---	---	---	---	---	---	**1,070 B1**	**1,146**	---
SB2 4-5	KSB-02	04/14/10	4-5	---	---	---	---	---	---	---	---	---	**807 B1**	**821**	---
SB2 9-10	KSB-02	04/14/10	9-10	---	---	---	---	---	---	---	---	---	**705 B1**	---	---
SB2 14-15	KSB-02	04/14/10	14-15	---	---	---	---	---	---	---	---	---	283 B1	---	---
SB2 19-20	KSB-02	04/14/10	19-20	---	---	---	---	---	---	---	---	---	292 B1	---	---
SB2 24-5	KSB-02	04/14/10	24-25	<0.000947	<0.000947	<0.000947	<0.000947	BDL	<4.88	<0.0947	BDL	---	64.3 B1	---	---
SB2 29-30	KSB-02	04/14/10	29-30	<0.000943	<0.000943	<0.000943	<0.000943	BDL	10.9	<0.0943	10.9	---	289 B1	---	---

TABLE 1
CUMULATIVE SOIL ANALYTICAL RESULTS
New Mexico State K Tank Battery No. 3
Lea County, New Mexico
Cardno 3613

Sampling Method				EPA 8021B					EPA 8015B			EPA 525.2	EPA 9056	Saturated Paste	SM 4500-Cl C
Sample ID	Boring	Sampling Date	Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH as Diesel (mg/kg)	TPH as Gasoline (mg/kg)	Total TPH (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/L)
NMOCD RRALs				**10**	**---**	**---**	**---**	**50**	**---**	**---**	**1,000**	**---**	**---**	**---**	---
NMOCD Chloride Limits				---	**---**	**---**	**---**	---	**---**	**---**	---	**600**	**600**	**600**	**600**
SB4 0-1	KSB-04	04/14/10	0-1	---	---	---	---	---	---	---	---	---	494	**643**	---
SB4 4-5	KSB-04	04/14/10	4-5	---	---	---	---	---	---	---	---	---	43.2 B1	**880**	---
SB4 9-10	KSB-04	04/14/10	9-10	<0.000873	<0.000873	<0.000873	<0.000873	BDL	5.69	<0.0873	5.69	---	**732 B1**	---	---
SB4 14-15	KSB-04	04/14/10	14-15	---	---	---	---	---	---	---	---	---	**958 B1**	---	---
SB4 19-20	KSB-04	04/14/10	19-20	---	---	---	---	---	---	---	---	---	163 B1	---	---
SB4 24-5	KSB-04	04/14/10	24-25	---	---	---	---	---	---	---	---	---	552 B1	---	---
SB4 29-30	KSB-04	04/14/10	29-30	<0.000926	<0.000926	<0.000926	<0.000926	BDL	12.0	<0.0926	12.0	---	520 B1	---	---
SB5 0-1	KSB-05	04/14/10	0-1	---	---	---	---	---	---	---	---	---	---	**5,223**	---
SB6 0-1	KSB-06	04/14/10	0-1	---	---	---	---	---	---	---	---	---	---	**1,632**	---
SB7 0-1	KSB-07	04/14/10	0-1	---	---	---	---	---	---	---	---	---	521	555	---
SB7 4-5	KSB-07	04/14/10	4-5	---	---	---	---	---	---	---	---	---	349 B1	19	---
SB7 9-10	KSB-07	04/14/10	9-10	<0.000990	<0.000990	<0.000990	<0.000990	BDL	<4.86	<0.0990	BDL	---	94.6 B1	---	---
SB7 14-15	KSB-07	04/14/10	14-15	---	---	---	---	---	---	---	---	---	**1,150 B1**	---	---
SB7 19-20	KSB-07	04/14/10	19-20	---	---	---	---	---	---	---	---	---	**1,450 B1**	---	---
SB7 24-5	KSB-07	04/14/10	24-25	---	---	---	---	---	---	---	---	---	155 B1	---	---
SB7 29-30	KSB-07	04/14/10	29-30	<0.000904	<0.000904	<0.000904	<0.000904	BDL	<4.86	<0.0904	BDL	---	110 B1	---	---
2018 Subsurface Investigation															
S-10-B1	B1	10/27/18	10	---	---	---	---	---	---	---	---	---	260 B	---	---
S-15-B1	B1	10/27/18	15	---	---	---	---	---	---	---	---	---	120 B	---	---
S-20-B1	B1	10/27/18	20	---	---	---	---	---	---	---	---	---	330 B	---	---
S-25-B1	B1	10/27/18	25	---	---	---	---	---	---	---	---	---	**670 B**	---	---
S-30-B1	B1	10/27/18	30	---	---	---	---	---	---	---	---	---	**1,200 B**	---	46
S-35-B1	B1	10/27/18	35	---	---	---	---	---	---	---	---	---	180 B	---	---

TABLE 1
CUMULATIVE SOIL ANALYTICAL RESULTS
New Mexico State K Tank Battery No. 3
Lea County, New Mexico
Cardno 3613

Sampling Method				EPA 8021B					EPA 8015B			EPA 525.2	EPA 9056	Saturated Paste	SM 4500-Cl C
Sample ID	Boring	Sampling Date	Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH as Diesel (mg/kg)	TPH as Gasoline (mg/kg)	Total TPH (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/L)
NMOCD RRALs				**10**	**---**	**---**	**---**	**50**	**---**	**---**	**1,000**	**---**	**---**	**---**	---
NMOCD Chloride Limits				---	**---**	**---**	**---**	---	**---**	**---**	---	**600**	**600**	**600**	**600**
S-5-B2	B2	10/29/18	5	---	---	---	---	---	---	---	---	---	560	---	---
S-10-B2	B2	10/29/18	10	---	---	---	---	---	---	---	---	---	**890**	---	---
S-15-B2	B2	10/29/18	15	---	---	---	---	---	---	---	---	---	**840**	---	---
S-20-B2	B2	10/29/18	20	---	---	---	---	---	---	---	---	---	**1,600**	---	---
S-30-B2	B2	10/29/18	30	---	---	---	---	---	---	---	---	---	260	---	---
S-35-B2	B2	10/29/18	35	---	---	---	---	---	---	---	---	---	320	---	---
S-40-B2	B2	10/29/18	40	---	---	---	---	---	---	---	---	---	340	---	---
S-45-B2	B2	10/29/18	45	---	---	---	---	---	---	---	---	---	120	---	---
S-50-B2 (a)	B2	10/29/18	50	<0.0050	<0.0050	<0.0050	<0.0050	BDL	<5.3	<0.49	BDL	---	56	---	---
S-5-B3	B3	10/27/18	5	---	---	---	---	---	---	---	---	---	300	---	---
S-10-B3	B3	10/27/18	10	---	---	---	---	---	---	---	---	---	**1,000**	---	---
S-15-B3	B3	10/27/18	15	---	---	---	---	---	---	---	---	---	510	---	---
S-20-B3	B3	10/27/18	20	---	---	---	---	---	---	---	---	---	63	---	---
S-5-B4	B4	10/27/18	5	<0.0051	<0.0051	<0.0051	<0.0051	BDL	---	<0.50	BDL	---	35	---	---
S-10-B4	B4	10/27/18	10	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.50	BDL	---	63 B	---	---
S-15-B4	B4	10/27/18	15	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.50	BDL	---	23	---	---
S-20-B4	B4	10/27/18	20	<0.0051	<0.0051	<0.0051	<0.0051	BDL	---	<0.50	BDL	---	100 B	---	---
S-5-B5	B5	10/27/18	5	---	---	---	---	---	---	---	---	---	90	---	---
S-10-B5	B5	10/27/18	10	---	---	---	---	---	---	---	---	---	64	---	---
S-15-B5	B5	10/27/18	15	---	---	---	---	---	---	---	---	---	46	---	---
S-20-B5	B5	10/27/18	20	---	---	---	---	---	---	---	---	---	**880**	---	---
S-25-B5	B5	10/27/18	25	---	---	---	---	---	---	---	---	---	**740**	---	---
S-5-B6	B6	10/27/18	5	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.51	BDL	---	67	---	---
S-10-B6	B6	10/27/18	10	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.49	BDL	---	7.0 J	---	---
S-15-B6	B6	10/27/18	15	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.48	BDL	---	26	---	---
S-20-B6	B6	10/27/18	20	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.50	BDL	---	33	---	---
S-25-B6	B6	10/27/18	25	<0.0051	<0.0051	<0.0051	<0.0051	BDL	---	<0.48	BDL	---	4.8 J	---	---
S-30-B6	B6	10/27/18	30	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.50	BDL	---	11	---	---

TABLE 1
CUMULATIVE SOIL ANALYTICAL RESULTS
New Mexico State K Tank Battery No. 3
Lea County, New Mexico
Cardno 3613

Sampling Method				EPA 8021B					EPA 8015B			EPA 525.2	EPA 9056	Saturated Paste	SM 4500-Cl C
Sample ID	Boring	Sampling Date	Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH as Diesel (mg/kg)	TPH as Gasoline (mg/kg)	Total TPH (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/L)
NMOCD RRALs				**10**	**---**	**---**	**---**	**50**	**---**	**---**	**1,000**	**---**	**---**	**---**	---
NMOCD Chloride Limits				---	**---**	**---**	**---**	---	**---**	**---**	---	**600**	**600**	**600**	**600**
S-5-B7	B7	10/27/18	5	---	---	---	---	---	---	---	---	---	28	---	---
S-10-B7	B7	10/27/18	10	---	---	---	---	---	---	---	---	---	14	---	---
S-20-B7	B7	10/27/18	20	---	---	---	---	---	---	---	---	---	8.8 J	---	---
S-25-B7	B7	10/27/18	25	---	---	---	---	---	---	---	---	---	5.3 J	---	---
S-30-B7	B7	10/27/18	30	---	---	---	---	---	---	---	---	---	8.2 J	---	---
S-5-B8	B8	10/28/18	5	---	---	---	---	---	---	---	---	---	**690 B**	---	---
S-10-B8	B8	10/28/18	10	---	---	---	---	---	---	---	---	---	**900**	---	---
S-15-B8	B8	10/28/18	15	---	---	---	---	---	---	---	---	---	180	---	---
S-25-B8	B8	10/28/18	25	---	---	---	---	---	---	---	---	---	310	---	---
S-30-B8	B8	10/28/18	30	---	---	---	---	---	---	---	---	---	110	---	---
S-40-B8	B8	10/28/18	40										74	---	---
S-5-B9	B9	10/29/18	5	<0.0052	<0.0052	<0.0052	<0.0052	BDL	---	<0.51	BDL	---	28	---	---
S-10-B9	B9	10/29/18	10	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.50	BDL	---	34	---	---
S-15-B9	B9	10/29/18	15	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.51	BDL	---	54	---	---
S-20-B9	B9	10/29/18	20	<0.0051	<0.0051	<0.0051	<0.0051	BDL	---	<0.50	BDL	---	9.1 J	---	---
S-5-B10	B10	10/29/18	5	<0.0051	<0.0051	<0.0051	<0.0051	BDL	---	<0.49	BDL	---	29	---	---
S-10-B10	B10	10/29/18	10	<0.0050	<0.0050	<0.0050	<0.0050	BDL	---	<0.51	BDL	---	13	---	---
S-15-B10	B10	10/29/18	15	<0.0051	<0.0051	<0.0051	<0.0051	BDL	---	<0.51	BDL	---	17	---	---
S-20-B10	B10	10/29/18	20	0.00013 J	<0.0050	<0.0050	<0.0050	BDL	---	<0.52	BDL	---	30	---	---
S-5-B11	B11	10/28/18	5	---	---	---	---	---	---	---	---	---	**950**	---	---
S-10-B11	B11	10/28/18	10	---	---	---	---	---	---	---	---	---	40	---	---
S-15-B11	B11	10/28/18	15	---	---	---	---	---	---	---	---	---	**630**	---	---
S-20-B11	B11	10/28/18	20	---	---	---	---	---	---	---	---	---	**930**	---	---
S-25-B11	B11	10/28/18	25	---	---	---	---	---	---	---	---	---	**870**	---	---
S-30-B11	B11	10/28/18	30	---	---	---	---	---	---	---	---	---	**830**	---	---
S-35-B11	B11	10/28/18	35	---	---	---	---	---	---	---	---	---	40	---	---
S-40-B11	B11	10/28/18	40	---	---	---	---	---	---	---	---	---	110	---	---

TABLE 1
CUMULATIVE SOIL ANALYTICAL RESULTS
New Mexico State K Tank Battery No. 3
Lea County, New Mexico
Cardno 3613

Sampling Method				EPA 8021B					EPA 8015B			EPA 525.2	EPA 9056	Saturated Paste	SM 4500-Cl C
Sample ID	Boring	Sampling Date	Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH as Diesel (mg/kg)	TPH as Gasoline (mg/kg)	Total TPH (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/kg)	Chloride (mg/L)
NMOCD RRALs				**10**	**---**	**---**	**---**	**50**	**---**	**---**	**1,000**	**---**	**---**	**---**	---
NMOCD Chloride Limits				---	**---**	**---**	**---**	---	**---**	**---**	---	**600**	**600**	**600**	**600**
S-5-B12	B12	10/28/18	5	---	---	---	---	---	---	---	---	---	270	---	---
S-10-B12	B12	10/28/18	10	---	---	---	---	---	---	---	---	---	180	---	---
S-15-B12	B12	10/28/18	15	---	---	---	---	---	---	---	---	---	200	---	---
S-20-B12	B12	10/28/18	20	---	---	---	---	---	---	---	---	---	74	---	---
S-25-B12	B12	10/28/18	25	---	---	---	---	---	---	---	---	---	390	---	---
S-35-B12	B12	10/28/18	35	---	---	---	---	---	---	---	---	---	140	---	---
S-40-B12	B12	10/28/18	40	---	---	---	---	---	---	---	---	---	110	---	---
S-5-B13	B13	10/29/18	5	---	---	---	---	---	---	---	---	---	92	---	---
S-10-B13	B13	10/29/18	10	---	---	---	---	---	---	---	---	---	340	---	---
S-15-B13	B13	10/29/18	15	---	---	---	---	---	---	---	---	---	450	---	---
S-20-B13	B13	10/29/18	20	---	---	---	---	---	---	---	---	---	21	---	---

Explanation:

BDL	=	Individual analyses below respective laboratory detection limits.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes.
EPA	=	Environmental Protection Agency.
NMOCD	=	New Mexico Oil Conservation Division.
RRALs	=	Recommended Remediation Action Levels for Sites with Total Ranking Score <19.
SM	=	Standard Method.
TPH	=	Total petroleum hydrocarbons.
mg/kg	=	Milligrams per kilogram.
mg/L	=	Milligrams per liter.
<	=	Not detected at or above the stated laboratory reporting limit.
---	=	Not analyzed/not available.
B	=	Analyte was present in the associated method blank.
B1	=	Analyte was detected in the associated Method Blank. Analyte concentration in the sample is greater than 10 times the concentration found in the Method Blank.
J	=	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
(a)	=	Analyzed for additional analytes. See laboratory analytical report for details.

TABLE 2
CUMULATIVE SOIL ANALYTICAL RESULTS - METALS
New Mexico State K Tank Battery No. 3
Lea County, New Mexico
Cardno 3613

Sampling Method				EPA 6010B															EPA 7471A	SW-846 Chapter 7		EPA 1010A(M)	EPA 9045C
Sample ID	Boring	Sampling Date	Depth (feet)	Anti-mony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Molyb-denum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vana-dium (mg/kg)	Zinc (mg/kg)	Mercury (mg/kg)	Reactive Sulfide (mg/kg)	Reactive Cyanide (mg/kg)	Ignitability (deg F)	pH (su)
NMOCD RRAL				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S-50-B2	B2	10/29/18	50	<0.769	<0.769	13.1	0.172 J	<0.513	6.67	0.288	1.22	0.738	<0.256	1.35	<0.769	<0.256	<0.769	10.7	1.88	0.00882 B,J	<2.0	<0.50	>212	8.13

Explanation:

NMOCD RRAL = New Mexico Oil Conservation Division Recommended Remediation Action Levels for Sites with Total Ranking Score <19.
EPA = Environmental Protection Agency.
deg F = Degrees Fahrenheit.
mg/kg = Milligrams per kilogram.
su = Standard units.
< = Not detected at or above the stated laboratory reporting limit.
--- = Not analyzed/not available.
B = Analyte was present in the associated method blank.
J = Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.

APPENDIX A

CORRESPONDENCE

David Purdy

From: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Sent: Wednesday, September 19, 2018 11:39 AM
To: David Purdy; Mann, Ryan
Cc: Patty Garcia
Subject: RE: Work Plan for Additional Soil Assessment - Former State K Tank Battery No. 3, Vacuum Oil Field, Lea County, New Mexico (NMOCD IRP No. 09-7-2239)
Attachments: approved_01361304.W01 Work Plan for Additional Soil Assessment 09-11-18.pdf

Mr. Purdy:

Notes

- All documents that you have previously sent to NMOCD has been uploaded to 1RP-2239. http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx
- Although no longer functional, there is a playa lake, which is a surface waterbody of New Mexico, approximately 500 ft. NE of the release location.

Thank you for your patience. NMOCD approves of the proposed additional release characterization for 1RP-2239. Please provide either on the soil bore logs or tabulated separately, the GPS coordinates of the soil bore locations.

Approval from NMSLO required. NMSLO may have additional concerns or stipulations.

Thanks,

Olivia Yu
Environmental Specialist
NMOCD, District I
Olivia.yu@state.nm.us
575-393-6161 x113

From: David Purdy <dave.purdy@cardno.com>
Sent: Tuesday, September 11, 2018 3:40 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Cc: Patty Garcia <patty.garcia@cardno.com>
Subject: Work Plan for Additional Soil Assessment - Former State K Tank Battery No. 3, Vacuum Oil Field, Lea County, New Mexico (NMOCD IRP No. 09-7-2239)
Importance: High

Ms. Yu:

Attached for your review, please find Cardno's Work Plan for Additional Soil Assessment prepared for Former State K Tank Battery No. 3, located at Vacuum Oil Field, Lea County, New Mexico (NMOCD IRP No. 09-7-2239).

Document Title

01361304.W01 Work Plan for Additional Soil Assessment.

Project Name

Former State K Tank Battery No.3

Project Identifiers

NMOCD IRP No. 09-7-2239

Regional Board Staff Name

Ms. Olivia Yu

Please contact me if you have any questions regarding this work plan, or if I need to electronically submit or upload it to another email/website.

Thank you.

Dave Purdy
SR. PROJECT MANAGER
CARDNO

Cardno
Shaping the Future

We've moved! Please note our new address below.

Direct +1 949 457 8941 Mobile +1 949 355 4470 Fax +1 949 457 8956
Address 20505 Crescent Bay, Lake Forest, CA 92630
Email dave.purdy@cardno.com Web www.cardno.com

CONNECT WITH CARDNO

APPENDIX B

SITE PHOTOGRAPHS

SITE PHOTOGRAPHS

Former Tank Battery
Lea County, NM
October 18, 2018

32°47’25.81” N - 103°28’31.63” W

32°47’26.43” N - 103°28’30.00” W looking north

32°47’26.06” N - 103°28’30.17” W looking north

32°47’24.97” N - 103°28’31.01” W looking north

32°47’25.58” N - 103°28’30.14” W looking north

32°47’24.97” N - 103°28’31.01” W looking northwest

APPENDIX C

NMOCD C-141 FORMS
FOR
SITE ASSESSMENT/ CHARACTERIZATION
AND
REMEDIATION PLAN

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 ExxonMobil Oil Corporation	OGRID
Contact Name David Purdy, Consultant for ExxonMobil	Contact Telephone (949) 457-8941
Contact email dave.purdy@cardno.com	Incident # *(assigned by OCD)* NMOCD IRP No. 09-7-2239
Contact mailing address 20505 Crescent Bay Drive, Lake Forest California, 92630	

Location of Release Source

Latitude 32°47'25" N Longitude 103°28'30" W
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Former State K Battery	Site Type Former Tank Battery Location
Date Release Discovered Unknown	API# *(if applicable)*

Unit Letter	Section	Township	Range	County
	32	17 South	32 East	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)	Volume Recovered (bbls)
	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) Water containing chloride	Volume/Weight Released (provide units) Unknown	Volume/Weight Recovered (provide units) Unknown
Cause of Release Historic operations		

Form C-141
Page 2

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?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

Initial Response

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

☒ 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: David M. Purdy, Consultant for ExxonMobil Title: Sr. Project Manager

Signature: D. M. Purdy Date: 8/15/2019

email: dave.purdy@cardno.com Telephone: (949) 457-8941

OCD Only

Received by: Date:

Form C-141
Page 3

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?	95' (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.

Form C-141
Page 4

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: David M. Purdy Title: Sr. Project Manager

Signature: David M. Purdy Date: 8/15/19

email: dave.purdy@cardno.com Telephone: (949) 457-8941

OCD Only

Received by: Date:

Form C-141
Page 5

State of New Mexico
Oil Conservation Division

Incident ID	nRM2101347620
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: David M. Purdy Title: Sr. Project Manager

Signature: David M. Purdy Date: 8/15/19

email: dave.purdy@cardno.com Telephone: (949) 457-8941

OCD Only

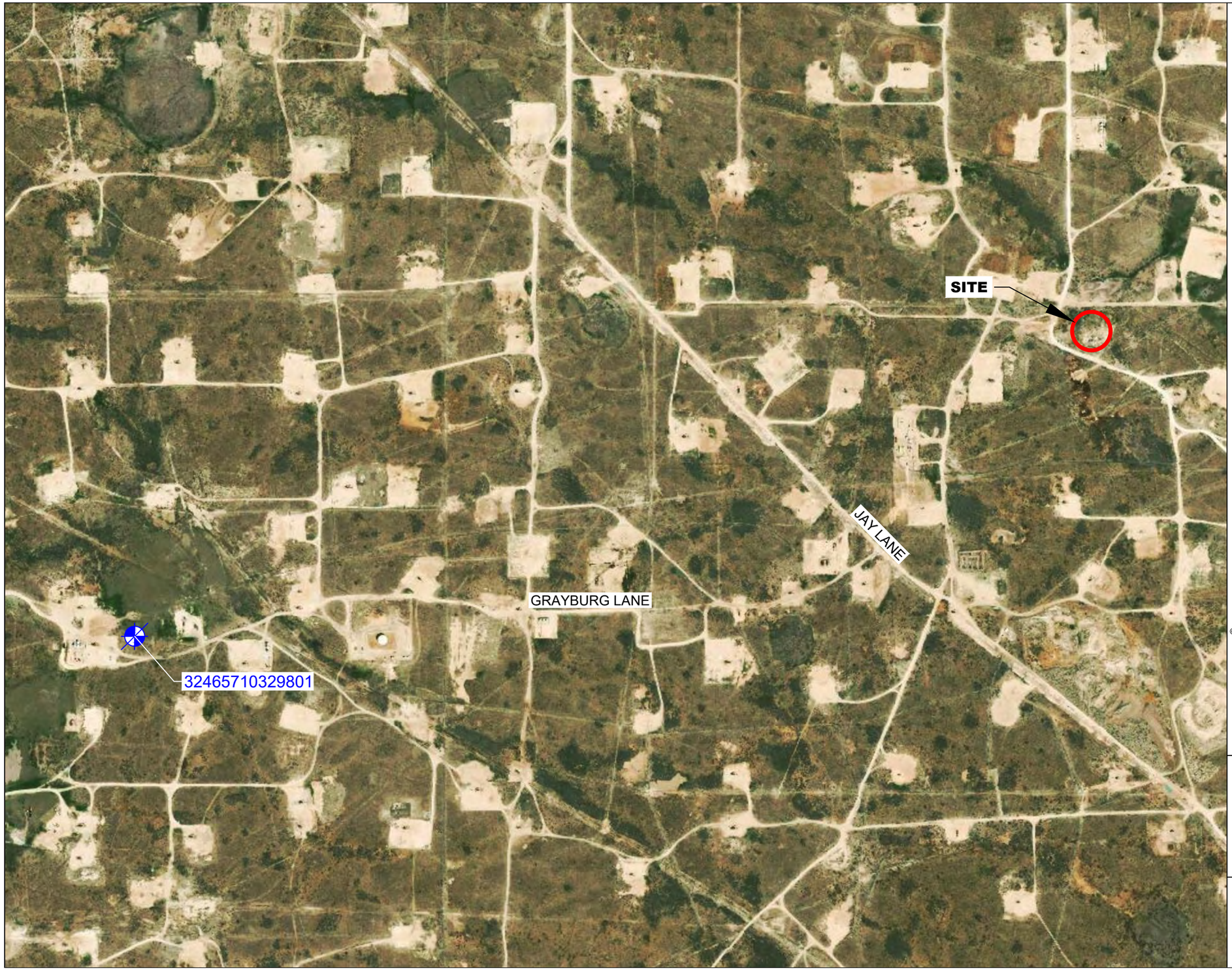
Received by: _____ Date: _____

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

Signature: Bradford Billings Date: 07/12/2021

APPENDIX D

WELL LOCATION MAP
AND
DEPTH TO GROUNDWATER DATA



EXPLANATION

32465710329801 Inactive water well

N

SOURCE:
Modified from maps provided by
Google Earth Pro and
© 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

APPROXIMATE SCALE

0 600 1200
FEET

FN 013613.R01B-Appendix.D

WELL LOCATION MAP

FORMER STATE K TANK BATTERY NO. 3
Vacuum Oil Field
Lea County, New Mexico

Cardno

PROJECT NO.
3613

APPENDIX
D

DATE: 08/19/19

National Water Information System: Map View

Help Info

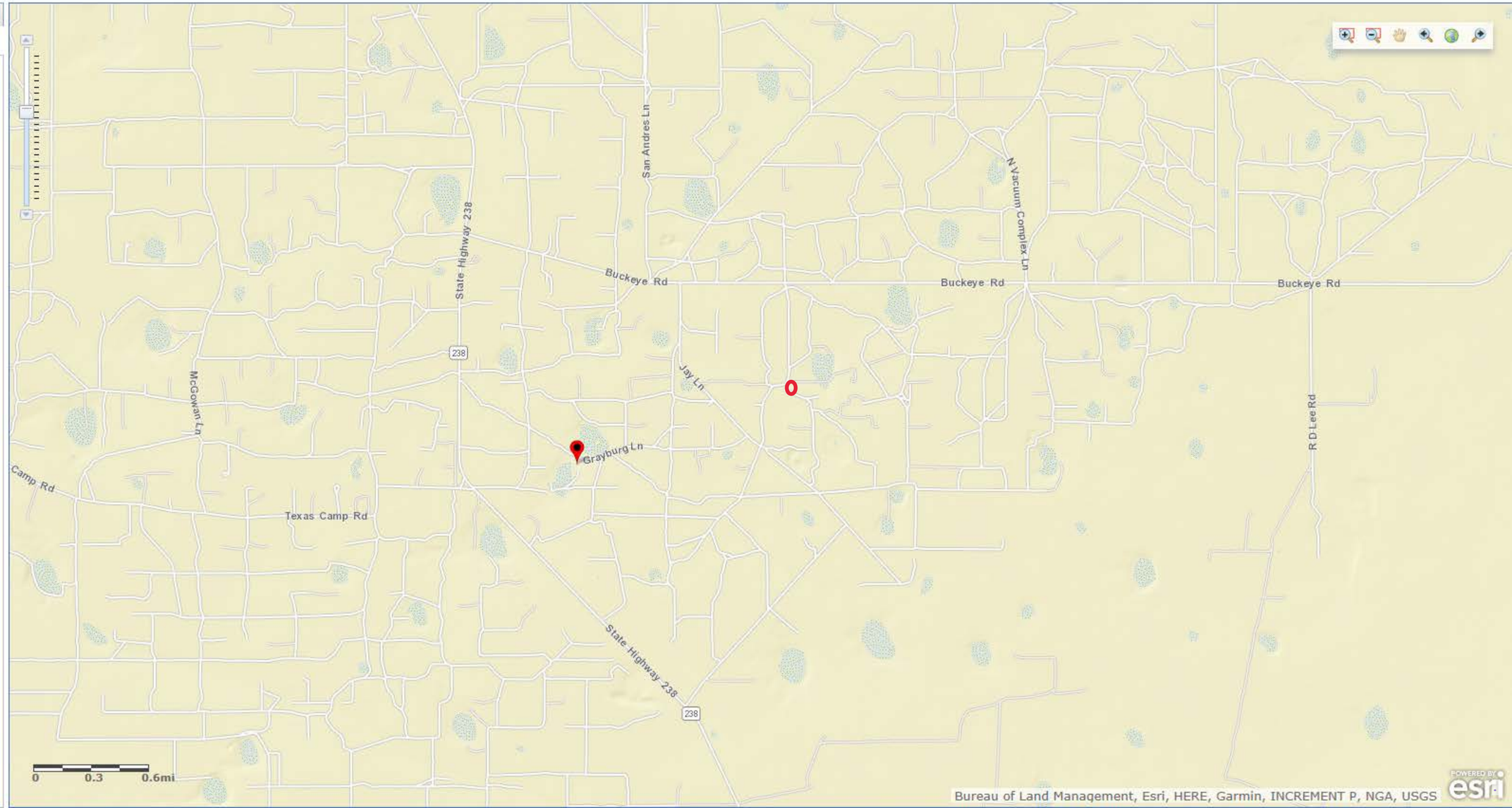
Sites | Map Layers

Search Results

Export Sites

Site Number	Site Name
324657103292801	17S.35E.31.43411

Search Parameters



USGS 32 47 57.0 103 29 38.1 17S.35E.31.43411

Lea County, New Mexico
Latitude 32°47'08", Longitude 103°29'38" NAD27
Land-surface elevation 3,968.00 feet above NGVD29
The depth of the well is 146 feet below land surface.
This well is completed in the Ogallala Formation (121OGLL) local aquifer.

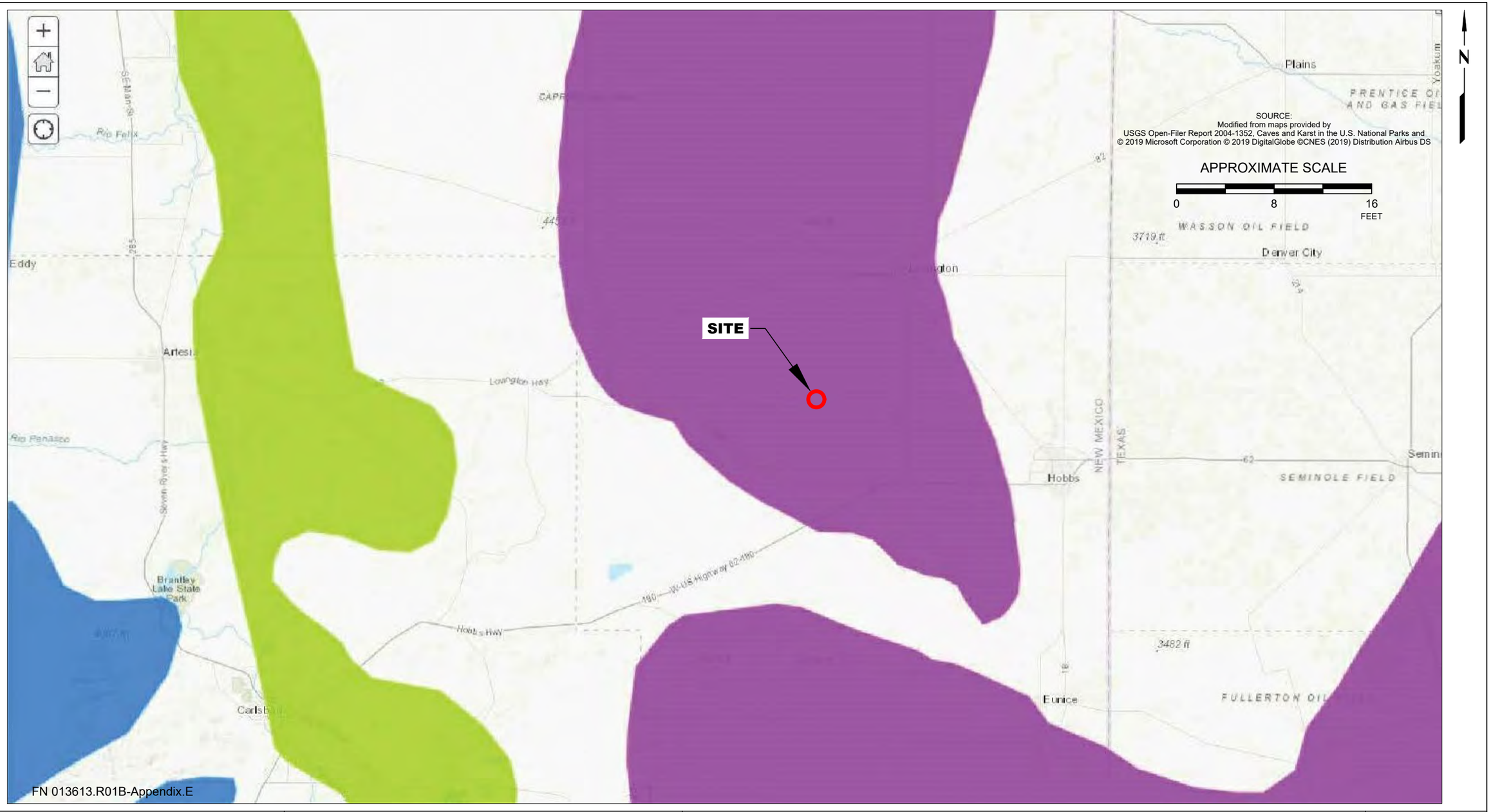
Output formats

- Table of data
- Tab-separated data
- Graph of data
- Reselect period

Date	Time	Water-level date-time accuracy	Water level, feet below land surface	Water level, feet above specific vertical datum	Referenced vertical datum	Water-level accuracy	Status	Method of measurement	Measuring agency	Source of measurement
1961-02-16		D	63.92			2		U		U
1966-03-17		D	65.63			2		U		U
1971-02-12		D	67.38			2		U		U
1976-03-04		D	71.12			2		U		U
1981-01-20		D	82.27			2		U		U
1981-06-17		D	83.25			2		U		U
1986-04-04		D	91.89			2		U		U
1991-01-15		D	95.01			2		U		U

APPENDIX E

KARST LOCATION MAP



Cardno

KARST LOCATION MAP

FORMER STATE K TANK BATTERY NO. 3
Vacuum Oil Field
Lea County, New Mexico

Karst Type
- Carbonate
- Erosional
- Gypsum
- Volcanic

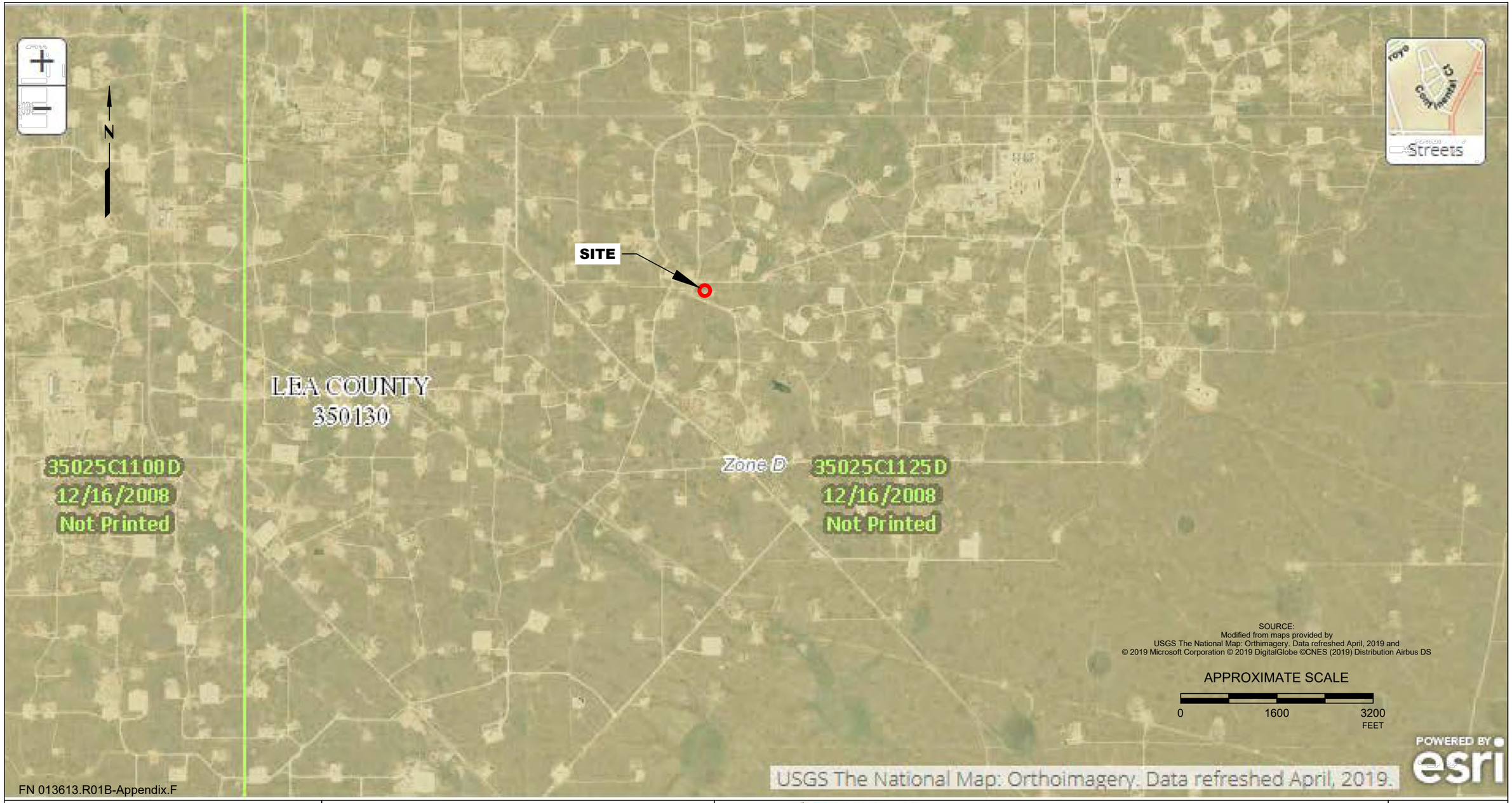
PROJECT NO.
3613

APPENDIX
E

DATE: 08/19/19

APPENDIX F

FLOOD HAZARDS MAP



FN 013613.R01B-Appendix.F

Cardno

FLOOD HAZARDS MAP

FORMER STATE K TANK BATTERY NO. 3
Vacuum Oil Field
Lea County, New Mexico

EXPLANATION

MAP PANELS
- Selected FloodMap Boundary
- Digital Data Available
- No Digital Data Available
- Unmapped

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D
- Otherwise Protected Area
- Coastal Barrier Resource System Area

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth
- Regulatory Floodway Zone AE, AO, AH, VE, AR

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

PROJECT NO.
3613

APPENDIX
F

DATE: 08/19/19

APPENDIX G

FIELD PROTOCOL

Soil Boring and Well Installation Field Protocol

Preliminary Activities

Prior to the onset of field activities at the site, Cardno obtains the appropriate permit(s) from the governing agency(s). Advance notification is made as required by the agency(s) prior to the start of work. Cardno marks the borehole locations and contacts the local one call utility locating service at least 48 hours prior to the start of work to mark buried utilities. Borehole locations may also be checked for buried utilities by a private geophysical surveyor. Prior to drilling, the borehole location is cleared in accordance with the client's procedures. Fieldwork is conducted under the advisement of a registered professional geologist and in accordance with an updated site-specific safety plan prepared for the project, which is available at the job site during field activities.

Drilling and Soil Sampling Procedures

Cardno contracts a licensed driller to advance the boring and collect soil samples. The specific drilling method (e.g., hollow-stem auger, direct push method, or sonic drilling), sampling method [e.g., core barrel or California-modified split spoon sampler (CMSSS)] and sampling depths are documented on the boring log and may be specified in a work plan. Soil samples are typically collected at the capillary fringe and at 5-foot intervals to the total depth of the boring. To determine the depth of the capillary fringe prior to drilling, the static groundwater level is measured with a water level indicator in the closest monitoring well to the boring location, if available.

The borehole is advanced to just above the desired sampling depth. For CMSSSs, the sampler is placed inside the auger and driven to a depth of 18 inches past the bit of the auger. The sampler is driven into the soil with a standard 140-pound hammer repeatedly dropped from a height of 30 inches onto the sampler. The number of blows required to drive the sampler each 6-inch increment is recorded on the boring log. For core samplers (e.g., direct push), the core is driven 18 inches using the rig apparatus.

Soil samples are preserved in the metal or plastic sleeve used with the CMSSS or core sampler, in glass jars or other manner required by the local regulatory agency (e.g., Environmental Protection Agency Method 5035). Sleeves are removed from the sample barrel, and the lowermost sample sleeve is immediately sealed with Teflon™ tape, capped, labeled, placed in a cooler chilled to 4º Celsius and transported to a state-certified laboratory. The samples are transferred under chain-of-custody (COC) protocol.

Field Screening Procedures

Cardno places the soil from the middle of the sampling interval into a plastic re-sealable bag. The bag is placed away from direct sunlight for a period of time which allows volatilization of chemical constituents, after which the tip of a photo-ionization detector (PID) or similar device is inserted through the plastic bag to measure organic vapor concentrations in the headspace. The PID measurement is recorded on the boring log. At a minimum, the PID or other device is calibrated on a daily basis in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration are recorded on a calibration log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis. Cardno trained personnel describe the soil in the bag according to the Unified Soil Classification System and record the description on the boring log, which is included in the final report.

Air Monitoring Procedures

Cardno performs a field evaluation for volatile hydrocarbon concentrations in the breathing zone using a calibrated photo-ionization detector or lower explosive level meter.

Groundwater Sampling

A groundwater sample, if desired, is collected from the boring by using Hydropunch™ sampling technology or installing a well in the borehole. In the case of using Hydropunch™ technology, after collecting the capillary fringe soil sample, the boring is advanced to the top of the soil/groundwater interface and a sampling probe is pushed to approximately 2 feet below the top of the static water level. The probe is opened by partially withdrawing it and thereby exposing the screen. A new or decontaminated bailer is used to collect a water sample from the probe. The water sample is then emptied into laboratory-supplied containers constructed of the correct material and with the correct volume and preservative to comply with the proposed laboratory test. The container is slowly filled with the retrieved water sample until no headspace remains and then promptly sealed with a Teflon-lined cap, checked for the presence of bubbles, labeled, entered onto a COC record and placed in chilled storage at 4° Celsius. Laboratory-supplied trip blanks accompany the water samples as a quality assurance/quality control procedure. Equipment blanks may be collected as required. The samples are kept in chilled storage and transported under COC protocol to a client-approved, state-certified laboratory for analysis.

Backfilling of Soil Boring

If a well is not installed, the boring is backfilled from total depth to approximately 5 feet below ground surface (bgs) with either neat cement or bentonite grout using a tremie pipe and either the boring is backfilled from 5 feet bgs to approximately 1 foot bgs with hydrated bentonite chips or backfill is continued to just below grade with neat cement grout. The borehole is completed to surface grade with material that best matches existing surface conditions and meets local agency requirements. Site-specific backfilling details are shown on the respective boring log.

Well Construction

A well (if constructed) is completed using materials documented on the boring log or specified in a work plan. The well is constructed with slotted casing across the desired groundwater sampling depth(s) and completed with blank casing to within 6 inches of surface grade. No further construction is conducted on temporary wells. For permanent wells, the annular space of the well is backfilled with Monterey sand from the total depth to approximately 2 feet above the top of the screened casing. A hydrated granular bentonite seal is placed on top of the sand filter pack. Grout may be placed on top of the bentonite seal to the desired depth using a tremie pipe. The well may be completed to surface grade with a 1-foot thick concrete pad. A traffic-rated well vault and locking cap for the well casing may be installed to protect against surface-water infiltration and unauthorized entry. Site-specific well construction details including type of well, well depth, casing diameter, slot size, length of screen interval and sand size are documented on the boring log or specified in the work plan.

Well Development and Sampling

If a permanent groundwater monitoring well is installed, the grout is allowed to cure a minimum of 48 hours before development. Cardno personnel or a contracted driller use a submersible pump or surge block to develop the newly installed well. Prior to development, the pump is decontaminated by allowing it to run and re-circulate while immersed in a non-phosphate solution followed by successive immersions in potable water and de-ionized water baths. The well is developed until sufficient well casing volumes are removed so that turbidity is within allowable limits and pH, conductivity and temperature levels stabilize in the purge water. The volume of groundwater extracted is recorded on a log.

Following development, groundwater within the well is allowed to recharge until at least 80% of the drawdown is recovered. A new or decontaminated bailer is slowly lowered past the air/water interface in the well, and a water sample is collected and checked for the presence of non-aqueous phase liquid, sheen or emulsions. The water sample is then emptied into laboratory-supplied containers as discussed above.

Surveying

If required, wells are surveyed by a licensed land surveyor relative to an established benchmark of known elevation above mean sea level to an accuracy of +/- 0.01 foot. The casing is notched or marked on one side to identify a consistent surveying and measuring point.

Decontamination Procedures

Cardno or the contracted driller decontaminates soil and water sampling equipment between each sampling event with a non-phosphate solution, followed by a minimum of two tap water rinses. De-ionized water may be used for the final rinse. Downhole drilling equipment is steam-cleaned prior to drilling the borehole and at completion of the borehole.

Waste Treatment and Soil Disposal

Soil cuttings generated from the drilling or sampling are stored on site in labeled, Department of Transportation-approved, 55-gallon drums or other appropriate storage container. The soil is removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal. Decontamination fluids and purge water from well development and sampling activities, if conducted, are stored on site in labeled, regulatory-approved storage containers. Fluids are subsequently transported under manifest to a client- and regulatory-approved facility for disposal or treated with a permitted mobile or fixed-base carbon treatment system.

Excavation Field Protocol

Preliminary Activities

Prior to the onset of field activities at the site, Cardno or a licensed subcontractor obtains the appropriate permit(s) from the governing agency(s). Advance notification is made as required by the agency(s) prior to the start of work. Cardno or the general contractor marks the area to be excavated and contacts the local one call utility locating service at least 48 hours prior to the start of work to mark buried utilities. The excavation location may also be checked for buried utilities by a private geophysical surveyor. Prior to excavation, the area is cleared in accordance with the client's procedures. Fieldwork is conducted under the advisement of a registered professional geologist or civil engineer and in accordance with an updated site-specific safety plan prepared for the project, which is available at the site during field activities.

Excavation and Soil Sampling Procedures

The excavation is performed by a licensed general contractor. Air monitoring is conducted as required by the regulatory agency or client, and the readings are recorded on a log. Excavated soil is temporarily stockpiled, covered with an impervious material (e.g., plastic sheeting), secured and labeled, or immediately containerized into bins.

Upon reaching the planned limit of the excavation, soil samples are collected from the bottom and sidewalls of the excavation, as directed by the regulatory agency or as specified in the work plan. Soil samples are collected using the bucket of the excavating equipment (e.g., backhoe or excavator), and then the sample container (sleeve or glass jar) is pushed by hand into the soil near the teeth of the equipment bucket to ensure that soil from the limit of the excavation, not slough, is collected. Alternatively, a metal sleeve may be driven by slide hammer into the soil. Samples from the stockpile(s) are collected in the same manner.

Soil samples are preserved in the metal or plastic sleeve, in glass jars or other manner required by the local regulatory agency (e.g., Environmental Protection Agency Method 5035). Each sleeve is promptly sealed with Teflon™ tape, capped, labeled, and placed in a cooler chilled to 4º Celsius. The samples are transferred under chain-of-custody protocol to a client-approved, state-certified laboratory for analysis.

Field Screening Procedures

Field screening is conducted during the excavation activities, and the excavated material is segregated into stockpiles based on concentrations above and below regulatory action levels. The stockpiled soil with concentrations above regulatory action levels is placed on an imperious surface (e.g., paving or plastic).

A photo-ionization detector (PID) or similar device is used to measure organic vapor concentration and segregate the excavated soil. The tip of the measuring device is placed approximately 3 inches above the excavated soil. At a minimum, the PID or other device is calibrated on a daily basis in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration are recorded on a calibration log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis.

Cardno trained personnel describe the soil according to the Unified Soil Classification System and record the description, sampling method and sampling depth on the field notes.

Backfilling of Excavation

The excavation is backfilled using excavated stockpile material with concentrations below regulatory action levels and/or clean import fill. Import fill typically is virgin material obtained from a quarry; if the material is obtained from another source, it is selectively sampled to verify it does not contain constituents of concern.

Decontamination Procedures

Cardno decontaminates soil sampling equipment between each sampling event with a non-phosphate solution, followed by a minimum of two tap water rinses. De-ionized water may be used for the final rinse. The bucket of the excavating equipment is not typically decontaminated between sampling events.

Waste Treatment and Soil Disposal

The stockpiled soil containing concentrations above regulatory action levels is removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal, or remediated on site and placed back into the excavation. Decontamination fluids are stored on site in labeled, regulatory-approved storage containers. Fluids are subsequently transported under manifest to a client- and regulatory-approved facility for disposal or treated with a permitted mobile or fixed-base carbon treatment system.

APPENDIX H

PERMIT

Aubrey Dunn
COMMISSIONER

State of New Mexico
Commissioner of Public Lands
310 OLD SANTA FE TRAIL
P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

COMMISSIONER'S OFFICE
Phone (505) 827-5760
Fax (505) 827-5766
www.nmstatelands.org

October 19, 2018

Cardno Inc.
20505 Crescent Bay Drive
Lake Forest, CA 92630

Attn: Dave Purdy

Re: Right-of-Entry Permit No.: RE-4074 State K Tank Battery

Dear Mr. Purdy:

Enclosed is the completed captioned Right-of-Entry permit. If any corrections are necessary, please let us know and we will retype or amend this permit as necessary.

The New Mexico State Land Office requires you to notify any surface lessees that will be impacted by your project prior to construction.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact Conrad Kegel at 505-827-5789.

Sincerely,

Aubrey Dunn
Commissioner of Public Lands

AD/ck

Enclosures

NEW MEXICO STATE LAND OFFICE
Commissioner of Public Lands
Aubrey Dunn
New Mexico State Land Office Building
P.O. Box 1148, Santa Fe, NM 87504-1148

RIGHT OF ENTRY PERMIT
CONTRACT NO. RE - 4074

1. RIGHT OF ENTRY PERMIT

This permit is issued under the authority of NMSA 1978, Section 19-1-2. Therefore, and in consideration of and subject to the terms, covenants, conditions, agreements, obligations and reservations contained in the permit and all other existing rights, the Commissioner of Public Lands, New Mexico State Land Office, State Of New Mexico, hereinafter called "COMMISSIONER," grants to **Cardno Inc.**, whose address is **20505 Crescent Bay Drive, Lake Forest, CA 92630** called "PERMITTEE," authorized use of a specific tract(s) of State Trust Land only for the term, and only for the permitted use, described in this permit.

2. TERM AND LAND DESCRIPTION

Right of entry is granted for a term of **180 days**, commencing on the execution date of this document by the Commissioner of Public Lands, to the following State Trust Lands.

Section	Township	Range	Subdivision	County
32	17S	35E	NW4SW4	Lea

3. APPLICATION and PROCESSING FEE

$ 50.00 Application Fee
$ 500.00 Permit Fee
$ 550.00 Total Fee

4. PERMITTED USE, PERSONNEL, EQUIPMENT AND MATERIALS

Permitted use is for the purpose of: **Access to perform remediation and related activities related to the State K Tank Battery.**

Personnel present on State Trust Land: **Cardno personnel and contractors**

Equipment & Materials present on State Trust Land: **Vehicles, drill rig, and sampling kit**

Prior to execution of project company must contact the Surface Lessees.

Only fresh water lines (less than 10,000 ppm tds) will be allowed.

The granting of this permit does not allow access across private lands.

5. IMPROVEMENTS

No improvements shall be placed on the premises without the prior written consent of the Commissioner.

6. RESERVATIONS

Commissioner reserves the right to execute leases, rights of way, easements, permits, exchange agreements, sale agreements, permits and other lawful rights on or across the land covered by this permit, including but not limited to any such rights for mining purposes and for the extraction of oil, gas, salt, geothermal resources, and other mineral deposits there from and the right to go upon, explore for, mine, remove and sell same.

7. COMPLIANCE WITH LAWS

Permittee shall at its own expense comply fully with and be subject to all applicable regulations, rules, ordinances, and requirements of law or of the Commissioner, including but not limited to the regulations of the State Land Office; Chapter 19 NMSA governing State Trust Lands; federal and state environmental laws and regulations; and the New Mexico Cultural Properties Act, NMSA 1978 Sections 18-6-1 through 18-6-23. It is illegal for any person or his agent to appropriate, excavate, injure, or destroy any historic, or prehistoric ruin or monument, or any object of historical, archaeological, architectural, or scientific value situated on lands owned or controlled by the State Land Office without a valid permit issued by the Cultural Properties Review Committee and approved by the Commissioner of Public Lands.

8. HOLD HARMLESS AND INDEMNIFICATION

Permittee shall save, hold harmless, indemnify and defend Commissioner, the State Land Office, the State of New Mexico, and any of their officers, employees or agents, in their official and individual capacities, of and from any and all liability, claims, losses, damages, costs, and fees arising out of or alleged to arise out of, or directly or indirectly connected with, the operations of Permittee under this permit on or off State Trust Lands or arising out of the presence on State Trust Lands of any equipment, material, agent, invitee, contractor or subcontractor of Permittee. This Hold Harmless and Indemnification clause covers any claim, including any brought in any court or before any administrative agency, of any loss or alleged loss, and any damages or alleged damages asserted with respect to any violation or alleged violation of any state, federal or local law or regulation, including but not limited to any environmental law or regulation, any cultural properties law (including the New Mexico Cultural Properties Act, cited above) or regulation, and any alleged damage to the property, rights or interests of any State Land Office lessee, right-of-way holder, or other permittee.

9. AMENDMENT

This permit shall not be altered, changed, or amended except by an instrument in writing executed by Commissioner and Permittee.

10. WITHDRAWAL

Commissioner reserves the right to withdraw any or all of the land authorized for use under this permit. If applicable, Permittee shall vacate the acreage specified within 30 days after receipt of written notification of withdrawal from the Commissioner.

11. CANCELLATION

The violation by Permittee of any of the terms, conditions, or covenants of this permit or the nonpayment by Permittee of the fees due under this permit shall at the option of the Commissioner be considered a default and shall cause the cancellation of this permit 30 days after Permittee has been sent written notice of such.

12. PRESERVE AND PROTECT

The Permittee agrees to preserve and protect the natural environmental conditions of the land encompassed in this permit, and to take those reclamation or corrective actions that are accepted soil and water conservation practices and that are deemed necessary by the Commissioner to protect the land from pollution, erosion, or other environmental degradation. The Permittee further agrees not to injure the property of, or interfere with the operations or rights of, any State Land Office lessee, right-of-way holder, easement holder or other permittee who has rights to use the State Trust Land subject to this permit.

13. PIPELINE IDENTIFICATION AND SPACING REQUIREMENTS

The Permittee shall label each aboveground pipeline crossing State Trust Lands with the Permittee's name, and contact information. Such information shall be placed at both the inlet and outlet of the pipeline, and every 2,500 feet between the two points. Pipelines must be spaced a minimum of 12" apart from existing surface pipelines to allow for livestock to cross. If the minimum line spacing cannot be met to allow livestock to cross, berms 3 feet in width must be placed in areas where established cattle trails exist, but no less than every tenth of a mile.

14. RECLAMATION, REMOVAL OF EQUIPMENT, MATERIALS, AND WASTE

The Permittee agrees to reclaim those areas that may be damaged by activities conducted thereon.

The Permittee agrees to remove from the State Trust Lands, no later than the end of the term of this permit, all equipment, and materials it has placed or brought upon the land and to clean up and remove from the land any trash, waste, effluent, or other products used or brought upon the land in connection with this permit.

15. SPECIAL INSTRUCTIONS AND/OR RESTRICTIONS

1. No off road traffic allowed.

2. No wood collection or tree cutting allowed.

3. Disturbing, dislodging, damaging, defacing, destroying or removing historical archaeological, paleontological or cultural sites or artifacts in a manner inconsistent with the provisions of the granted permit is prohibited.

4. Disturbing, dislodging, damaging, defacing, destroying any improvement, fixture, item, object or thing placed or located in, under or upon the land is prohibited.

5. This permit does not grant a right to enter State Trust Lands to which there is no public access.

6. Any uses or activities not within the scope of this permit are not allowed unless prior written approval from the Commissioner of Public Lands is granted.

7. Line pressure not to exceed 125 psi.

PERMITTEE:

By: _____

ACKNOWLEDGMENT

STATE OF New Mexico)
) ss.
COUNTY OF Lea)

The foregoing instrument was acknowledged before me this 18 day of Oct, 2018, by David Michael Rudy, of Cardno, a _____ corporation, on behalf of said corporation.

My Commission Expires:

4/21/2021

Connie Romero
NOTARY PUBLIC

OFFICIAL SEAL
Connie Romero
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 4/21/2021

STATE OF NEW MEXICO

BY: _____
AUBREY DUNN
COMMISSIONER OF PUBLIC LANDS

S
E
A
L

DATE: October 19, 2018

2018 OCT 19 AM 10:07

RE - 4074

APPENDIX I

BORING LOGS

Cardno®

BORING LOG B1

(Page 1 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652408.2 N
Easting	804946.7 E
Total Boring Depth	35' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B1
Elevation: 3954.8'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0						Dirt and caliche rocks at the surface Borehole was cleared to 1' bgs on 10/26/18 using a hand auger
5						No Sample Recovery
10	50	0.6				Silty SAND with gravel: fine grained sand, white, dry, poorly graded, non-plastic, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/30/55/15)
15	50	4.3			SM	Same as 10 feet bgs; tan, indurated limestone rocks (0/30/55/15)
20	50	0				Same as 15 feet bgs (0/30/55/15)

Portland Cement Mixture

Cardno

BORING LOG B1

(Page 2 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652408.2 N
Easting	804946.7 E
Total Boring Depth	35' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B1
Elevation: 3954.8'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
20						
25	50	0				Same as 10 feet bgs; reddish tan, indurated sandstone rocks (0/30/55/15)
					SM	
30	50	0				Same as 25 feet bgs (0/30/55/15)
35	50	0				Silty SAND: fine to medium grained sand, tan, dry, non-plastic, graded (0/35/65/0)
40						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

Cardno

BORING LOG B2

(Page 1 of 3)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652380.9 N
Easting	804949.1 E
Total Boring Depth	50' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B2
Elevation: 3955.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0						Dirt at the surface Borehole was cleared to 9" bgs on 10/26/18 using a hand auger
5	50				GP	GRAVEL with silt and sand: white, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/20/20/60)
10	50					Same as 5 feet bgs (0/20/20/60)
15	50				ML	SILT with sand and gravel: red-brown, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated sandstone rocks, non-calcareous soil (0/55/20/25)
20	50					Same as 15 feet bgs (0/55/20/25)

Portland Cement Mixture

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BORING LOG B2

(Page 2 of 3)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652380.9 N
Easting	804949.1 E
Total Boring Depth	50' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B2
Elevation: 3955.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
20					ML	
25						No Sample Recovery
30	50					SILT with sand and gravel: brown, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated sandstone rocks, non-calcareous soil (0/60/20/20)
35	50				ML	Same as 30 feet bgs (0/60/20/20)
40	50					Same as 30 feet bgs (0/60/20/20)

Portland Cement Mixture

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BORING LOG B2

(Page 3 of 3)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652380.9 N
Easting	804949.1 E
Total Boring Depth	50' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B2
Elevation: 3955.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
40						
45	50				ML	Sandy SILT with gravel: brown, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/45/35/20)
50	50				SP	SAND with silt and gravel: fine grained sand, brown, dry, poorly graded, non-plastic, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/20/60/20)
55						
60						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B3

(Page 1 of 1)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/27/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652358.2 N
Easting	8044959.3 E
Total Boring Depth	20' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B3
Elevation: 3955.6'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0				Dirt, caliche rocks, and light vegetation at the surface Borehole was cleared to 1' bgs on 10/26/18 using a hand auger
5	50		SW	SAND with silt and gravel: fine grained sand, tan, dry, poorly graded, non-plastic, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/25/50/25)
10	50		ML	Sandy SILT with gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/rounded gravel, indurated limestone rocks, calcareous soil (0/60/30/10)
15	50			Same as 10 feet bgs (0/60/30/10)
20	50		GW	GRAVEL with silt and sand: whitish tan, dry, graded, non-plastic, fine to medium grained sand, subrounded/angular gravel, indurated limestone, calcareous soil (0/20/20/60)
25				

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B4

(Page 1 of 1)

Project No.:	: 013613U118
Site:	: Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	: Vincent Nguyen
Reviewed By:	: Jens Walker, P.G. 9487
Signature:	: Jens Walker

Date Drilled	: 10/27/18
Drilling Co.	: Yellow Jacket Drilling
Drilling Method	: Air Rotary
Sampling Method	: 2" CA Modified Split Spoon
Borehole Diameter	: 6"
Casing Diameter	: NA
Northing	: 652448.8 N
Easting	: 804950.2 E
Total Boring Depth	: 20' bgs
First GW Depth	: NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B4
Elevation: 3954.3'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0						Dirt, caliche rocks, and light vegetation at the surface Borehole was cleared to 2' bgs on 10/26/18 using a hand auger
5	50					Silty SAND with gravel: fine grained sand, tan, dry, poorly graded, non-plastic, subangular gravel, indurated caliche rocks, calcareous soil (0/30/55/15)
10	50				SP	SAND with silt and gravel: fine grained sand, tan, dry, poorly graded, non-plastic, subangular gravel, indurated limestone rocks, calcareous soil (0/25/60/15)
15	50					Same as 10 feet bgs (0/25/60/15)
20	50					Same as 10 feet bgs (0/20/75/5)
25						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B5

(Page 1 of 1)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G.9487
Signature:	Jens Walker

Date Drilled	10/27/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652476.7 N
Easting	804955.0 E
Total Boring Depth	25' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B5
Elevation: 3953.6'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0				Dirt and light vegetation at the surface Borehole was cleared to 2' bgs on 10/26/18 using a hand auger
5	50	14.5	SM	Silty SAND with gravel: fine grained sand, tan, dry, poorly graded, non-plastic, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/35/55/10)
10	50	53.1		Same as 5 feet bgs; indurated limestone rocks (0/30/55/15)
15	50	169.7		Same as 10 feet bgs (0/30/55/15)
20	50	77.3	ML	Sandy SILT with gravel: brown, dry, poorly graded, non-plastic, fine grained sand, subangular gravel, indurated limestone rocks, calcareous soil (0/50/40/10)
25	50	5.1		Same as 20 feet bgs (0/50/40/10)
30				

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B6

(Page 1 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/27/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652370.8 N
Easting	805034.6 E
Total Boring Depth	30' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B6
Elevation: 3956.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0				Dirt at the surface Borehole was cleared to 1.5' bgs on 10/26/18 using a hand auger
5	50	0	SM	SAND with silt: fine grained sand, white, dry, poorly graded, non-plastic (0/35/65/0)
10	50	0.7	ML	Sandy SILT with gravel: tan, dry, graded, non-plastic, fine to medium grained sand, rounded/subangular gravel, indurated caliche rocks, calcareous soil (0/40/35/25)
15	50	1.2	GW	GRAVEL with silt and sand: tan, dry, graded, non-plastic, fine to medium grained sand, subrounded/angular gravel, indurated caliche rocks, calcareous soil (0/15/10/75)
20	50	0.3		Same as 15 feet bgs (0/15/10/75)

Portland Cement Mixture

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BORING LOG B6

(Page 2 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/27/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652370.8 N
Easting	805034.6 E
Total Boring Depth	30' bgs
First GW Depth	NA

Sample Condition
- No Recovery
- Sampled Interval
- Described Sample
- Preserved Sample

Water Levels
- Groundwater After Completion
- Groundwater During Drilling

Boring: B6
Elevation: 3956.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
20					GW	
25	50	2.2			ML	Sandy SILT with gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/60/30/10)
30	50	0				SILT with sand and gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/55/20/25)
35						
40						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B7

(Page 1 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/27/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652448.3 N
Easting	805068.6 E
Total Boring Depth	30' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B7
Elevation: 3954.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0				Dirt at the surface Borehole was cleared to 1.5' bgs on 10/26/18 using a hand auger
5	50	0	ML	SILT with sand and gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/angular gravel, indurated caliche rocks, calcareous soil (0/50/25/25)
10	50	0.7	GP	GRAVEL with silt and sand: whitish tan, dry, poorly graded, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/15/10/75)
15				No Sample Recovery
20	50	0.3	ML	Sandy SILT with gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/45/30/25)

Portland Cement Mixture

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BORING LOG B7

(Page 2 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/27/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652448.3 N
Easting	805068.6 E
Total Boring Depth	30' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B7
Elevation: 3954.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
20					ML	
25	50	2.2			SP	SAND with silt and gravel: fine grained sand, red-brown, dry, poorly graded, non-plastic, subangular gravel, indurated caliche rocks, calcareous soil (0/20/70/10)
30	50	0				Same as 25 feet bgs (0/20/70/10)
35						
40						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B8

(Page 1 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/28/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652470.0 N
Easting	805176.8 E
Total Boring Depth	40' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B8
Elevation: 3954.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0						Dirt and vegetation at the surface Borehole was cleared to 1' bgs on 10/26/18 using a hand auger
5	50	0			ML	Sandy SILT: tan, dry, poorly graded, non-plastic, fine grained sand (0/70/30/0)
10	50	0				SILT with sand and gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/55/25/20)
15	50	0			GP	GRAVEL with silt and sand: red-brown, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/20/20/60)
20						No Sample Recovery

Portland Cement Mixture

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BORING LOG B8

(Page 2 of 2)

Project No.:	: 013613U118
Site:	: Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	: Vincent Nguyen
Reviewed By:	: Jens Walker, P.G. 9487
Signature:	: Jens Walker

Date Drilled	: 10/28/18
Drilling Co.	: Yellow Jacket Drilling
Drilling Method	: Air Rotary
Sampling Method	: 2" CA Modified Split Spoon
Borehole Diameter	: 6"
Casing Diameter	: NA
Northing	: 652470.0 N
Easting	: 805176.8 E
Total Boring Depth	: 40' bgs
First GW Depth	: NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B8
Elevation: 3954.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
24	50	2.7	ML	Sandy SILT: brown, dry, poorly graded, non-plastic, fine grained sand (0/65/35/0)
29	50	1.8		Same as 25 feet bgs (0/65/35/0)
34				No Sample Recovery
39	50	6.5	ML	Sandy SILT: brown, dry, poorly graded, non-plastic, fine grained sand (0/65/35/0)
44				

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B9

(Page 1 of 1)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652373.5 N
Easting	805185.1 E
Total Boring Depth	20' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B9
Elevation: 3955.5'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0						Dirt and light vegetation at the surface Borehole was cleared to 1' bgs on 10/26/18 using a hand auger
5	50				ML	Sandy SILT with gravel: white, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/50/30/20)
10	50					Same as 5 feet bgs; indurated limestone rocks (0/50/30/20)
15	50					SILT with sand and gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/55/20/25)
20	50				GW	GRAVEL with silt and trace sand: tan, dry, poorly graded, fine grained sand, non-plastic, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/20/10/70)
25						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B10

(Page 1 of 1)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652327.3 N
Easting	805164.2 E
Total Boring Depth	20' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B10
Elevation: 3955.9'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0						Dirt at the surface Borehole was cleared to 9" bgs on 10/26/18 using a hand auger
5	50					Sandy SILT with gravel: white, dry, graded, non-plastic, fine to medium grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/50/30/20)
10	50				ML	Same as 5 feet bgs (0/50/30/20)
15	50					SILT with sand and gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/55/20/25)
20	50					Gravelly SILT with sand: tan, dry, poorly graded, fine grained sand, non-plastic, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/45/20/35)
25						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B11

(Page 1 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/28/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652416.1 N
Easting	805211.0 E
Total Boring Depth	40' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B11
Elevation: 3955.3'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0				Dirt with gravel at the surface Borehole was cleared to 8" bgs on 10/26/18 using a hand auger
5	50	28.5	ML	Sandy SILT with gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated caliche rocks, calcareous soil (0/50/30/20)
10	50	17.0	SP	SAND with silt and gravel: fine grained sand, tan, dry, poorly graded, non-plastic, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/25/50/25)
15	50	7.9	GP	GRAVEL with silt and sand: red-brown, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/50/25/25)
20	50	9.1	ML	SILT with sand and gravel: red-brown, dry, poorly graded, non-plastic, fine grained sand, subangular/angular gravel, indurated limestone rocks, calcareous soil (0/20/20/60)

Portland Cement Mixture

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BORING LOG B11

(Page 2 of 2)

Project No.:	: 013613U118
Site:	: Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	: Vincent Nguyen
Reviewed By:	: Jens Walker, P.G. 9487
Signature:	: Jens Walker

Date Drilled	: 10/28/18
Drilling Co.	: Yellow Jacket Drilling
Drilling Method	: Air Rotary
Sampling Method	: 2" CA Modified Split Spoon
Borehole Diameter	: 6"
Casing Diameter	: NA
Northing	: 652416.1 N
Easting	: 805211.0 E
Total Boring Depth	: 40' bgs
First GW Depth	: NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B11
Elevation: 3955.3'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
24	50	33.1	ML	Sandy SILT: brown, dry, poorly graded, non-plastic, fine grained sand (0/65/35/0)
29	50	9.5		Same as 25 feet bgs (0/65/35/0)
34	50	15.1		Same as 25 feet bgs (0/65/35/0)
39	50	11.4		Same as 25 feet bgs (0/65/35/0)
44				

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B12

(Page 1 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/28/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652428.9 N
Easting	805339.9 E
Total Boring Depth	40' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B12
Elevation: 3954.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0				Dirt with light vegetation at the surface Borehole was cleared to 9" bgs on 10/26/18 using a hand auger
5	50	223.4	ML	Sandy SILT with trace gravel: tan, dry, poorly graded, non-plastic, fine grained sand, subangular gravel, indurated caliche rocks, calcareous soil (0/50/30/20)
10	50	60.4		Same as 5 feet bgs; Increasing gravel (0/45/30/25)
15	50	52.6	GP	GRAVEL with silt and sand: brown, dry, poorly graded, non-plastic, fine grained sand, subrounded/subangular gravel, indurated sandstone rocks, non-calcareous soil (0/10/10/80)
20	50	47.9	ML	Gravelly SILT with sand: brown, dry, poorly graded, non-plastic, fine grained sand, subangular/angular gravel, indurated sandstone rocks, non-calcareous soil (0/45/20/35)

Portland Cement Mixture

Cardno

BORING LOG B12

(Page 2 of 2)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 9487
Signature:	Jens Walker

Date Drilled	10/28/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652428.9 N
Easting	805339.9 E
Total Boring Depth	40' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B12
Elevation: 3954.4'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
24	50	31.3			ML	Sandy SILT with gravel: brown, dry, poorly graded, non-plastic, fine grained sand, subangular/angular gravel, indurated sandstone rocks, calcareous soil (0/50/30/20)
29						No Sample Recovery
34	50	50.1			ML	SILT with sand: brown, dry, poorly graded, non-plastic, fine grained sand (0/80/20/0)
39	50	24.9				Same as 35 feet bgs (0/80/20/0)
44						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

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BORING LOG B13

(Page 1 of 1)

Project No.:	013613U118
Site:	Former State K Tank Battery No. 3, Lea County, New Mexico
Logged By:	Vincent Nguyen
Reviewed By:	Jens Walker, P.G. 8360
Signature:	Jens Walker

Date Drilled	10/29/18
Drilling Co.	Yellow Jacket Drilling
Drilling Method	Air Rotary
Sampling Method	2" CA Modified Split Spoon
Borehole Diameter	6"
Casing Diameter	NA
Northing	652392.4 N
Easting	805361.3 E
Total Boring Depth	20' bgs
First GW Depth	NA

Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Boring: B13
Elevation: 3954.3'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (%clay/silt/sand/gravel)
0						Dirt and light vegetation at the surface Borehole was cleared to 2' bgs on 10/26/18 using a hand auger
5	50				GW	GRAVEL with silt and sand: tan, dry, non-plastic, poorly graded, fine grained sand, subrounded/subangular gravel, strongly indurated limestone rocks, calcareous soil (0/15/10/75)
10	50				ML	SILT with sand: tan, dry, non-plastic, poorly graded, fine grained sand (0/80/20/0)
15	50					Same as 10 feet bgs (0/80/20/0)
20	50				SW	Gravelly SAND with silt: fine grained sand, tan, dry, poorly graded, non-plastic, subrounded/subangular gravel, indurated limestone rocks, calcareous soil (0/10/55/35)
25						

Portland Cement Mixture

The descriptive information for classification symbol and name of soil is based on ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

APPENDIX J

LABORATORY ANALYTICAL REPORTS

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Supplemental Report 1

Additional requested analyses have been added to the original report.

WORK ORDER NUMBER: 18-10-2309

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Cardno

Client Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field

Attention: David Purdy
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Approved for release on 11/20/2018 by:
Cecile deGuia
Project Manager

ResultLink

Email your PM

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Contents

Client Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Work Order Number: 18-10-2309

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The difference is service

Work Order: 18-10-2309 Page 1 of 1

Work Order Narrative

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 10/31/18. They were assigned to Work Order 18-10-2309.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

DoD Projects:

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

Return to Contents

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The difference is service

Client:	Cardno 20505 Crescent Bay Drive Lake Forest, CA 92630-8825	Work Order:	18-10-2309
		Project Name:	ExxonMobil NM K Battery No. 3, Vacuum Oil Field
		PO Number:	013613U118
		Date/Time Received:	10/31/18 10:00
		Number of Containers:	30
Attn:	David Purdy		

Sample Summary

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
S-10-B1	18-10-2309-1	10/27/18 08:05	1	Solid
S-15-B1	18-10-2309-2	10/27/18 08:15	1	Solid
S-20-B1	18-10-2309-3	10/27/18 08:25	1	Solid
S-25-B1	18-10-2309-4	10/27/18 08:35	1	Solid
S-30-B1	18-10-2309-5	10/27/18 08:50	1	Solid
S-35-B1	18-10-2309-6	10/27/18 09:00	1	Solid
S-5-B4	18-10-2309-7	10/27/18 09:45	1	Solid
S-10-B4	18-10-2309-8	10/27/18 09:55	1	Solid
S-15-B4	18-10-2309-9	10/27/18 10:05	1	Solid
S-20-B4	18-10-2309-10	10/27/18 10:15	1	Solid
S-5-B5	18-10-2309-11	10/27/18 11:00	1	Solid
S-10-B5	18-10-2309-12	10/27/18 11:05	1	Solid
S-15-B5	18-10-2309-13	10/27/18 11:15	1	Solid
S-20-B5	18-10-2309-14	10/27/18 11:20	1	Solid
S-25-B5	18-10-2309-15	10/27/18 11:40	1	Solid
S-5-B3	18-10-2309-16	10/27/18 13:10	1	Solid
S-10-B3	18-10-2309-17	10/27/18 13:20	1	Solid
S-15-B3	18-10-2309-18	10/27/18 13:25	1	Solid
S-20-B3	18-10-2309-19	10/27/18 13:30	1	Solid
S-5-B6	18-10-2309-20	10/27/18 14:15	1	Solid
S-10-B6	18-10-2309-21	10/27/18 14:25	1	Solid
S-15-B6	18-10-2309-22	10/27/18 14:30	1	Solid
S-20-B6	18-10-2309-23	10/27/18 14:40	1	Solid
S-25-B6	18-10-2309-24	10/27/18 14:50	1	Solid
S-30-B6	18-10-2309-25	10/27/18 15:00	1	Solid
S-5-B7	18-10-2309-26	10/27/18 15:45	1	Solid
S-10-B7	18-10-2309-27	10/27/18 15:55	1	Solid
S-20-B7	18-10-2309-28	10/27/18 16:20	1	Solid
S-25-B7	18-10-2309-29	10/27/18 16:30	1	Solid
S-30-B7	18-10-2309-30	10/27/18 16:40	1	Solid

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: 1 (S-10-B1, Solid) Sampled: 10/27/18 08:05									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	260	B	mg/kg	1.5	10	1.00	11/04/18 01:32	EPA 300.0	181102L01P
Sample ID: 2 (S-15-B1, Solid) Sampled: 10/27/18 08:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	120	B	mg/kg	1.5	10	1.00	11/04/18 03:14	EPA 300.0	181102L01P
Sample ID: 3 (S-20-B1, Solid) Sampled: 10/27/18 08:25									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	330	B	mg/kg	1.5	10	1.00	11/04/18 03:34	EPA 300.0	181102L01P
Sample ID: 4 (S-25-B1, Solid) Sampled: 10/27/18 08:35									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	670	B	mg/kg	1.5	10	1.00	11/04/18 03:54	EPA 300.0	181102L01P
Sample ID: 5 (S-30-B1, Solid) Sampled: 10/27/18 08:50									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	1200	B	mg/kg	2.9	20	2.00	11/04/18 04:15	EPA 300.0	181102L01P
SM 4500-CL C Chloride (Extraction Method: EPA 1312) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	46		mg/L	0.76	2.0	1.00	11/16/18 19:03	SM 4500-Cl C	I1116CLCL1
Sample ID: 6 (S-35-B1, Solid) Sampled: 10/27/18 09:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	180	B	mg/kg	1.5	10	1.00	11/04/18 04:35	EPA 300.0	181102L01P
Sample ID: 7 (S-5-B4, Solid) Sampled: 10/27/18 09:45									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	35		mg/kg	1.5	10	1.00	11/06/18 14:38	EPA 300.0	181106L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.091	0.50	1.00	11/09/18 20:08	EPA 8015B	181109L032
Surr: 1,4-Bromofluorobenzene (42-126%)	*77%*						*11/09/18 20:08*	*EPA 8015B*	*181109L032*

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Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0051	1.00	11/08/18 00:24	EPA 8260B	181107L062
Toluene	ND		mg/kg	0.00053	0.0051	1.00	11/08/18 00:24	EPA 8260B	181107L062
Ethylbenzene	ND		mg/kg	0.00015	0.0051	1.00	11/08/18 00:24	EPA 8260B	181107L062
o-Xylene	ND		mg/kg	0.00057	0.0051	1.00	11/08/18 00:24	EPA 8260B	181107L062
p/m-Xylene	ND		mg/kg	0.00027	0.0051	1.00	11/08/18 00:24	EPA 8260B	181107L062
Xylenes (total)	ND		mg/kg	0.00027	0.0051	1.00	11/08/18 00:24	EPA 8260B	181107L062
Surr: 1,4-Bromofluorobenzene (80-120%)	*96%*						*11/08/18 00:24*	*EPA 8260B*	*181107L062*
Surr: Dibromofluoromethane (79-133%)	*94%*						*11/08/18 00:24*	*EPA 8260B*	*181107L062*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*89%*						*11/08/18 00:24*	*EPA 8260B*	*181107L062*
Surr: Toluene-d8 (80-120%)	*98%*						*11/08/18 00:24*	*EPA 8260B*	*181107L062*
Sample ID: 8 (S-10-B4, Solid) Sampled: 10/27/18 09:55									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	63	B	mg/kg	1.5	10	1.00	11/04/18 05:16	EPA 300.0	181102L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.090	0.50	1.00	11/09/18 21:49	EPA 8015B	181109L032
Surr: 1,4-Bromofluorobenzene (42-126%)	*84%*						*11/09/18 21:49*	*EPA 8015B*	*181109L032*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/08/18 00:50	EPA 8260B	181107L062
Toluene	ND		mg/kg	0.00051	0.0050	1.00	11/08/18 00:50	EPA 8260B	181107L062
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/08/18 00:50	EPA 8260B	181107L062
o-Xylene	ND		mg/kg	0.00055	0.0050	1.00	11/08/18 00:50	EPA 8260B	181107L062
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/08/18 00:50	EPA 8260B	181107L062
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/08/18 00:50	EPA 8260B	181107L062
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/08/18 00:50*	*EPA 8260B*	*181107L062*
Surr: Dibromofluoromethane (79-133%)	*96%*						*11/08/18 00:50*	*EPA 8260B*	*181107L062*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*91%*						*11/08/18 00:50*	*EPA 8260B*	*181107L062*
Surr: Toluene-d8 (80-120%)	*99%*						*11/08/18 00:50*	*EPA 8260B*	*181107L062*
Sample ID: 9 (S-15-B4, Solid) Sampled: 10/27/18 10:05									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	23		mg/kg	1.5	10	1.00	11/06/18 14:57	EPA 300.0	181106L01P

Return to Contents

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Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.091	0.50	1.00	11/09/18 22:23	EPA 8015B	181109L032
Surr: 1,4-Bromofluorobenzene (42-126%)	*85%*						*11/09/18 22:23*	*EPA 8015B*	*181109L032*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/08/18 01:17	EPA 8260B	181107L062
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/08/18 01:17	EPA 8260B	181107L062
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/08/18 01:17	EPA 8260B	181107L062
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/08/18 01:17	EPA 8260B	181107L062
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/08/18 01:17	EPA 8260B	181107L062
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/08/18 01:17	EPA 8260B	181107L062
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/08/18 01:17*	*EPA 8260B*	*181107L062*
Surr: Dibromofluoromethane (79-133%)	*95%*						*11/08/18 01:17*	*EPA 8260B*	*181107L062*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*92%*						*11/08/18 01:17*	*EPA 8260B*	*181107L062*
Surr: Toluene-d8 (80-120%)	*100%*						*11/08/18 01:17*	*EPA 8260B*	*181107L062*
Sample ID: 10 (S-20-B4, Solid) Sampled: 10/27/18 10:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	100	B	mg/kg	1.5	10	1.00	11/04/18 05:57	EPA 300.0	181102L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.090	0.50	1.00	11/09/18 22:57	EPA 8015B	181109L032
Surr: 1,4-Bromofluorobenzene (42-126%)	*87%*						*11/09/18 22:57*	*EPA 8015B*	*181109L032*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0051	1.00	11/07/18 19:03	EPA 8260B	181107L004
Toluene	ND		mg/kg	0.00053	0.0051	1.00	11/07/18 19:03	EPA 8260B	181107L004
Ethylbenzene	ND		mg/kg	0.00016	0.0051	1.00	11/07/18 19:03	EPA 8260B	181107L004
o-Xylene	ND		mg/kg	0.00057	0.0051	1.00	11/07/18 19:03	EPA 8260B	181107L004
p/m-Xylene	ND		mg/kg	0.00028	0.0051	1.00	11/07/18 19:03	EPA 8260B	181107L004
Xylenes (total)	ND		mg/kg	0.00028	0.0051	1.00	11/07/18 19:03	EPA 8260B	181107L004
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/07/18 19:03*	*EPA 8260B*	*181107L004*
Surr: Dibromofluoromethane (79-133%)	*94%*						*11/07/18 19:03*	*EPA 8260B*	*181107L004*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*93%*						*11/07/18 19:03*	*EPA 8260B*	*181107L004*
Surr: Toluene-d8 (80-120%)	*99%*						*11/07/18 19:03*	*EPA 8260B*	*181107L004*

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: 11 (S-5-B5, Solid) Sampled: 10/27/18 11:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	90		mg/kg	1.5	10	1.00	11/09/18 17:32	EPA 300.0	181109L01P
Sample ID: 12 (S-10-B5, Solid) Sampled: 10/27/18 11:05									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	64		mg/kg	1.5	10	1.00	11/09/18 17:50	EPA 300.0	181109L01P
Sample ID: 13 (S-15-B5, Solid) Sampled: 10/27/18 11:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	46		mg/kg	1.5	10	1.00	11/09/18 18:09	EPA 300.0	181109L01P
Sample ID: 14 (S-20-B5, Solid) Sampled: 10/27/18 11:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	880		mg/kg	2.9	20	2.00	11/09/18 18:28	EPA 300.0	181109L01P
Sample ID: 15 (S-25-B5, Solid) Sampled: 10/27/18 11:40									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	740		mg/kg	1.5	10	1.00	11/09/18 18:47	EPA 300.0	181109L01P
Sample ID: 16 (S-5-B3, Solid) Sampled: 10/27/18 13:10									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	300		mg/kg	1.5	10	1.00	11/09/18 19:06	EPA 300.0	181109L01P
Sample ID: 17 (S-10-B3, Solid) Sampled: 10/27/18 13:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	1000		mg/kg	2.9	20	2.00	11/09/18 19:25	EPA 300.0	181109L01P
Sample ID: 18 (S-15-B3, Solid) Sampled: 10/27/18 13:25									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	510		mg/kg	1.5	10	1.00	11/09/18 19:44	EPA 300.0	181109L01P
Sample ID: 19 (S-20-B3, Solid) Sampled: 10/27/18 13:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Chloride	63		mg/kg	1.5	10	1.00	11/09/18 20:23	EPA 300.0	181109L01P
Sample ID: 20 (S-5-B6, Solid) Sampled: 10/27/18 14:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	67		mg/kg	1.5	10	1.00	11/09/18 20:42	EPA 300.0	181109L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.092	0.51	1.00	11/09/18 23:30	EPA 8015B	181109L032
Surr: 1,4-Bromofluorobenzene (42-126%)	*85%*						*11/09/18 23:30*	*EPA 8015B*	*181109L032*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/09/18 17:58	EPA 8260B	181109L046
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/09/18 17:58	EPA 8260B	181109L046
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/09/18 17:58	EPA 8260B	181109L046
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/09/18 17:58	EPA 8260B	181109L046
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/09/18 17:58	EPA 8260B	181109L046
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/09/18 17:58	EPA 8260B	181109L046
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/09/18 17:58*	*EPA 8260B*	*181109L046*
Surr: Dibromofluoromethane (79-133%)	*98%*						*11/09/18 17:58*	*EPA 8260B*	*181109L046*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*93%*						*11/09/18 17:58*	*EPA 8260B*	*181109L046*
Surr: Toluene-d8 (80-120%)	*100%*						*11/09/18 17:58*	*EPA 8260B*	*181109L046*
Sample ID: 21 (S-10-B6, Solid) Sampled: 10/27/18 14:25									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	7.0	J	mg/kg	1.5	10	1.00	11/09/18 22:16	EPA 300.0	181109L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.088	0.49	1.00	11/10/18 05:27	EPA 8015B	181109L055
Surr: 1,4-Bromofluorobenzene (42-126%)	*80%*						*11/10/18 05:27*	*EPA 8015B*	*181109L055*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/09/18 18:25	EPA 8260B	181109L046
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/09/18 18:25	EPA 8260B	181109L046
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/09/18 18:25	EPA 8260B	181109L046
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/09/18 18:25	EPA 8260B	181109L046
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/09/18 18:25	EPA 8260B	181109L046
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/09/18 18:25	EPA 8260B	181109L046

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/09/18 18:25*	*EPA 8260B*	*181109L046*
Surr: Dibromofluoromethane (79-133%)	*100%*						*11/09/18 18:25*	*EPA 8260B*	*181109L046*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*95%*						*11/09/18 18:25*	*EPA 8260B*	*181109L046*
Surr: Toluene-d8 (80-120%)	*99%*						*11/09/18 18:25*	*EPA 8260B*	*181109L046*
Sample ID: 22 (S-15-B6, Solid) Sampled: 10/27/18 14:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	26		mg/kg	1.5	10	1.00	11/09/18 22:35	EPA 300.0	181109L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.087	0.48	1.00	11/10/18 07:17	EPA 8015B	181109L055
Surr: 1,4-Bromofluorobenzene (42-126%)	*67%*						*11/10/18 07:17*	*EPA 8015B*	*181109L055*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/07/18 19:30	EPA 8260B	181107L004
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/07/18 19:30	EPA 8260B	181107L004
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/07/18 19:30	EPA 8260B	181107L004
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/07/18 19:30	EPA 8260B	181107L004
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/07/18 19:30	EPA 8260B	181107L004
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/07/18 19:30	EPA 8260B	181107L004
Surr: 1,4-Bromofluorobenzene (80-120%)	*95%*						*11/07/18 19:30*	*EPA 8260B*	*181107L004*
Surr: Dibromofluoromethane (79-133%)	*95%*						*11/07/18 19:30*	*EPA 8260B*	*181107L004*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*91%*						*11/07/18 19:30*	*EPA 8260B*	*181107L004*
Surr: Toluene-d8 (80-120%)	*98%*						*11/07/18 19:30*	*EPA 8260B*	*181107L004*
Sample ID: 23 (S-20-B6, Solid) Sampled: 10/27/18 14:40									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	33		mg/kg	1.5	10	1.00	11/09/18 22:54	EPA 300.0	181109L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.090	0.50	1.00	11/10/18 07:54	EPA 8015B	181109L055
Surr: 1,4-Bromofluorobenzene (42-126%)	*77%*						*11/10/18 07:54*	*EPA 8015B*	*181109L055*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/07/18 19:56	EPA 8260B	181107L004
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/07/18 19:56	EPA 8260B	181107L004

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/07/18 19:56	EPA 8260B	181107L004
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/07/18 19:56	EPA 8260B	181107L004
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/07/18 19:56	EPA 8260B	181107L004
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/07/18 19:56	EPA 8260B	181107L004
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/07/18 19:56*	*EPA 8260B*	*181107L004*
Surr: Dibromofluoromethane (79-133%)	*96%*						*11/07/18 19:56*	*EPA 8260B*	*181107L004*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*90%*						*11/07/18 19:56*	*EPA 8260B*	*181107L004*
Surr: Toluene-d8 (80-120%)	*99%*						*11/07/18 19:56*	*EPA 8260B*	*181107L004*
Sample ID: 24 (S-25-B6, Solid) Sampled: 10/27/18 14:50									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	4.8	J	mg/kg	1.5	10	1.00	11/09/18 23:13	EPA 300.0	181109L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.087	0.48	1.00	11/10/18 08:31	EPA 8015B	181109L055
Surr: 1,4-Bromofluorobenzene (42-126%)	*77%*						*11/10/18 08:31*	*EPA 8015B*	*181109L055*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0051	1.00	11/07/18 20:23	EPA 8260B	181107L004
Toluene	ND		mg/kg	0.00053	0.0051	1.00	11/07/18 20:23	EPA 8260B	181107L004
Ethylbenzene	ND		mg/kg	0.00016	0.0051	1.00	11/07/18 20:23	EPA 8260B	181107L004
o-Xylene	ND		mg/kg	0.00057	0.0051	1.00	11/07/18 20:23	EPA 8260B	181107L004
p/m-Xylene	ND		mg/kg	0.00028	0.0051	1.00	11/07/18 20:23	EPA 8260B	181107L004
Xylenes (total)	ND		mg/kg	0.00028	0.0051	1.00	11/07/18 20:23	EPA 8260B	181107L004
Surr: 1,4-Bromofluorobenzene (80-120%)	*96%*						*11/07/18 20:23*	*EPA 8260B*	*181107L004*
Surr: Dibromofluoromethane (79-133%)	*97%*						*11/07/18 20:23*	*EPA 8260B*	*181107L004*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*91%*						*11/07/18 20:23*	*EPA 8260B*	*181107L004*
Surr: Toluene-d8 (80-120%)	*100%*						*11/07/18 20:23*	*EPA 8260B*	*181107L004*
Sample ID: 25 (S-30-B6, Solid) Sampled: 10/27/18 15:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	11		mg/kg	1.5	10	1.00	11/09/18 23:32	EPA 300.0	181109L01P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.091	0.50	1.00	11/10/18 09:08	EPA 8015B	181109L055
Surr: 1,4-Bromofluorobenzene (42-126%)	*79%*						*11/10/18 09:08*	*EPA 8015B*	*181109L055*

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/07/18 20:50	EPA 8260B	181107L004
Toluene	ND		mg/kg	0.00051	0.0050	1.00	11/07/18 20:50	EPA 8260B	181107L004
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/07/18 20:50	EPA 8260B	181107L004
o-Xylene	ND		mg/kg	0.00055	0.0050	1.00	11/07/18 20:50	EPA 8260B	181107L004
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/07/18 20:50	EPA 8260B	181107L004
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/07/18 20:50	EPA 8260B	181107L004
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/07/18 20:50*	*EPA 8260B*	*181107L004*
Surr: Dibromofluoromethane (79-133%)	*97%*						*11/07/18 20:50*	*EPA 8260B*	*181107L004*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*91%*						*11/07/18 20:50*	*EPA 8260B*	*181107L004*
Surr: Toluene-d8 (80-120%)	*99%*						*11/07/18 20:50*	*EPA 8260B*	*181107L004*
Sample ID: 26 (S-5-B7, Solid) Sampled: 10/27/18 15:45									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	28		mg/kg	1.5	10	1.00	11/09/18 23:51	EPA 300.0	181109L01P
Sample ID: 27 (S-10-B7, Solid) Sampled: 10/27/18 15:55									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	14		mg/kg	1.5	10	1.00	11/10/18 00:10	EPA 300.0	181109L01P
Sample ID: 28 (S-20-B7, Solid) Sampled: 10/27/18 16:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	8.8	J	mg/kg	1.5	10	1.00	11/10/18 00:29	EPA 300.0	181109L01P
Sample ID: 29 (S-25-B7, Solid) Sampled: 10/27/18 16:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	5.3	J	mg/kg	1.5	10	1.00	11/10/18 00:48	EPA 300.0	181109L01P
Sample ID: 30 (S-30-B7, Solid) Sampled: 10/27/18 16:40									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	8.2	J	mg/kg	1.5	10	1.00	11/10/18 01:07	EPA 300.0	181109L01P

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Qualifiers	Units	QC Batch	Lab Number	Analysis Date/Time
EPA 300.0 Anions						
099-12-922-1011						
Chloride	2.7	J	mg/kg	181102L01P	099-12-922-1011	11/03/18 21:48
EPA 300.0 Anions						
099-12-922-1012						
Chloride	ND		mg/kg	181106L01P	099-12-922-1012	11/06/18 12:32
EPA 300.0 Anions						
099-12-922-1016						
Chloride	ND		mg/kg	181109L01P	099-12-922-1016	11/09/18 16:54
SM 4500-CL C Chloride						
099-05-057-2239						
Chloride	ND		mg/L	I1116CLCL1	099-05-057-2239	11/16/18 19:03
EPA 8015B GRO						
099-12-024-1261						
Gasoline Range Organics	ND		mg/kg	181109L032	099-12-024-1261	11/09/18 13:07
Surr: 1,4-Bromofluorobenzene (42-126%)	*88%*			*181109L032*	*099-12-024-1261*	*11/09/18 13:07*
EPA 8015B GRO						
099-12-024-1262						
Gasoline Range Organics	ND		mg/kg	181109L055	099-12-024-1262	11/10/18 04:13
Surr: 1,4-Bromofluorobenzene (42-126%)	*79%*			*181109L055*	*099-12-024-1262*	*11/10/18 04:13*
EPA 8260B BTEX/MTBE						
099-12-882-2148						
Benzene	ND		mg/kg	181107L062	099-12-882-2148	11/07/18 23:30
Toluene	ND		mg/kg	181107L062	099-12-882-2148	11/07/18 23:30
Ethylbenzene	ND		mg/kg	181107L062	099-12-882-2148	11/07/18 23:30
o-Xylene	ND		mg/kg	181107L062	099-12-882-2148	11/07/18 23:30
p/m-Xylene	ND		mg/kg	181107L062	099-12-882-2148	11/07/18 23:30
Xylenes (total)	ND		mg/kg	181107L062	099-12-882-2148	11/07/18 23:30
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*			*181107L062*	*099-12-882-2148*	*11/07/18 23:30*
Surr: Dibromofluoromethane (79-133%)	*97%*			*181107L062*	*099-12-882-2148*	*11/07/18 23:30*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*92%*			*181107L062*	*099-12-882-2148*	*11/07/18 23:30*
Surr: Toluene-d8 (80-120%)	*100%*			*181107L062*	*099-12-882-2148*	*11/07/18 23:30*
EPA 8260B BTEX/MTBE						
099-12-882-2137						
Benzene	ND		mg/kg	181107L004	099-12-882-2137	11/07/18 11:27
Toluene	ND		mg/kg	181107L004	099-12-882-2137	11/07/18 11:27
Ethylbenzene	ND		mg/kg	181107L004	099-12-882-2137	11/07/18 11:27

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Qualifiers	Units	QC Batch	Lab Number	Analysis Date/Time
o-Xylene	ND		mg/kg	181107L004	099-12-882-2137	11/07/18 11:27
p/m-Xylene	ND		mg/kg	181107L004	099-12-882-2137	11/07/18 11:27
Xylenes (total)	ND		mg/kg	181107L004	099-12-882-2137	11/07/18 11:27
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*			*181107L004*	*099-12-882-2137*	*11/07/18 11:27*
Surr: Dibromofluoromethane (79-133%)	*97%*			*181107L004*	*099-12-882-2137*	*11/07/18 11:27*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*91%*			*181107L004*	*099-12-882-2137*	*11/07/18 11:27*
Surr: Toluene-d8 (80-120%)	*99%*			*181107L004*	*099-12-882-2137*	*11/07/18 11:27*
EPA 8260B BTEX/MTBE						
099-12-882-2149						
Benzene	ND		mg/kg	181109L046	099-12-882-2149	11/09/18 11:50
Toluene	ND		mg/kg	181109L046	099-12-882-2149	11/09/18 11:50
Ethylbenzene	ND		mg/kg	181109L046	099-12-882-2149	11/09/18 11:50
o-Xylene	ND		mg/kg	181109L046	099-12-882-2149	11/09/18 11:50
p/m-Xylene	ND		mg/kg	181109L046	099-12-882-2149	11/09/18 11:50
Xylenes (total)	ND		mg/kg	181109L046	099-12-882-2149	11/09/18 11:50
Surr: 1,4-Bromofluorobenzene (80-120%)	*98%*			*181109L046*	*099-12-882-2149*	*11/09/18 11:50*
Surr: Dibromofluoromethane (79-133%)	*100%*			*181109L046*	*099-12-882-2149*	*11/09/18 11:50*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*95%*			*181109L046*	*099-12-882-2149*	*11/09/18 11:50*
Surr: Toluene-d8 (80-120%)	*100%*			*181109L046*	*099-12-882-2149*	*11/09/18 11:50*

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Matrix Spike

Analyte	Orig. Val.	MS Val.	Qual.	Units	Spike Conc.	% Rec.	Target Range	Batch	Sample Spiked	Analysis Date/Time
EPA 300.0 Anions										
18-11-0078-1										
Chloride	34.05	534.7		mg/kg	500.0	100	80-120	181102S01P	18-11-0078-1	11/04/18 01:52
EPA 300.0 Anions										
18-10-2221-1										
Chloride	76.80	548.2		mg/kg	500.0	94	80-120	181106S01P	18-10-2221-1	11/06/18 13:42
EPA 300.0 Anions										
18-10-2309-11										
Chloride	90.32	643.0		mg/kg	500.0	111	80-120	181109S01P	18-10-2309-11	11/09/18 21:01
SM 4500-CL C Chloride										
18-10-2309-5										
Chloride	46.09	158.6		mg/L	100.0	112	80-120	I1116CLCS1	18-10-2309-5	11/16/18 19:03
EPA 8015B GRO										
18-10-2309-7										
Gasoline Range Organics	ND	6.906		mg/kg	10.00	69	66-108	181109S012	18-10-2309-7	11/09/18 20:41
EPA 8015B GRO										
18-10-2309-21										
Gasoline Range Organics	ND	7.782		mg/kg	10.00	78	66-108	181109S021	18-10-2309-21	11/10/18 06:04
EPA 8260B BTEX/MTBE										
18-10-2309-7										
Benzene	ND	0.03700		mg/kg	0.05000	74	61-127	181107S023	18-10-2309-7	11/08/18 01:44
Toluene	ND	0.03762		mg/kg	0.05000	75	63-123	181107S023	18-10-2309-7	11/08/18 01:44
Ethylbenzene	ND	0.03327		mg/kg	0.05000	67	57-129	181107S023	18-10-2309-7	11/08/18 01:44
o-Xylene	ND	0.03512		mg/kg	0.05000	70	70-130	181107S023	18-10-2309-7	11/08/18 01:44
p/m-Xylene	ND	0.06128	HX	mg/kg	0.1000	61	70-130	181107S023	18-10-2309-7	11/08/18 01:44
EPA 8260B BTEX/MTBE										
18-11-0417-1										
Benzene	ND	0.04088		mg/kg	0.05000	82	61-127	181107S008	18-11-0417-1	11/07/18 13:14
Toluene	ND	0.04357		mg/kg	0.05000	87	63-123	181107S008	18-11-0417-1	11/07/18 13:14
Ethylbenzene	ND	0.04190		mg/kg	0.05000	84	57-129	181107S008	18-11-0417-1	11/07/18 13:14
o-Xylene	ND	0.04186		mg/kg	0.05000	84	70-130	181107S008	18-11-0417-1	11/07/18 13:14
p/m-Xylene	ND	0.08217		mg/kg	0.1000	82	70-130	181107S008	18-11-0417-1	11/07/18 13:14
EPA 8260B BTEX/MTBE										
18-11-0640-2										
Benzene	ND	0.04530		mg/kg	0.05000	91	61-127	181109S010	18-11-0640-2	11/09/18 14:34
Toluene	ND	0.04741		mg/kg	0.05000	95	63-123	181109S010	18-11-0640-2	11/09/18 14:34
Ethylbenzene	ND	0.04559		mg/kg	0.05000	91	57-129	181109S010	18-11-0640-2	11/09/18 14:34
o-Xylene	ND	0.04499		mg/kg	0.05000	90	70-130	181109S010	18-11-0640-2	11/09/18 14:34

Return to Contents

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The difference is service

Client:	Cardno 20505 Crescent Bay Drive Lake Forest, CA 92630-8825	Work Order: Project Name: Date Received:	18-10-2309 ExxonMobil NM K Battery No. 3, Vacuum Oil Field 10/31/18

QUALITY CONTROL
Matrix Spike

Analyte	Orig. Val.	MS Val.	Qual.	Units	Spike Conc.	% Rec.	Target Range	Batch	Sample Spiked	Analysis Date/Time
p/m-Xylene	ND	0.08823		mg/kg	0.1000	88	70-130	181109S010	18-11-0640-2	11/09/18 14:34

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Matrix Spike Duplicate

Analyte	Orig. Val.	Duplicate	Qual.	Units	Spike Conc.	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
EPA 300.0 Anions												
18-11-0078-1												
Chloride	34.05	534.3		mg/kg	500.0	100	80-120	0	0-20	181102S01P	18-11-0078-1	11/04/18 02:13
EPA 300.0 Anions												
18-10-2221-1												
Chloride	76.80	556.2		mg/kg	500.0	96	80-120	1	0-20	181106S01P	18-10-2221-1	11/06/18 14:01
EPA 300.0 Anions												
18-10-2309-11												
Chloride	90.32	645.9		mg/kg	500.0	111	80-120	0	0-20	181109S01P	18-10-2309-11	11/09/18 21:20
SM 4500-CL C Chloride												
18-10-2309-5												
Chloride	46.09	160.6		mg/L	100.0	114	80-120	1	0-25	I1116CLCS1	18-10-2309-5	11/16/18 19:03
EPA 8015B GRO												
18-10-2309-7												
Gasoline Range Organics	ND	6.660		mg/kg	10.00	67	66-108	4	0-18	181109S012	18-10-2309-7	11/09/18 21:15
EPA 8015B GRO												
18-10-2309-21												
Gasoline Range Organics	ND	7.620		mg/kg	10.00	76	66-108	2	0-18	181109S021	18-10-2309-21	11/10/18 06:40
EPA 8260B BTEX/MTBE												
18-10-2309-7												
Benzene	ND	0.03887		mg/kg	0.05000	78	61-127	5	0-20	181107S023	18-10-2309-7	11/08/18 02:11
Toluene	ND	0.03965		mg/kg	0.05000	79	63-123	5	0-20	181107S023	18-10-2309-7	11/08/18 02:11
Ethylbenzene	ND	0.03662		mg/kg	0.05000	73	57-129	10	0-22	181107S023	18-10-2309-7	11/08/18 02:11
o-Xylene	ND	0.03722		mg/kg	0.05000	74	70-130	6	0-30	181107S023	18-10-2309-7	11/08/18 02:11
p/m-Xylene	ND	0.07094		mg/kg	0.1000	71	70-130	15	0-30	181107S023	18-10-2309-7	11/08/18 02:11
EPA 8260B BTEX/MTBE												
18-11-0417-1												
Benzene	ND	0.04440		mg/kg	0.05000	89	61-127	8	0-20	181107S008	18-11-0417-1	11/07/18 13:41
Toluene	ND	0.04672		mg/kg	0.05000	93	63-123	7	0-20	181107S008	18-11-0417-1	11/07/18 13:41
Ethylbenzene	ND	0.04484		mg/kg	0.05000	90	57-129	7	0-22	181107S008	18-11-0417-1	11/07/18 13:41
o-Xylene	ND	0.04495		mg/kg	0.05000	90	70-130	7	0-20	181107S008	18-11-0417-1	11/07/18 13:41
p/m-Xylene	ND	0.08757		mg/kg	0.1000	88	70-130	6	0-20	181107S008	18-11-0417-1	11/07/18 13:41
EPA 8260B BTEX/MTBE												
18-11-0640-2												
Benzene	ND	0.03568	BA	mg/kg	0.05000	71	61-127	24	0-20	181109S010	18-11-0640-2	11/09/18 15:00
Toluene	ND	0.03741	BA	mg/kg	0.05000	75	63-123	24	0-20	181109S010	18-11-0640-2	11/09/18 15:00
Ethylbenzene	ND	0.03579	BA	mg/kg	0.05000	72	57-129	24	0-22	181109S010	18-11-0640-2	11/09/18 15:00
o-Xylene	ND	0.03596		mg/kg	0.05000	72	70-130	22	0-30	181109S010	18-11-0640-2	11/09/18 15:00

Return to Contents

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The difference is service

Client:	Cardno 20505 Crescent Bay Drive Lake Forest, CA 92630-8825	Work Order: Project Name: Date Received:	18-10-2309 ExxonMobil NM K Battery No. 3, Vacuum Oil Field 10/31/18

QUALITY CONTROL
Matrix Spike Duplicate

Analyte	Orig. Val.	Duplicate	Qual.	Units	Spike Conc.	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
p/m-Xylene	ND	0.07025		mg/kg	0.1000	70	70-130	23	0-30	181109S010	18-11-0640-2	11/09/18 15:00

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Laboratory Control Sample

Analyte	Known Val.	Analyzed	Qual.	Units	% Rec.	Target Range	Batch	Analysis Date/Time
EPA 300.0 Anions								
099-12-922-1011								
Chloride	500.0	509.6		mg/kg	102	90-110	181102L01P	11/03/18 22:08
EPA 300.0 Anions								
099-12-922-1012								
Chloride	500.0	478.5		mg/kg	96	90-110	181106L01P	11/06/18 12:51
EPA 300.0 Anions								
099-12-922-1016								
Chloride	500.0	497.3		mg/kg	99	90-110	181109L01P	11/09/18 17:13
SM 4500-CL C Chloride								
099-05-057-2239								
Chloride	100.0	101.6		mg/L	102	80-120	I1116CLCL1	11/16/18 19:03
EPA 8015B GRO								
099-12-024-1261								
Gasoline Range Organics	10.00	8.580		mg/kg	86	70-118	181109L032	11/09/18 12:33
EPA 8015B GRO								
099-12-024-1262								
Gasoline Range Organics	10.00	7.088		mg/kg	71	70-118	181109L055	11/10/18 02:59
EPA 8260B BTEX/MTBE								
099-12-882-2148								
Benzene	0.05000	0.04211		mg/kg	84	80-120	181107L062	11/07/18 22:37
Toluene	0.05000	0.04372		mg/kg	87	80-120	181107L062	11/07/18 22:37
Ethylbenzene	0.05000	0.04260		mg/kg	85	80-120	181107L062	11/07/18 22:37
o-Xylene	0.05000	0.04217		mg/kg	84	75-125	181107L062	11/07/18 22:37
p/m-Xylene	0.1000	0.08309		mg/kg	83	75-125	181107L062	11/07/18 22:37
EPA 8260B BTEX/MTBE								
099-12-882-2137								
Benzene	0.05000	0.05021		mg/kg	100	80-120	181107L004	11/07/18 10:14
Toluene	0.05000	0.05283		mg/kg	106	80-120	181107L004	11/07/18 10:14
Ethylbenzene	0.05000	0.05167		mg/kg	103	80-120	181107L004	11/07/18 10:14
o-Xylene	0.05000	0.05064		mg/kg	101	75-125	181107L004	11/07/18 10:14
p/m-Xylene	0.1000	0.1006		mg/kg	101	75-125	181107L004	11/07/18 10:14
EPA 8260B BTEX/MTBE								
099-12-882-2149								
Benzene	0.05000	0.04821		mg/kg	96	80-120	181109L046	11/09/18 10:21
Toluene	0.05000	0.04966		mg/kg	99	80-120	181109L046	11/09/18 10:21
Ethylbenzene	0.05000	0.04852		mg/kg	97	80-120	181109L046	11/09/18 10:21
o-Xylene	0.05000	0.04714		mg/kg	94	75-125	181109L046	11/09/18 10:21

Return to Contents

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The difference is service

Client:	Cardno 20505 Crescent Bay Drive Lake Forest, CA 92630-8825	Work Order: Project Name: Date Received:	18-10-2309 ExxonMobil NM K Battery No. 3, Vacuum Oil Field 10/31/18

PROJECT QUALITY CONTROL DATA
Laboratory Control Sample

Analyte	Known Val.	Analyzed	Qual.	Units	% Rec.	Target Range	Batch	Analysis Date/Time
p/m-Xylene	0.1000	0.09433		mg/kg	94	75-125	181109L046	11/09/18 10:21

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2309
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Laboratory Control Sample Duplicate

Analyte	LCS Val.	Duplicate	Qual.	Units	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
SM 4500-CL C Chloride											
099-05-057-2239											
Chloride	100.0	105.6		mg/L	106	80-120	4	0-20	I1116CLCL1	099-05-057-2239	11/16/18 19:03
EPA 8015B GRO											
099-12-024-1262											
Gasoline Range Organics	10.00	7.002		mg/kg	70	70-118	1	0-28	181109L055	099-12-024-1262	11/10/18 03:36

Qual - Qualifiers RPD: Relative Percent Difference

Return to Contents

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The difference is service

Work Order: 18-10-2309 Page 1 of 1

Sample Analysis Summary Report

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 300.0	N/A	27	IC 7	1
EPA 300.0	N/A	27	IC 9	1
EPA 8015B	EPA 5030C	715	GC 4	2
EPA 8015B	EPA 5030C	1161	GC 24	2
EPA 8260B	EPA 5030C	316	GC/MS Q	2
EPA 8260B	EPA 5030C	1176	GC/MS Q	2
SM 4500-Cl C	EPA 1312	1168	BUR02	1

Return to Contents

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The difference is service

Work Order: 18-10-2309 Page 1 of 1

Glossary of Terms and Qualifiers

Qualifiers	Definition
AZ	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
B	Analyte was present in the associated method blank.
BA	The MS/MSD RPD was out of control due to suspected matrix interference.
BB	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
DF	Reporting limits elevated due to matrix interferences.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
GE	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
HD	Chromat. profile inconsistent with pattern(s) of ref. fuel stnds.
HO	High concentration matrix spike recovery out of limits
HT	Analytical value calculated using results from associated tests.
HX	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS was in control.
IL	Relative percent difference out of control.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LD	Analyte presence was not confirmed by second column or GC/MS analysis.
LP	The LCS and/or LCSD recoveries for this analyte were above the upper control limit. The associated sample was non-detected. Therefore, the sample data was reported without further clarification.
LQ	LCS recovery above method control limits.
LR	LCS recovery below method control limits.
ND	Parameter not detected at the indicated reporting limit.
QO	Compound did not meet method-described identification guidelines. Identification was based on additional GC/MS characteristics.
RU	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
SG	A silica gel cleanup procedure was performed.
SN	See applicable analysis comment.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Return to Contents

Cecile L de Guia

From: David Purdy <dave.purdy@cardno.com>
Sent: Wednesday, November 14, 2018 12:35 PM
To: Cecile L de Guia
Cc: Vincent Nguyen; Stephen Hunter
Subject: FW: ExxonMobil NM K Battery No. 3, Vacuum Oil Field / CEL 18-10-2309
Attachments: 18-10-2309.pdf; 18102309.xls

EXTERNAL EMAIL*

Cecile:

Please analyze Sample ID 18 (S-25-B5) for SPLP by Method SM 4500-Cl C.
A revised COC is attached.

Thank you.

Dave Purdy
SR. PROJECT MANAGER
CARDNO

We've moved! Please notice our address change below.

Direct +1 949 457 8941 Mobile +1 949 355 4470 Fax +1 949 457 8956
Address 20505 Crescent Bay, Lake Forest, CA 92630
Email dave.purdy@cardno.com Web www.cardno.com

From: Cecile L de Guia [mailto:CecileLdeGuia@eurofinsUS.com]
Sent: Wednesday, November 14, 2018 11:51 AM
To: David Purdy <dave.purdy@cardno.com>
Cc: geotracker01@cardno.com
Subject: ExxonMobil NM K Battery No. 3, Vacuum Oil Field / CEL 18-10-2309

Hello,

Report & EDD are attached.

Thanks,
Sandy

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ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2309

7440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Page: 2 of 3

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden | Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

	Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Matrix: Water	Matrix: Other	Total # of Containers	Analyses Requested: TPH GRO By EPA Method 8015M	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C
1	S-5-B5	B5	10/22/18	1100	X		X			1			X	
2	S-10-B5			1105	X		X			1			X	
3	S-15-B5			1115	X		X			1			X	
4	S-20-B5			1120	X		X			1			X	
5	S-25-B5	B5		1140	X		X			1			X	X - DMP
6	S-5-B3	B3		1310	X		X			1			X	
7	S-10-B3			1320	X		X			1			X	
8	S-15-B3			1325	X		X			1			X	
9	S-20-B3	B3		1330	X		X			1			X	
10	S-5-B6	B6	10/23/18	1415	X		X			1	X	X	X	

Comments:

Remarks:

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Standard | 5 day | 4day | 72hour | 48hour | 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A | **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	10/30/18	1500	FedEx	10/30/18	1500
Relinquished by:	Date	Time	Received by: [signature]	Date 10/31/18	Time 1000
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____			Received by:	Date	Time
Temperature upon receipt ____ °C			Custody Seals Intact? Yes No		

Return to Contents

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# **18-10-2309** 3

7440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Page: 1 of 3

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden

Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen / Stephen Hunter

State of sample collection: New Mexico

COC#:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH GRO By EPA Method 8015M	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C
S-10-B1	B1	10/27/18	0805	X		X			1			X	
S-15-B1			0815	X		X			1			X	
S-20-B1			0825	X		X			1			X	
S-25-B1			0835	X		X			1			X	
S-30-B1			0850	X		X			1			X	
S-35-B1	B1		0900	X		X			1			X	
S-5-B4	B4		0945	X		X			1	X	X	X	
S-10-B4			0955	X		X			1	X	X	X	
S-15-B4			1005	X		X			1	X	X	X	
S-20-B4	B4	10/27/18	1015	X		X			1	X	X	X	

Comments:

Remarks: low sample recovery

low sample recovery

low sample recovery

low sample recovery

low sample recovery

low sample recovery

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

(Standard) 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
				10/31/18	1000

Relinquished by Commercial Carrier:
UPS _____ FedEx X Other _____

Temperature upon receipt _____ °C

Received by:

Custody Seals Intact? Yes No

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2309

7440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

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PO #: 013613U118

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Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

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Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	Analyses Requested: TPH GRO By EPA Method 8015M	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Comments
S-5-B5	B5	10/22/18	1100	X		X			1			X		Remarks:
S-10-B5			1105	X		X			1			X		
S-15-B5			1115	X		X			1			X		
S-20-B5			1120	X		X			1			X		
S-25-B5	B5		1140	X		X			1			X		
S-5-B3	B3		1310	X		X			1			X		
S-10-B3			1320	X		X			1			X		
S-15-B3			1325	X		X			1			X		
S-20-B3	B3		1330	X		X			1			X		
S-5-B6	B6	10/23/18	1415	X		X			1	X	X	X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Standard | 5 day | 4day | 72hour | 48hour | 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
				10/31/18	1000

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Temperature upon receipt ____°C

Received by: | Date | Time

Custody Seals Intact? Yes No

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# 23091

140 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Page: 3 of 3

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen / Stephen Hunter

State of sample collection: New Mexico

COC#:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	Analyses Requested: TPH GRO By EPA Method 8015M DRP	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Comments
S-10 - BC	BC	10/27/18	1425	X		X				X	X	X		Remarks:
S-15 - BC			1435	X		X				X	X	X		low sample recovery
S-20 - BC			1440	X		X				X	X	X		
S-25 - BC			1450	X		X				X	X	X		
S-30 - BC	BC		1500	X		X				X	X	X		low sample recovery
S-5-B7	B7		1545	X		X						X		
S-10 - B7			1555	X		X						X		
S-20 - B7			1620	X		X						X		
S-25 - B7			1630	X		X						X		
S-30 - B7	B7	10/27/18	1640	X		X						X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Standard | 5 day | 4day | 72hour | 48hour | 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vinh Nguyen	10/30/18	1500	FedEx	10/30/18	1500
			[signature]	10/31/18	1000

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other _____

Temperature upon receipt _____°C

Received by:

Custody Seals Intact? Yes No

Return to Contents

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ExxonMobil Analysis Request/Chain of Custody

ECI WO# **18-10-2309** 3

7440 Lincoln Way, Garden Grove, CA 92841-1427
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Page: 1 of 3

Facility#/SID:

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Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Comments:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Remarks
S-10-B1	B1	10/27/18	0805	X		X			1			X		low sample recovery
S-15-B1			0815	X		X			1			X		
S-20-B1			0825	X		X			1			X		
S-25-B1			0835	X		X			1			X		low sample recovery
S-30-B1			0850	X		X			1			X		
S-35-B1	B1		0900	X		X			1			X		low sample recovery
S-5-B4	B4		0945	X		X			1	X	X	X		
S-10-B4			0955	X		X			1	X	X	X		low sample recovery
S-15-B4			1005	X		X			1	X	X	X		low sample recovery
S-20-B4	B4	10/27/18	1015	X		X			1	X	X	X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

(Standard) 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vinh Nguyen	10/30/18	1500	FedEx	10/30/18	1500
				10/31/18	1000

Relinquished by Commercial Carrier:
UPS _____ FedEx X Other _____

Temperature upon receipt _____°C

Received by:

Custody Seals Intact? Yes No

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2309

1440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden | Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Comments
S-5-B5	B5	10/22/18	1100	X		X			1			X		Remarks:
S-10-B5			1105	X		X			1			X		
S-15-B5			1115	X		X			1			X		
S-20-B5			1120	X		X			1			X		
S-25-B5	B5		1140	X		X			1			X		
S-5-B3	B3		1310	X		X			1			X		
S-10-B3			1320	X		X			1			X		
S-15-B3			1325	X		X			1			X		
S-20-B3	B3		1330	X		X			1			X		
S-5-B6	B6	10/23/18	1415	X		X			1	X	X	X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Standard | 5 day | 4day | 72hour | 48hour | 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
Relinquished by:	Date	Time	Received by:	Date	Time
				10/31/18	1000
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____			Received by:	Date	Time
Temperature upon receipt ____°C			Custody Seals Intact? Yes No		

Return to Contents

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ExxonMobil Analysis Request/Chain of Custody

ECI WO# 23091

1140 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Page: 3 of 3

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen / Stephen Hunter

State of sample collection: New Mexico

COC#:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Comments
S-10 - BC	BC	10/27/18	1475	X		X				X	X	X		Remarks:
S-15 - BC			1435 1425	X		X				X	X	X		low sample recovery
S-20 - BC			1490	X		X				X	X	X		
S-25 - BC			1450	X		X				X	X	X		
S-30 - BC	BC		1500	X		X				X	X	X		low sample recovery
S-5-B7	B7		1545	X		X						X		
S-10 - B7			1555	X		X						X		
S-20 - B7			1620	X		X						X		
S-25 - B7			1630	X		X						X		
S-30 - B7	B7	10/27/18	1640	X		X						X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Standard | 5 day | 4day | 72hour | 48hour | 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vinh Nguyen	10/30/18	1500	FedEx	10/30/18	1500
	Date	Time	Received by:	Date	Time
Relinquished by:				10/31/18	1000
Relinquished by:	Date	Time	Received by:	Date	Time

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other _____

Temperature upon receipt _____ °C

Received by: | Date | Time

Custody Seals Intact? Yes No

Return to Contents

2304

ORIGIN ID:HOBA (949) 457-8950
CARDNO
20505 CRESCENT BAY DR
LAKE FOREST, CA 92630
UNITED STATES US

SHIP DATE: 30OCT18
ACTWGT: 64.20 LB
CAD: 006994246/SSFE1922
DIMS: 15x15x15 IN
BILL THIRD PARTY

TO CALSCIENCE
CAL
7440 RT 349 5 10:30 C 6221 10.31
GARD ST 12 CA 92841
(714) 895-549
INV:
PO:
REF:
DEPT:

552J1/3BE7/DC85

FedEx Express

J18211808150lsw

1 of 3
TRK 020 7835 1457 6221
MASTER

WED - 31 OCT 10:30A
PRIORITY OVERNIGHT

A7 APVA

92841
CA-US SNA

Return to Contents

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WORK ORDER NUMBER: 18-10-2309

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: CARDNO

DATE: 10/31/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 2.4 °C (w/ CF): 2.4 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: VJ6P

CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: VJ6P

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: HGMW

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☐	☑	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☑ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Acid/base preserved samples - pH within acceptable range	☐	☐	☑
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOAh ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB ☐ 125PB**znna** (pH__9)

☐ 250AGB ☐ 250CGB ☐ 250CGB**s** (pH__2) ☐ 250PB ☐ 250PB**n** (pH__2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s** (pH__2) ☐ 500PB

☐ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** (pH__2) ☐ 1AGB**s** (O&G) ☐ 1PB ☐ 1PB**na** (pH__12) ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☑ Sleeve (B) ☐ EnCores® (___) ☐ TerraCores® (___) ☐ _____ ☐ _____ ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, Labeled/Checked by: HGMW

s = H_2SO_4, **u** = ultra-pure, **x** = Na_2SO_3+$NaHSO_4.H_2O$, **znna** = Zn $(CH_3CO_2)_2$ + NaOH Reviewed by: VJSO

Return to Contents

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WORK ORDER NUMBER: 18-10- 2309

SAMPLE ANOMALY REPORT

DATE: 10 / 31 / 2018

SAMPLES, CONTAINERS, AND LABELS:

Comments

- ☐ Sample(s) NOT RECEIVED but listed on COC
- ☐ Sample(s) received but NOT LISTED on COC
- ☐ Holding time expired (list client or ECI sample ID and analysis)
- ☐ Insufficient sample amount for requested analysis (list analysis)
- ☐ Improper container(s) used (list analysis)
- ☐ Improper preservative used (list analysis)
- ☐ pH outside acceptable range (list analysis)
- ☐ No preservative noted on COC or label (list analysis and notify lab)
- ☐ Sample container(s) not labeled
- ☐ Client sample label(s) illegible (list container type and analysis)
- ☑ Client sample label(s) do not match COC (comment)
  - ☐ Project information
  - ☐ Client sample ID
  - ☐ Sampling date and/or time
  - ☑ Number of container(s)
  - ☐ Requested analysis
- ☐ Sample container(s) compromised (comment)
  - ☐ Broken
  - ☐ Water present in sample container
- ☐ Air sample container(s) compromised (comment)
  - ☐ Flat
  - ☐ Very low in volume
  - ☐ Leaking (not transferred; duplicate bag submitted)
  - ☐ Leaking (transferred into ECI Tedlar™ bags*)
  - ☐ Leaking (transferred into client's Tedlar™ bags*)

(-21) to (-30) Received 1 container only.

* Transferred at client's request.

MISCELLANEOUS: (Describe)

Comments

HEADSPACE:

(Containers with bubble > 6 mm or ¼ inch for volatile organic or dissolved gas analysis)

ECI Sample ID	ECI Container ID	Total Number**	ECI Sample ID	ECI Container ID	Total Number**

(Containers with bubble for other analysis)

ECI Sample ID	ECI Container ID	Total Number**	Requested Analysis

Comments:

Reported by: HYMW

Reviewed by: WFSO

** Record the total number of containers (i.e., vials or bottles) for the affected sample.

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WORK ORDER NUMBER: 18-10-2310

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Cardno

Client Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field

Attention: David Purdy
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Approved for release on 11/14/2018 by:
Cecile deGuia
Project Manager

ResultLink

Email your PM

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Contents

Client Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Work Order Number: 18-10-2310

eurofins | Calscience

The difference is service

Work Order: 18-10-2310 Page 1 of 1

Work Order Narrative

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 10/31/18. They were assigned to Work Order 18-10-2310.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

DoD Projects:

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2310
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
PO Number: 013613U118
Date/Time Received: 10/31/18 10:00
Number of Containers: 21

Sample Summary

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
S-5-B8	18-10-2310-1	10/28/18 07:50	1	Solid
S-10-B8	18-10-2310-2	10/28/18 08:00	1	Solid
S-15-B8	18-10-2310-3	10/28/18 08:08	1	Solid
S-25-B8	18-10-2310-4	10/28/18 08:20	1	Solid
S-30-B8	18-10-2310-5	10/28/18 08:30	1	Solid
S-40-B8	18-10-2310-6	10/28/18 09:05	1	Solid
S-5-B12	18-10-2310-7	10/28/18 10:00	1	Solid
S-10-B12	18-10-2310-8	10/28/18 10:10	1	Solid
S-15-B12	18-10-2310-9	10/28/18 10:20	1	Solid
S-20-B12	18-10-2310-10	10/28/18 10:30	1	Solid
S-25-B12	18-10-2310-11	10/28/18 10:40	1	Solid
S-35-B12	18-10-2310-12	10/28/18 11:00	1	Solid
S-40-B12	18-10-2310-13	10/28/18 11:30	1	Solid
S-5-B11	18-10-2310-14	10/28/18 12:20	1	Solid
S-10-B11	18-10-2310-15	10/28/18 12:25	1	Solid
S-15-B11	18-10-2310-16	10/28/18 12:35	1	Solid
S-20-B11	18-10-2310-17	10/28/18 12:40	1	Solid
S-25-B11	18-10-2310-18	10/28/18 12:45	1	Solid
S-30-B11	18-10-2310-19	10/28/18 12:55	1	Solid
S-35-B11	18-10-2310-20	10/28/18 13:15	1	Solid
S-40-B11	18-10-2310-21	10/28/18 13:30	1	Solid

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2310
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: 1 (S-5-B8, Solid) Sampled: 10/28/18 07:50									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	690	B	mg/kg	1.5	10	1.00	11/04/18 06:17	EPA 300.0	181102L01P
Sample ID: 2 (S-10-B8, Solid) Sampled: 10/28/18 08:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	900		mg/kg	2.9	20	2.00	11/10/18 12:11	EPA 300.0	181109L03P
Sample ID: 3 (S-15-B8, Solid) Sampled: 10/28/18 08:08									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	180		mg/kg	1.5	10	1.00	11/10/18 12:30	EPA 300.0	181109L03P
Sample ID: 4 (S-25-B8, Solid) Sampled: 10/28/18 08:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	310		mg/kg	1.5	10	1.00	11/10/18 12:49	EPA 300.0	181109L03P
Sample ID: 5 (S-30-B8, Solid) Sampled: 10/28/18 08:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	110		mg/kg	1.5	10	1.00	11/10/18 13:08	EPA 300.0	181109L03P
Sample ID: 6 (S-40-B8, Solid) Sampled: 10/28/18 09:05									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	74		mg/kg	1.5	10	1.00	11/10/18 13:27	EPA 300.0	181109L03P
Sample ID: 7 (S-5-B12, Solid) Sampled: 10/28/18 10:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	270		mg/kg	1.5	10	1.00	11/10/18 13:46	EPA 300.0	181109L03P
Sample ID: 8 (S-10-B12, Solid) Sampled: 10/28/18 10:10									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	180		mg/kg	1.5	10	1.00	11/10/18 14:05	EPA 300.0	181109L03P
Sample ID: 9 (S-15-B12, Solid) Sampled: 10/28/18 10:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	200		mg/kg	1.5	10	1.00	11/10/18 14:24	EPA 300.0	181109L03P

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2310
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: 10 (S-20-B12, Solid) Sampled: 10/28/18 10:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	74		mg/kg	1.5	10	1.00	11/10/18 14:43	EPA 300.0	181109L03P
Sample ID: 11 (S-25-B12, Solid) Sampled: 10/28/18 10:40									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	390		mg/kg	1.5	10	1.00	11/10/18 15:02	EPA 300.0	181109L03P
Sample ID: 12 (S-35-B12, Solid) Sampled: 10/28/18 11:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	140		mg/kg	1.5	10	1.00	11/10/18 16:36	EPA 300.0	181109L03P
Sample ID: 13 (S-40-B12, Solid) Sampled: 10/28/18 11:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	110		mg/kg	1.5	10	1.00	11/10/18 16:55	EPA 300.0	181109L03P
Sample ID: 14 (S-5-B11, Solid) Sampled: 10/28/18 12:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	950		mg/kg	2.9	20	2.00	11/10/18 17:14	EPA 300.0	181109L03P
Sample ID: 15 (S-10-B11, Solid) Sampled: 10/28/18 12:25									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	40		mg/kg	1.5	10	1.00	11/10/18 17:33	EPA 300.0	181109L03P
Sample ID: 16 (S-15-B11, Solid) Sampled: 10/28/18 12:35									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	630		mg/kg	1.5	10	1.00	11/10/18 17:52	EPA 300.0	181109L03P
Sample ID: 17 (S-20-B11, Solid) Sampled: 10/28/18 12:40									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	930		mg/kg	1.5	10	1.00	11/10/18 18:11	EPA 300.0	181109L03P
Sample ID: 18 (S-25-B11, Solid) Sampled: 10/28/18 12:45									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2310
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Chloride	870		mg/kg	1.5	10	1.00	11/10/18 18:30	EPA 300.0	181109L03P
Sample ID: 19 (S-30-B11, Solid) Sampled: 10/28/18 12:55									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	830		mg/kg	1.5	10	1.00	11/10/18 18:49	EPA 300.0	181109L03P
Sample ID: 20 (S-35-B11, Solid) Sampled: 10/28/18 13:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	40		mg/kg	1.5	10	1.00	11/10/18 19:08	EPA 300.0	181109L03P
Sample ID: 21 (S-40-B11, Solid) Sampled: 10/28/18 13:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	110		mg/kg	1.5	10	1.00	11/10/18 19:26	EPA 300.0	181109L03P

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2310
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Qualifiers	Units	QC Batch	Lab Number	Analysis Date/Time
EPA 300.0 Anions						
099-12-922-1011						
Chloride	2.7	J	mg/kg	181102L01P	099-12-922-1011	11/03/18 21:48
EPA 300.0 Anions						
099-12-922-1015						
Chloride	ND		mg/kg	181109L03P	099-12-922-1015	11/10/18 11:33

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2310
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Matrix Spike

Analyte	Orig. Val.	MS Val.	Qual.	Units	Spike Conc.	% Rec.	Target Range	Batch	Sample Spiked	Analysis Date/Time
EPA 300.0 Anions										
18-11-0078-1										
Chloride	34.05	534.7		mg/kg	500.0	100	80-120	181102S01P	18-11-0078-1	11/04/18 01:52
EPA 300.0 Anions										
18-10-2310-7										
Chloride	271.0	807.2		mg/kg	500.0	107	80-120	181109S03P	18-10-2310-7	11/10/18 15:20

Return to Contents

eurofins | Calscience

The difference is service

Client:	Cardno 20505 Crescent Bay Drive Lake Forest, CA 92630-8825	Work Order: Project Name: Date Received:	18-10-2310 ExxonMobil NM K Battery No. 3, Vacuum Oil Field 10/31/18

QUALITY CONTROL
Matrix Spike Duplicate

Analyte	Orig. Val.	Duplicate	Qual.	Units	Spike Conc.	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
EPA 300.0 Anions												
18-11-0078-1												
Chloride	34.05	534.3		mg/kg	500.0	100	80-120	0	0-20	181102S01P	18-11-0078-1	11/04/18 02:13
EPA 300.0 Anions												
18-10-2310-7												
Chloride	271.0	799.6		mg/kg	500.0	106	80-120	1	0-20	181109S03P	18-10-2310-7	11/10/18 15:39

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2310
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Laboratory Control Sample

Analyte	Known Val.	Analyzed	Qual.	Units	% Rec.	Target Range	Batch	Analysis Date/Time
EPA 300.0 Anions								
099-12-922-1011								
Chloride	500.0	509.6		mg/kg	102	90-110	181102L01P	11/03/18 22:08
EPA 300.0 Anions								
099-12-922-1015								
Chloride	500.0	467.4		mg/kg	93	90-110	181109L03P	11/10/18 11:52

Return to Contents

eurofins | Calscience

The difference is service

Work Order: 18-10-2310 Page 1 of 1

Sample Analysis Summary Report

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 300.0	N/A	1027	IC 7	1
EPA 300.0	N/A	1027	IC 9	1

Return to Contents

eurofins | Calscience

The difference is service

Work Order: 18-10-2310 Page 1 of 1

Glossary of Terms and Qualifiers

Qualifiers	Definition
AZ	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
B	Analyte was present in the associated method blank.
BA	The MS/MSD RPD was out of control due to suspected matrix interference.
BB	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
DF	Reporting limits elevated due to matrix interferences.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
GE	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
HD	Chromat. profile inconsistent with pattern(s) of ref. fuel stnds.
HO	High concentration matrix spike recovery out of limits
HT	Analytical value calculated using results from associated tests.
HX	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS was in control.
IL	Relative percent difference out of control.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LD	Analyte presence was not confirmed by second column or GC/MS analysis.
LP	The LCS and/or LCSD recoveries for this analyte were above the upper control limit. The associated sample was non-detected. Therefore, the sample data was reported without further clarification.
LQ	LCS recovery above method control limits.
LR	LCS recovery below method control limits.
ND	Parameter not detected at the indicated reporting limit.
QO	Compound did not meet method-described identification guidelines. Identification was based on additional GC/MS characteristics.
RU	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
SG	A silica gel cleanup procedure was performed.
SN	See applicable analysis comment.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# **18-10-2310**

7440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen / Stephen Hunter

State of sample collection: New Mexico

COC#:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Matrix: Water	Matrix: Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C
S-5-B8	B8	10/28/18	0750	X		X			1			X	
S-10-B8			0800	X		X			1			X	
S-15-B8			0808	X		X			1			X	
S-25-B8			0820	X		X			1			X	
S-30-B8			0830	X		X			1			X	
S-40-B8	B8	10/28/18	0905	X		X			1			X	
S-5-B12	B12		1000	X		X			1			X	
S-10-B12			1010	X		X			1			X	
S-15-B12			1020	X		X			1			X	
S-20-B12	B12	10/28/18	1030	X		X			1			X	

Comments:

Remarks: low sample recovery

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Standard 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
Relinquished by:	Date	Time	Received by:	Date	Time
				10/31/18	1000
Relinquished by:	Date	Time	Received by:	Date	Time

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Temperature upon receipt ____°C

Received by: ____ Date ____ Time ____

Custody Seals Intact? Yes No

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2310

1140 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden | Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Stephen Hunter / Vincent Nguyen

State of sample collection: New Mexico

COC#:

Comments:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Remarks:
S-25-B12	B12	10/29/18	1040	X		X			1			X		
S-35-B12	↓		1100	X		X			1			X		
S-40-B12	B12		1130	X		X			1			X		
S-5-B11	B11		1220	X		X			1			X		
S-10-B11			1225	X		X			1			X		
S-15-B11			1235	X		X			1			X		
S-20-B11			1240	X		X			1			X		
S-25-B11			1245	X		X			1			X		
S-30-B11	↓	↓	1255	X		X			1			X		
S-35-B11	B11	10/29/18	1315	X		X			1			X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Standard 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)
Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )
Geotracker Global ID: N/A **Log Code:**
Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
				10/31/18	1000
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____			Received by:	Date	Time
Temperature upon receipt ____°C			Custody Seals Intact? Yes No		

Return to Contents

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ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2310

1140 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden | Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Comments:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Matrix: Water	Matrix: Other	Total # of Containers	Analyses Requested: TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Remarks
S-40-B11	B11	10/29/18	1330	X		X			1			X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

(Standard) 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

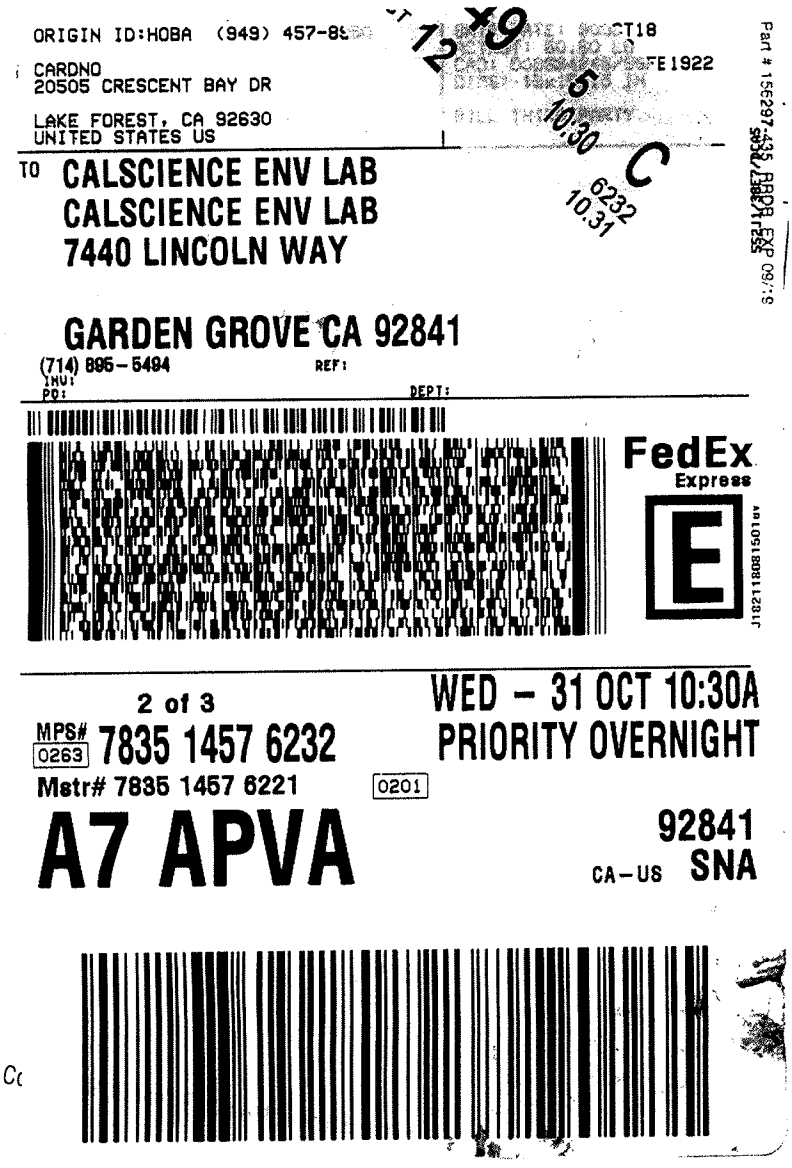
Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
Relinquished by:	Date	Time	Received by:	Date	Time
			[signature]	10/31/18	1000
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____			Received by:	Date	Time
Temperature upon receipt ____ °C			Custody Seals Intact? Yes No		

Return to Contents

2310


ORIGIN ID:HOBA (949) 457-8
CARDNO
20505 CRESCENT BAY DR
LAKE FOREST, CA 92630
UNITED STATES US
TO CALSCIENCE ENV LAB
CALSCIENCE ENV LAB
7440 LINCOLN WAY
GARDEN GROVE CA 92841
(714) 895-5494
REF:
DEPT:
FedEx
Express
2 of 3
MPS# 0263 7835 1457 6232
Mstr# 7835 1457 6221
0201
WED - 31 OCT 10:30A
PRIORITY OVERNIGHT
A7 APVA
92841
CA-US SNA

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WORK ORDER NUMBER: 18-10-2510

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: CARDNO

DATE: 10/31/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 1.9 °C (w/ CF): 1.9 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: VJ68

CUSTODY SEAL:

Cooler ☑ Present and Intact ☐ Present but Not Intact ☐ Not Present ☐ N/A Checked by: VJ68

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: HMW

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Acid/base preserved samples - pH within acceptable range	☐	☐	☑
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOAh ☐ VOA**na₂** ☐ 100PJ ☐ 100PJ**na₂** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB ☐ 125PB**znna** (pH__9)

☐ 250AGB ☐ 250CGB ☐ 250CGB**s** (pH__2) ☐ 250PB ☐ 250PB**n** (pH__2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s** (pH__2) ☐ 500PB

☐ 1AGB ☐ 1AGB**na₂** ☐ 1AGB**s** (pH__2) ☐ 1AGB**s** (O&G) ☐ 1PB ☐ 1PB**na** (pH__12) ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☑ Sleeve (B) ☐ EnCores® (___) ☐ TerraCores® (___) ☑ Sleeve (S) ☐ _____ ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na₂** = $Na_2S_2O_3$, **p** = H_3PO_4, Labeled/Checked by: HMW

s = H_2SO_4, **u** = ultra-pure, **x** = Na_2SO_3+$NaHSO_4.H_2O$, **znna** = Zn $(CH_3CO_2)_2$ + NaOH Reviewed by: WJS

*(-11) (-14) (-19) (-20) (-21)

Return to Contents

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Supplemental Report 1

Additional requested analyses have been added to the original report.

WORK ORDER NUMBER: 18-10-2311

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Cardno

Client Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field

Attention: David Purdy
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Approved for release on 11/14/2018 by:
Cecile deGuia
Project Manager

ResultLink

Email your PM

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Contents

Client Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Work Order Number: 18-10-2311

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The difference is service

Work Order: 18-10-2311 Page 1 of 1

Work Order Narrative

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 10/31/18. They were assigned to Work Order 18-10-2311.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

DoD Projects:

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

Return to Contents

eurofins | Calscience

The difference is service

Client:	Cardno 20505 Crescent Bay Drive Lake Forest, CA 92630-8825	Work Order:	18-10-2311
		Project Name:	ExxonMobil NM K Battery No. 3, Vacuum Oil Field
		PO Number:	013613U118
		Date/Time Received:	10/31/18 10:00
		Number of Containers:	21
Attn:	David Purdy		

Sample Summary

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
S-5-B9	18-10-2311-1	10/29/18 08:20	1	Solid
S-10-B9	18-10-2311-2	10/29/18 08:25	1	Solid
S-15-B9	18-10-2311-3	10/29/18 08:30	1	Solid
S-20-B9	18-10-2311-4	10/29/18 08:35	1	Solid
S-5-B10	18-10-2311-5	10/29/18 09:10	1	Solid
S-10-B10	18-10-2311-6	10/29/18 09:15	1	Solid
S-15-B10	18-10-2311-7	10/29/18 09:25	1	Solid
S-20-B10	18-10-2311-8	10/29/18 09:35	1	Solid
S-5-B13	18-10-2311-9	10/29/18 10:15	1	Solid
S-10-B13	18-10-2311-10	10/29/18 10:20	1	Solid
S-15-B13	18-10-2311-11	10/29/18 10:30	1	Solid
S-20-B13	18-10-2311-12	10/29/18 10:40	1	Solid
S-5-B2	18-10-2311-13	10/29/18 11:15	1	Solid
S-10-B2	18-10-2311-14	10/29/18 11:20	1	Solid
S-15-B2	18-10-2311-15	10/29/18 11:25	1	Solid
S-20-B2	18-10-2311-16	10/29/18 11:30	1	Solid
S-45-B2	18-10-2311-17	10/29/18 12:45	1	Solid
S-30-B2	18-10-2311-18	10/29/18 11:45	1	Solid
S-35-B2	18-10-2311-19	10/29/18 12:00	1	Solid
S-40-B2	18-10-2311-20	10/29/18 12:15	1	Solid
S-50-B2	18-10-2311-21	10/29/18 13:00	1	Solid

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: 1 (S-5-B9, Solid) Sampled: 10/29/18 08:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	28		mg/kg	1.5	10	1.00	11/10/18 06:27	EPA 300.0	181109L02P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.092	0.51	1.00	11/10/18 13:35	EPA 8015B	181110L019
Surr: 1,4-Bromofluorobenzene (42-126%)	*90%*						*11/10/18 13:35*	*EPA 8015B*	*181110L019*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0052	1.00	11/03/18 14:43	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00053	0.0052	1.00	11/03/18 14:43	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00016	0.0052	1.00	11/03/18 14:43	EPA 8260B	181103L011
o-Xylene	ND		mg/kg	0.00057	0.0052	1.00	11/03/18 14:43	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00028	0.0052	1.00	11/03/18 14:43	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00028	0.0052	1.00	11/03/18 14:43	EPA 8260B	181103L011
Surr: 1,4-Bromofluorobenzene (80-120%)	*96%*						*11/03/18 14:43*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*102%*						*11/03/18 14:43*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*96%*						*11/03/18 14:43*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*99%*						*11/03/18 14:43*	*EPA 8260B*	*181103L011*
Sample ID: 2 (S-10-B9, Solid) Sampled: 10/29/18 08:25									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	34		mg/kg	1.5	10	1.00	11/10/18 06:48	EPA 300.0	181109L02P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.091	0.50	1.00	11/10/18 14:09	EPA 8015B	181110L019
Surr: 1,4-Bromofluorobenzene (42-126%)	*85%*						*11/10/18 14:09*	*EPA 8015B*	*181110L019*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/03/18 15:11	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/03/18 15:11	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/03/18 15:11	EPA 8260B	181103L011
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/03/18 15:11	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 15:11	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 15:11	EPA 8260B	181103L011

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/03/18 15:11*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*95%*						*11/03/18 15:11*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*99%*						*11/03/18 15:11*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*101%*						*11/03/18 15:11*	*EPA 8260B*	*181103L011*
Sample ID: 3 (S-15-B9, Solid) Sampled: 10/29/18 08:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	54		mg/kg	1.5	10	1.00	11/10/18 07:08	EPA 300.0	181109L02P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.092	0.51	1.00	11/10/18 14:43	EPA 8015B	181110L019
Surr: 1,4-Bromofluorobenzene (42-126%)	*84%*						*11/10/18 14:43*	*EPA 8015B*	*181110L019*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/03/18 17:33	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00051	0.0050	1.00	11/03/18 17:33	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/03/18 17:33	EPA 8260B	181103L011
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/03/18 17:33	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 17:33	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 17:33	EPA 8260B	181103L011
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/03/18 17:33*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*97%*						*11/03/18 17:33*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*101%*						*11/03/18 17:33*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*101%*						*11/03/18 17:33*	*EPA 8260B*	*181103L011*
Sample ID: 4 (S-20-B9, Solid) Sampled: 10/29/18 08:35									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	9.1	J	mg/kg	1.5	10	1.00	11/10/18 07:28	EPA 300.0	181109L02P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.090	0.50	1.00	11/12/18 16:56	EPA 8015B	181112L033
Surr: 1,4-Bromofluorobenzene (42-126%)	*76%*						*11/12/18 16:56*	*EPA 8015B*	*181112L033*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0051	1.00	11/03/18 18:02	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00053	0.0051	1.00	11/03/18 18:02	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00016	0.0051	1.00	11/03/18 18:02	EPA 8260B	181103L011

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
o-Xylene	ND		mg/kg	0.00057	0.0051	1.00	11/03/18 18:02	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00028	0.0051	1.00	11/03/18 18:02	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00028	0.0051	1.00	11/03/18 18:02	EPA 8260B	181103L011
Surr: 1,4-Bromofluorobenzene (80-120%)	*96%*						*11/03/18 18:02*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*94%*						*11/03/18 18:02*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*97%*						*11/03/18 18:02*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*100%*						*11/03/18 18:02*	*EPA 8260B*	*181103L011*
Sample ID: 5 (S-5-B10, Solid) Sampled: 10/29/18 09:10									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	29		mg/kg	1.5	10	1.00	11/10/18 07:49	EPA 300.0	181109L02P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.088	0.49	1.00	11/10/18 15:50	EPA 8015B	181110L019
Surr: 1,4-Bromofluorobenzene (42-126%)	*87%*						*11/10/18 15:50*	*EPA 8015B*	*181110L019*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0051	1.00	11/03/18 18:30	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00052	0.0051	1.00	11/03/18 18:30	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00015	0.0051	1.00	11/03/18 18:30	EPA 8260B	181103L011
o-Xylene	ND		mg/kg	0.00056	0.0051	1.00	11/03/18 18:30	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00027	0.0051	1.00	11/03/18 18:30	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00027	0.0051	1.00	11/03/18 18:30	EPA 8260B	181103L011
Surr: 1,4-Bromofluorobenzene (80-120%)	*98%*						*11/03/18 18:30*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*102%*						*11/03/18 18:30*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*102%*						*11/03/18 18:30*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*101%*						*11/03/18 18:30*	*EPA 8260B*	*181103L011*
Sample ID: 6 (S-10-B10, Solid) Sampled: 10/29/18 09:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	13		mg/kg	1.5	10	1.00	11/10/18 08:09	EPA 300.0	181109L02P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.092	0.51	1.00	11/10/18 16:24	EPA 8015B	181110L019
Surr: 1,4-Bromofluorobenzene (42-126%)	*96%*						*11/10/18 16:24*	*EPA 8015B*	*181110L019*

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	11/03/18 18:58	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/03/18 18:58	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/03/18 18:58	EPA 8260B	181103L011
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/03/18 18:58	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 18:58	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 18:58	EPA 8260B	181103L011
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/03/18 18:58*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*100%*						*11/03/18 18:58*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*102%*						*11/03/18 18:58*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*100%*						*11/03/18 18:58*	*EPA 8260B*	*181103L011*
Sample ID: 7 (S-15-B10, Solid) Sampled: 10/29/18 09:25									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	17		mg/kg	1.5	10	1.00	11/10/18 08:29	EPA 300.0	181109L02P
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.093	0.51	1.00	11/10/18 16:58	EPA 8015B	181110L019
Surr: 1,4-Bromofluorobenzene (42-126%)	*98%*						*11/10/18 16:58*	*EPA 8015B*	*181110L019*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0051	1.00	11/03/18 19:26	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00053	0.0051	1.00	11/03/18 19:26	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00015	0.0051	1.00	11/03/18 19:26	EPA 8260B	181103L011
o-Xylene	ND		mg/kg	0.00057	0.0051	1.00	11/03/18 19:26	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00027	0.0051	1.00	11/03/18 19:26	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00027	0.0051	1.00	11/03/18 19:26	EPA 8260B	181103L011
Surr: 1,4-Bromofluorobenzene (80-120%)	*98%*						*11/03/18 19:26*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*102%*						*11/03/18 19:26*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*104%*						*11/03/18 19:26*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*100%*						*11/03/18 19:26*	*EPA 8260B*	*181103L011*
Sample ID: 8 (S-20-B10, Solid) Sampled: 10/29/18 09:35									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	30		mg/kg	1.5	10	1.00	11/10/18 08:50	EPA 300.0	181109L02P

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.094	0.52	1.00	11/10/18 17:32	EPA 8015B	181110L019
Surr: 1,4-Bromofluorobenzene (42-126%)	*63%*						*11/10/18 17:32*	*EPA 8015B*	*181110L019*
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	0.00013	J	mg/kg	0.00013	0.0050	1.00	11/03/18 19:55	EPA 8260B	181103L011
Toluene	ND		mg/kg	0.00052	0.0050	1.00	11/03/18 19:55	EPA 8260B	181103L011
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	11/03/18 19:55	EPA 8260B	181103L011
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	11/03/18 19:55	EPA 8260B	181103L011
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 19:55	EPA 8260B	181103L011
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	11/03/18 19:55	EPA 8260B	181103L011
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*						*11/03/18 19:55*	*EPA 8260B*	*181103L011*
Surr: Dibromofluoromethane (79-133%)	*101%*						*11/03/18 19:55*	*EPA 8260B*	*181103L011*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*99%*						*11/03/18 19:55*	*EPA 8260B*	*181103L011*
Surr: Toluene-d8 (80-120%)	*100%*						*11/03/18 19:55*	*EPA 8260B*	*181103L011*
Sample ID: 9 (S-5-B13, Solid) Sampled: 10/29/18 10:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	92		mg/kg	2.9	20	2.00	11/10/18 09:10	EPA 300.0	181109L02P
Sample ID: 10 (S-10-B13, Solid) Sampled: 10/29/18 10:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	340		mg/kg	1.5	10	1.00	11/10/18 09:31	EPA 300.0	181109L02P
Sample ID: 11 (S-15-B13, Solid) Sampled: 10/29/18 10:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	450		mg/kg	1.5	10	1.00	11/10/18 10:32	EPA 300.0	181109L02P
Sample ID: 12 (S-20-B13, Solid) Sampled: 10/29/18 10:40									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	21		mg/kg	1.5	10	1.00	11/10/18 10:52	EPA 300.0	181109L02P
Sample ID: 13 (S-5-B2, Solid) Sampled: 10/29/18 11:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	560		mg/kg	1.5	10	1.00	11/10/18 11:13	EPA 300.0	181109L02P

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: 14 (S-10-B2, Solid) Sampled: 10/29/18 11:20									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	890		mg/kg	1.5	10	1.00	11/10/18 11:33	EPA 300.0	181109L02P
Sample ID: 15 (S-15-B2, Solid) Sampled: 10/29/18 11:25									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	840		mg/kg	1.5	10	1.00	11/10/18 11:53	EPA 300.0	181109L02P
Sample ID: 16 (S-20-B2, Solid) Sampled: 10/29/18 11:30									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	1600		mg/kg	2.9	20	2.00	11/10/18 12:14	EPA 300.0	181109L02P
Sample ID: 17 (S-45-B2, Solid) Sampled: 10/29/18 12:45									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	120		mg/kg	1.5	10	1.00	11/10/18 12:34	EPA 300.0	181109L02P
Sample ID: 18 (S-30-B2, Solid) Sampled: 10/29/18 11:45									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	260		mg/kg	1.5	10	1.00	11/10/18 12:54	EPA 300.0	181109L02P
Sample ID: 19 (S-35-B2, Solid) Sampled: 10/29/18 12:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	320		mg/kg	1.5	10	1.00	11/10/18 13:15	EPA 300.0	181109L02P
Sample ID: 20 (S-40-B2, Solid) Sampled: 10/29/18 12:15									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	340		mg/kg	1.5	10	1.00	11/10/18 13:35	EPA 300.0	181109L02P
Sample ID: 21 (S-50-B2, Solid) Sampled: 10/29/18 13:00									
EPA 300.0 Anions (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Chloride	56		mg/kg	1.5	10	1.00	11/01/18 16:57	EPA 300.0	181101L01P
EPA 1010A(M) Ignitability (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Ignitability	>212		ºF	70	70	1.00	11/01/18 12:00	EPA 1010A(M)	I1101FPD1

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
EPA 9045C pH (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
pH	8.13		pH units	0.01	0.01	1.00	11/01/18 09:45	EPA 9045C	I1101PHD2
SW-846 Chapter 7 Reactive Cyanide (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Cyanide, Reactive	ND		mg/kg	0.24	0.50	1.00	11/01/18 12:53	SW-846, Chapter 7	I1101RCNB1
SW-846 Chapter 7 Reactive Sulfide (Extraction Method: N/A) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Sulfide, Reactive	ND		mg/kg	1.2	2.0	1.00	10/01/18 16:00	SW-846, Chapter 7	I1031RSB2
EPA 8015B DRO (Extraction Method: EPA 3550B) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Diesel Range Organics	ND		mg/kg	1.3	5.3	1.00	11/01/18 13:42	EPA 8015B	181031B12
Surr: n-Octacosane (42-162%)	*110%*						*11/01/18 13:42*	*EPA 8015B*	*181031B12*
EPA 8015B GRO (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Gasoline Range Organics	ND		mg/kg	0.089	0.49	1.00	10/31/18 20:39	EPA 8015B	181031L059
Surr: 1,4-Bromofluorobenzene (42-126%)	*76%*						*10/31/18 20:39*	*EPA 8015B*	*181031L059*
EPA 6010B/7471A CAC Title 22 Metals (Extraction Method: EPA 3050B) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Antimony	ND		mg/kg	0.153	0.769	1.03	11/01/18 13:43	EPA 6010B	181031L04
Arsenic	ND		mg/kg	0.266	0.769	1.03	11/01/18 13:43	EPA 6010B	181031L04
Barium	13.1		mg/kg	0.158	0.513	1.03	11/01/18 13:43	EPA 6010B	181031L04
Beryllium	0.172	J	mg/kg	0.140	0.256	1.03	11/01/18 13:43	EPA 6010B	181031L04
Cadmium	ND		mg/kg	0.139	0.513	1.03	11/01/18 13:43	EPA 6010B	181031L04
Chromium	6.67		mg/kg	0.146	0.256	1.03	11/01/18 13:43	EPA 6010B	181031L04
Cobalt	0.288		mg/kg	0.152	0.256	1.03	11/01/18 13:43	EPA 6010B	181031L04
Copper	1.22		mg/kg	0.138	0.513	1.03	11/01/18 13:43	EPA 6010B	181031L04
Lead	0.738		mg/kg	0.135	0.513	1.03	11/01/18 13:43	EPA 6010B	181031L04
Molybdenum	ND		mg/kg	0.135	0.256	1.03	11/01/18 13:43	EPA 6010B	181031L04
Nickel	1.35		mg/kg	0.148	0.256	1.03	11/01/18 13:43	EPA 6010B	181031L04
Selenium	ND		mg/kg	0.307	0.769	1.03	11/01/18 13:43	EPA 6010B	181031L04
Silver	ND		mg/kg	0.0879	0.256	1.03	11/01/18 13:43	EPA 6010B	181031L04
Thallium	ND		mg/kg	0.156	0.769	1.03	11/01/18 13:43	EPA 6010B	181031L04
Vanadium	10.7		mg/kg	0.145	0.256	1.03	11/01/18 13:43	EPA 6010B	181031L04
Zinc	1.88		mg/kg	0.182	1.03	1.03	11/01/18 13:43	EPA 6010B	181031L04
EPA 7471A Mercury (Extraction Method: EPA 7471A Total) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Mercury	0.00882	B,J	mg/kg	0.00597	0.0847	1.00	11/01/18 15:12	EPA 7471A	181101L01A

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

Attn: David Purdy

Analytical Report

Analyte	Result	Flag	Units	MDL	RL	Dilution Factor	Analysis Date/Time	Method	Batch
EPA 8260B BTEX/MTBE (Extraction Method: EPA 5030C) Container - A - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.									
Benzene	ND		mg/kg	0.00013	0.0050	1.00	10/31/18 16:18	EPA 8260B	181031L010
Toluene	ND		mg/kg	0.00052	0.0050	1.00	10/31/18 16:18	EPA 8260B	181031L010
Ethylbenzene	ND		mg/kg	0.00015	0.0050	1.00	10/31/18 16:18	EPA 8260B	181031L010
o-Xylene	ND		mg/kg	0.00056	0.0050	1.00	10/31/18 16:18	EPA 8260B	181031L010
p/m-Xylene	ND		mg/kg	0.00027	0.0050	1.00	10/31/18 16:18	EPA 8260B	181031L010
Xylenes (total)	ND		mg/kg	0.00027	0.0050	1.00	10/31/18 16:18	EPA 8260B	181031L010
Surr: 1,4-Bromofluorobenzene (80-120%)	*92%*						*10/31/18 16:18*	*EPA 8260B*	*181031L010*
Surr: Dibromofluoromethane (79-133%)	*101%*						*10/31/18 16:18*	*EPA 8260B*	*181031L010*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*101%*						*10/31/18 16:18*	*EPA 8260B*	*181031L010*
Surr: Toluene-d8 (80-120%)	*96%*						*10/31/18 16:18*	*EPA 8260B*	*181031L010*

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Qualifiers	Units	QC Batch	Lab Number	Analysis Date/Time
EPA 300.0 Anions						
099-12-922-1014						
Chloride	ND		mg/kg	181109L02P	099-12-922-1014	11/10/18 05:47
EPA 300.0 Anions						
099-12-922-1010						
Chloride	ND		mg/kg	181101L01P	099-12-922-1010	11/01/18 17:54
SW-846 Chapter 7 Reactive Cyanide						
099-05-031-2446						
Cyanide, Reactive	ND		mg/kg	I1101RCNB1	099-05-031-2446	11/01/18 12:53
SW-846 Chapter 7 Reactive Sulfide						
099-05-033-3401						
Sulfide, Reactive	ND		mg/kg	I1031RSB2	099-05-033-3401	10/01/18 16:00
EPA 8015B DRO						
099-15-414-1192						
Diesel Range Organics	ND		mg/kg	181031B12	099-15-414-1192	11/01/18 04:06
Surr: n-Octacosane (42-162%)	*97%*			*181031B12*	*099-15-414-1192*	*11/01/18 04:06*
EPA 8015B GRO						
099-12-024-1263						
Gasoline Range Organics	ND		mg/kg	181110L019	099-12-024-1263	11/10/18 09:05
Surr: 1,4-Bromofluorobenzene (42-126%)	*93%*			*181110L019*	*099-12-024-1263*	*11/10/18 09:05*
EPA 8015B GRO						
099-12-024-1264						
Gasoline Range Organics	ND		mg/kg	181112L033	099-12-024-1264	11/12/18 15:49
Surr: 1,4-Bromofluorobenzene (42-126%)	*82%*			*181112L033*	*099-12-024-1264*	*11/12/18 15:49*
EPA 8015B GRO						
099-12-024-1258						
Gasoline Range Organics	ND		mg/kg	181031L059	099-12-024-1258	10/31/18 19:35
Surr: 1,4-Bromofluorobenzene (42-126%)	*72%*			*181031L059*	*099-12-024-1258*	*10/31/18 19:35*
EPA 6010B/7471A CAC Title 22 Metals						
097-01-002-27179						
Antimony	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Arsenic	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Barium	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Beryllium	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Cadmium	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Chromium	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Cobalt	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Attn: David Purdy

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Qualifiers	Units	QC Batch	Lab Number	Analysis Date/Time
Copper	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Lead	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Molybdenum	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Nickel	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Selenium	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Silver	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Thallium	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Vanadium	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
Zinc	ND		mg/kg	181031L04	097-01-002-27179	11/01/18 10:53
EPA 7471A Mercury						
099-16-272-4240						
Mercury	0.0124	J	mg/kg	181101L01A	099-16-272-4240	11/01/18 14:09
EPA 8260B BTEX/MTBE						
099-12-882-2131						
Benzene	ND		mg/kg	181103L011	099-12-882-2131	11/03/18 13:46
Toluene	ND		mg/kg	181103L011	099-12-882-2131	11/03/18 13:46
Ethylbenzene	ND		mg/kg	181103L011	099-12-882-2131	11/03/18 13:46
o-Xylene	ND		mg/kg	181103L011	099-12-882-2131	11/03/18 13:46
p/m-Xylene	ND		mg/kg	181103L011	099-12-882-2131	11/03/18 13:46
Xylenes (total)	ND		mg/kg	181103L011	099-12-882-2131	11/03/18 13:46
Surr: 1,4-Bromofluorobenzene (80-120%)	*97%*			*181103L011*	*099-12-882-2131*	*11/03/18 13:46*
Surr: Dibromofluoromethane (79-133%)	*99%*			*181103L011*	*099-12-882-2131*	*11/03/18 13:46*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*100%*			*181103L011*	*099-12-882-2131*	*11/03/18 13:46*
Surr: Toluene-d8 (80-120%)	*100%*			*181103L011*	*099-12-882-2131*	*11/03/18 13:46*
EPA 8260B BTEX/MTBE						
099-12-882-2127						
Benzene	ND		mg/kg	181031L010	099-12-882-2127	10/31/18 14:56
Toluene	ND		mg/kg	181031L010	099-12-882-2127	10/31/18 14:56
Ethylbenzene	ND		mg/kg	181031L010	099-12-882-2127	10/31/18 14:56
o-Xylene	ND		mg/kg	181031L010	099-12-882-2127	10/31/18 14:56
p/m-Xylene	ND		mg/kg	181031L010	099-12-882-2127	10/31/18 14:56
Xylenes (total)	ND		mg/kg	181031L010	099-12-882-2127	10/31/18 14:56
Surr: 1,4-Bromofluorobenzene (80-120%)	*92%*			*181031L010*	*099-12-882-2127*	*10/31/18 14:56*
Surr: Dibromofluoromethane (79-133%)	*102%*			*181031L010*	*099-12-882-2127*	*10/31/18 14:56*
Surr: 1,2-Dichloroethane-d4 (71-155%)	*103%*			*181031L010*	*099-12-882-2127*	*10/31/18 14:56*
Surr: Toluene-d8 (80-120%)	*96%*			*181031L010*	*099-12-882-2127*	*10/31/18 14:56*

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Matrix Spike

Analyte	Orig. Val.	MS Val.	Qual.	Units	Spike Conc.	% Rec.	Target Range	Batch	Sample Spiked	Analysis Date/Time
EPA 300.0 Anions										
18-10-2311-17										
Chloride	123.3	726.8	HX	mg/kg	500.0	121	80-120	181109S02P	18-10-2311-17	11/10/18 13:56
EPA 300.0 Anions										
18-10-2311-21										
Chloride	56.45	574.2		mg/kg	500.0	104	80-120	181101S01P	18-10-2311-21	11/01/18 17:16
EPA 8015B DRO										
18-10-2353-3										
Diesel Range Organics	13770	3297	HX	mg/kg	400.0	0	33-153	181031S12	18-10-2353-3	11/01/18 06:57
EPA 8015B GRO										
18-11-0838-1										
Gasoline Range Organics	ND	5.792	HX	mg/kg	10.00	58	66-108	181110S007	18-11-0838-1	11/10/18 12:27
EPA 8015B GRO										
18-10-2311-4										
Gasoline Range Organics	ND	6.459	HX	mg/kg	10.00	65	66-108	181112S010	18-10-2311-4	11/12/18 18:04
EPA 8015B GRO										
18-10-2311-21										
Gasoline Range Organics	ND	8.409		mg/kg	10.00	84	66-108	181031S021	18-10-2311-21	10/31/18 21:11
EPA 6010B/7471A CAC Title 22 Metals										
18-10-2390-1										
Antimony	ND	9.810	HX	mg/kg	25.00	39	50-115	181031S04	18-10-2390-1	11/01/18 11:01
Arsenic	6.421	29.30		mg/kg	25.00	92	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Barium	90.79	107.5	HX	mg/kg	25.00	67	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Beryllium	0.5391	24.94		mg/kg	25.00	98	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Cadmium	ND	24.56		mg/kg	25.00	98	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Chromium	11.59	33.98		mg/kg	25.00	90	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Cobalt	5.481	29.01		mg/kg	25.00	94	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Copper	11.17	34.17		mg/kg	25.00	92	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Lead	3.029	27.27		mg/kg	25.00	97	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Molybdenum	ND	21.75		mg/kg	25.00	87	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Nickel	6.079	28.55		mg/kg	25.00	90	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Selenium	ND	21.79		mg/kg	25.00	87	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Silver	ND	11.95		mg/kg	12.50	96	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Thallium	ND	23.02		mg/kg	25.00	92	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Vanadium	39.70	59.91		mg/kg	25.00	81	75-125	181031S04	18-10-2390-1	11/01/18 11:01
Zinc	28.04	50.92		mg/kg	25.00	92	75-125	181031S04	18-10-2390-1	11/01/18 11:01
EPA 7471A Mercury										

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Matrix Spike

Analyte	Orig. Val.	MS Val.	Qual.	Units	Spike Conc.	% Rec.	Target Range	Batch	Sample Spiked	Analysis Date/Time
18-10-2390-1										
Mercury	ND	0.9663		mg/kg	0.8350	116	75-125	181101S01	18-10-2390-1	11/01/18 14:16
EPA 8260B BTEX/MTBE										
18-10-2311-1										
Benzene	ND	0.04296		mg/kg	0.05000	86	61-127	181103S004	18-10-2311-1	11/03/18 15:40
Toluene	ND	0.04432		mg/kg	0.05000	89	63-123	181103S004	18-10-2311-1	11/03/18 15:40
Ethylbenzene	ND	0.04547		mg/kg	0.05000	91	57-129	181103S004	18-10-2311-1	11/03/18 15:40
o-Xylene	ND	0.04508		mg/kg	0.05000	90	70-130	181103S004	18-10-2311-1	11/03/18 15:40
p/m-Xylene	ND	0.08981		mg/kg	0.1000	90	70-130	181103S004	18-10-2311-1	11/03/18 15:40
EPA 8260B BTEX/MTBE										
18-10-2102-13										
Benzene	ND	0.04162		mg/kg	0.05000	83	61-127	181031S003	18-10-2102-13	10/31/18 17:40
Toluene	ND	0.04326		mg/kg	0.05000	87	63-123	181031S003	18-10-2102-13	10/31/18 17:40
Ethylbenzene	ND	0.04176		mg/kg	0.05000	84	57-129	181031S003	18-10-2102-13	10/31/18 17:40
o-Xylene	ND	0.04213		mg/kg	0.05000	84	70-130	181031S003	18-10-2102-13	10/31/18 17:40
p/m-Xylene	ND	0.08405		mg/kg	0.1000	84	70-130	181031S003	18-10-2102-13	10/31/18 17:40

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Matrix Spike Duplicate

Analyte	Orig. Val.	Duplicate	Qual.	Units	Spike Conc.	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
EPA 300.0 Anions												
18-10-2311-17												
Chloride	123.3	727.4	HX	mg/kg	500.0	121	80-120	0	0-20	181109S02P	18-10-2311-17	11/10/18 14:16
EPA 300.0 Anions												
18-10-2311-21												
Chloride	56.45	557.4		mg/kg	500.0	100	80-120	3	0-20	181101S01P	18-10-2311-21	11/01/18 17:35
EPA 8015B DRO												
18-10-2353-3												
Diesel Range Organics	13770	4250	HX	mg/kg	400.0	0	33-153	25	0-32	181031S12	18-10-2353-3	11/01/18 07:18
EPA 8015B GRO												
18-11-0838-1												
Gasoline Range Organics	ND	5.820	HX	mg/kg	10.00	58	66-108	0	0-18	181110S007	18-11-0838-1	11/10/18 13:01
EPA 8015B GRO												
18-10-2311-4												
Gasoline Range Organics	ND	8.325	BA	mg/kg	10.00	83	66-108	25	0-18	181112S010	18-10-2311-4	11/12/18 18:38
EPA 8015B GRO												
18-10-2311-21												
Gasoline Range Organics	ND	8.512		mg/kg	10.00	85	66-108	1	0-18	181031S021	18-10-2311-21	10/31/18 21:43
EPA 6010B/7471A CAC Title 22 Metals												
18-10-2390-1												
Antimony	ND	8.827	HX	mg/kg	25.00	35	50-115	11	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Arsenic	6.421	30.43		mg/kg	25.00	96	75-125	4	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Barium	90.79	119.3		mg/kg	25.00	114	75-125	10	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Beryllium	0.5391	26.00		mg/kg	25.00	102	75-125	4	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Cadmium	ND	25.78		mg/kg	25.00	103	75-125	5	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Chromium	11.59	36.03		mg/kg	25.00	98	75-125	6	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Cobalt	5.481	30.78		mg/kg	25.00	101	75-125	6	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Copper	11.17	35.97		mg/kg	25.00	99	75-125	5	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Lead	3.029	28.58		mg/kg	25.00	102	75-125	5	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Molybdenum	ND	22.72		mg/kg	25.00	91	75-125	4	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Nickel	6.079	29.97		mg/kg	25.00	96	75-125	5	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Selenium	ND	23.16		mg/kg	25.00	93	75-125	6	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Silver	ND	12.57		mg/kg	12.50	101	75-125	5	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Thallium	ND	24.49		mg/kg	25.00	98	75-125	6	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Vanadium	39.70	65.04		mg/kg	25.00	101	75-125	8	0-20	181031S04	18-10-2390-1	11/01/18 11:03
Zinc	28.04	56.18		mg/kg	25.00	113	75-125	10	0-20	181031S04	18-10-2390-1	11/01/18 11:03
EPA 7471A Mercury												

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Matrix Spike Duplicate

Analyte	Orig. Val.	Duplicate	Qual.	Units	Spike Conc.	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
18-10-2390-1												
Mercury	ND	0.9879		mg/kg	0.8350	118	75-125	2	0-20	181101S01	18-10-2390-1	11/01/18 14:18
EPA 8260B BTEX/MTBE												
18-10-2311-1												
Benzene	ND	0.04028		mg/kg	0.05000	81	61-127	6	0-20	181103S004	18-10-2311-1	11/03/18 16:08
Toluene	ND	0.04238		mg/kg	0.05000	85	63-123	4	0-20	181103S004	18-10-2311-1	11/03/18 16:08
Ethylbenzene	ND	0.04250		mg/kg	0.05000	85	57-129	7	0-22	181103S004	18-10-2311-1	11/03/18 16:08
o-Xylene	ND	0.04220		mg/kg	0.05000	84	70-130	7	0-30	181103S004	18-10-2311-1	11/03/18 16:08
p/m-Xylene	ND	0.08386		mg/kg	0.1000	84	70-130	7	0-30	181103S004	18-10-2311-1	11/03/18 16:08
EPA 8260B BTEX/MTBE												
18-10-2102-13												
Benzene	ND	0.04089		mg/kg	0.05000	82	61-127	2	0-20	181031S003	18-10-2102-13	10/31/18 18:07
Toluene	ND	0.04285		mg/kg	0.05000	86	63-123	1	0-20	181031S003	18-10-2102-13	10/31/18 18:07
Ethylbenzene	ND	0.03957		mg/kg	0.05000	79	57-129	5	0-22	181031S003	18-10-2102-13	10/31/18 18:07
o-Xylene	ND	0.04027		mg/kg	0.05000	81	70-130	5	0-30	181031S003	18-10-2102-13	10/31/18 18:07
p/m-Xylene	ND	0.08104		mg/kg	0.1000	81	70-130	4	0-30	181031S003	18-10-2102-13	10/31/18 18:07

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Post Digestion Spike

Analyte	Orig. Val.	PDS Val.	Qual.	Units	Spike Conc.	% Rec.	Target Range	Batch	Sample Spiked	Analysis Date/Time
EPA 6010B/7471A CAC Title 22 Metals										
18-10-2390-1										
Antimony	ND	24.46		mg/kg	25.00	98	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Arsenic	6.421	30.66		mg/kg	25.00	97	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Barium	90.79	113.2		mg/kg	25.00	90	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Beryllium	0.5391	24.71		mg/kg	25.00	97	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Cadmium	ND	24.43		mg/kg	25.00	98	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Chromium	11.59	35.10		mg/kg	25.00	94	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Cobalt	5.481	29.45		mg/kg	25.00	96	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Copper	11.17	36.45		mg/kg	25.00	101	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Lead	3.029	27.31		mg/kg	25.00	97	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Molybdenum	ND	24.67		mg/kg	25.00	99	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Nickel	6.079	29.91		mg/kg	25.00	95	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Selenium	ND	23.45		mg/kg	25.00	94	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Silver	ND	11.14		mg/kg	12.50	89	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Thallium	ND	23.49		mg/kg	25.00	94	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Vanadium	39.70	63.02		mg/kg	25.00	93	75-125	181031S04	18-10-2390-1	11/01/18 11:05
Zinc	28.04	51.39		mg/kg	25.00	93	75-125	181031S04	18-10-2390-1	11/01/18 11:05
EPA 7471A Mercury										
18-10-2390-1										
Mercury	ND	0.9431		mg/kg	0.8350	113	75-125	181101S01	18-10-2390-1	11/01/18 14:21

Return to Contents

Qual: Qualifiers

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

QUALITY CONTROL
Sample Duplicate

Analyte	Orig. Val.	Duplicate	Qual.	Units	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
EPA 1010A(M) Ignitability									
18-10-1991-2									
Ignitability	>212	>212		ºF	1	0-25	I1101FPD1	18-10-1991-2	11/01/18 12:00
EPA 9045C pH									
18-10-2311-21									
pH	8.130	8.550		pH units	5	0-25	I1101PHD2	18-10-2311-21	11/01/18 09:45
SW-846 Chapter 7 Reactive Cyanide									
18-10-2349-1									
Cyanide, Reactive	ND	ND		mg/kg	N/A	0-25	I1101RCND1	18-10-2349-1	11/01/18 12:53
SW-846 Chapter 7 Reactive Sulfide									
18-10-2349-1									
Sulfide, Reactive	ND	ND		mg/kg	N/A	0-25	I1031RSD2	18-10-2349-1	10/01/18 16:00

Return to Contents

RPD: Relative Percent Difference.

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Laboratory Control Sample

Analyte	Known Val.	Analyzed	Qual.	Units	% Rec.	Target Range	Batch	Analysis Date/Time
EPA 300.0 Anions								
099-12-922-1014								
Chloride	500.0	514.5		mg/kg	103	90-110	181109L02P	11/10/18 06:07
EPA 300.0 Anions								
099-12-922-1010								
Chloride	50.00	51.78		mg/kg	104	90-110	181101L01P	11/01/18 16:38
EPA 8015B DRO								
099-15-414-1192								
Diesel Range Organics	400.0	341.6		mg/kg	85	67-121	181031B12	11/01/18 04:28
EPA 8015B GRO								
099-12-024-1263								
Gasoline Range Organics	10.00	7.489		mg/kg	75	70-118	181110L019	11/10/18 08:31
EPA 8015B GRO								
099-12-024-1264								
Gasoline Range Organics	10.00	9.111		mg/kg	91	70-118	181112L033	11/12/18 15:15
EPA 8015B GRO								
099-12-024-1258								
Gasoline Range Organics	10.00	8.867		mg/kg	89	70-118	181031L059	10/31/18 18:00
EPA 6010B/7471A CAC Title 22 Metals								
097-01-002-27179								
Antimony	25.00	21.28		mg/kg	85	80-120	181031L04	11/01/18 16:08
Arsenic	25.00	19.74	LR,RU	mg/kg	79	80-120	181031L04	11/01/18 16:08
Barium	25.00	23.08		mg/kg	92	80-120	181031L04	11/01/18 16:08
Beryllium	25.00	20.97		mg/kg	84	80-120	181031L04	11/01/18 16:08
Cadmium	25.00	22.50		mg/kg	90	80-120	181031L04	11/01/18 16:08
Chromium	25.00	21.99		mg/kg	88	80-120	181031L04	11/01/18 16:08
Cobalt	25.00	23.36		mg/kg	93	80-120	181031L04	11/01/18 16:08
Copper	25.00	22.58		mg/kg	90	80-120	181031L04	11/01/18 16:08
Lead	25.00	27.65		mg/kg	111	80-120	181031L04	11/01/18 16:08
Molybdenum	25.00	22.42		mg/kg	90	80-120	181031L04	11/01/18 16:08
Nickel	25.00	23.17		mg/kg	93	80-120	181031L04	11/01/18 16:08
Selenium	25.00	21.61		mg/kg	86	80-120	181031L04	11/01/18 16:08
Silver	12.50	9.942		mg/kg	80	80-120	181031L04	11/01/18 16:08
Thallium	25.00	23.87		mg/kg	95	80-120	181031L04	11/01/18 16:08
Vanadium	25.00	20.98		mg/kg	84	80-120	181031L04	11/01/18 16:08
Zinc	25.00	26.19		mg/kg	105	80-120	181031L04	11/01/18 16:08

Total number of LCS compounds: 16

Return to Contents

eurofins | Calscience

The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Laboratory Control Sample

Analyte	Known Val.	Analyzed	Qual.	Units	% Rec.	Target Range	Batch	Analysis Date/Time
Total number of ME compounds: 1								
Total number of ME compounds allowed: 1								
LCS ME CL validation result: Pass								
EPA 7471A Mercury								
099-16-272-4240								
Mercury	0.8350	0.9590		mg/kg	115	85-121	181101L01A	11/01/18 14:12
EPA 8260B BTEX/MTBE								
099-12-882-2131								
Benzene	0.05000	0.04076		mg/kg	82	80-120	181103L011	11/03/18 12:43
Toluene	0.05000	0.04262		mg/kg	85	80-120	181103L011	11/03/18 12:43
Ethylbenzene	0.05000	0.04354		mg/kg	87	80-120	181103L011	11/03/18 12:43
o-Xylene	0.05000	0.04357		mg/kg	87	75-125	181103L011	11/03/18 12:43
p/m-Xylene	0.1000	0.08584		mg/kg	86	75-125	181103L011	11/03/18 12:43
EPA 8260B BTEX/MTBE								
099-12-882-2127								
Benzene	0.05000	0.05232		mg/kg	105	80-120	181031L010	10/31/18 12:40
Toluene	0.05000	0.05377		mg/kg	108	80-120	181031L010	10/31/18 12:40
Ethylbenzene	0.05000	0.05318		mg/kg	106	80-120	181031L010	10/31/18 12:40
o-Xylene	0.05000	0.05286		mg/kg	106	75-125	181031L010	10/31/18 12:40
p/m-Xylene	0.1000	0.1082		mg/kg	108	75-125	181031L010	10/31/18 12:40

Return to Contents

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The difference is service

Client: Cardno
20505 Crescent Bay Drive
Lake Forest, CA 92630-8825

Work Order: 18-10-2311
Project Name: ExxonMobil NM K Battery No. 3, Vacuum Oil Field
Date Received: 10/31/18

PROJECT QUALITY CONTROL DATA
Laboratory Control Sample Duplicate

Analyte	LCS Val.	Duplicate	Qual.	Units	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analysis Date/Time
EPA 8015B GRO											
099-12-024-1258											
Gasoline Range Organics	10.00	8.916		mg/kg	89	70-118	1	0-28	181031L059	099-12-024-1258	10/31/18 18:32

Qual - Qualifiers RPD: Relative Percent Difference

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The difference is service

Work Order: 18-10-2311 Page 1 of 1

Sample Analysis Summary Report

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 1010A(M)	N/A	1050	FP 4	1
EPA 300.0	N/A	1027	IC 7	1
EPA 300.0	N/A	1027	IC 9	1
EPA 6010B	EPA 3050B	110	ICP 8300	1
EPA 7471A	EPA 7471A Total	110	Mercury 08	1
EPA 8015B	EPA 3550B	972	GC 49	1
EPA 8015B	EPA 5030C	607	GC 56	2
EPA 8015B	EPA 5030C	715	GC 4	2
EPA 8260B	EPA 5030C	867	GC/MS LL	2
EPA 8260B	EPA 5030C	1176	GC/MS OO	2
EPA 9045C	N/A	1086	PH 4	1
SW-846, Chapter 7	N/A	1155	BUR04	1
SW-846, Chapter 7	N/A	1155	UV 9	1

Return to Contents

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The difference is service

Work Order: 18-10-2311 Page 1 of 1

Glossary of Terms and Qualifiers

Qualifiers	Definition
AZ	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
B	Analyte was present in the associated method blank.
BA	The MS/MSD RPD was out of control due to suspected matrix interference.
BB	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
DF	Reporting limits elevated due to matrix interferences.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
GE	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
HD	Chromat. profile inconsistent with pattern(s) of ref. fuel stnds.
HO	High concentration matrix spike recovery out of limits
HT	Analytical value calculated using results from associated tests.
HX	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS was in control.
IL	Relative percent difference out of control.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
LD	Analyte presence was not confirmed by second column or GC/MS analysis.
LP	The LCS and/or LCSD recoveries for this analyte were above the upper control limit. The associated sample was non-detected. Therefore, the sample data was reported without further clarification.
LQ	LCS recovery above method control limits.
LR	LCS recovery below method control limits.
ND	Parameter not detected at the indicated reporting limit.
QO	Compound did not meet method-described identification guidelines. Identification was based on additional GC/MS characteristics.
RU	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
SG	A silica gel cleanup procedure was performed.
SN	See applicable analysis comment.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# **18-10-2311**

440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Comments:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	Analyses Requested: TPH GRO By EPA Method 8015M (DP)	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Remarks
S-5-B9	B9	10/29/18	0820	X		X				X	X	X		
S-10-B9			0825	X		X				X	X	X		
S-15-B9			0830	X		X				X	X	X		
S-20-B9	B9		0835	X		X				X	X	X		
S-5-B10	B10		0910	X		X				X	X	X		
S-10-B10			0915	X		X				X	X	X		
S-15-B10			0925	X		X				X	X	X		
S-20-B10	B10		0935	X		X				X	X	X		
S-5-B13	B13		1015	X		X						X		
~~S-5-B13~~ S-10-B13 DP	B13	10/29/18	1020	X		X						X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Standard 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)
Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )
Geotracker Global ID: N/A Log Code:
Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
Relinquished by:	Date	Time	Received by:	Date	Time
				10/31/18	1000
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____			Received by:	Date	Time
Temperature upon receipt ____ °C			Custody Seals Intact? Yes No		

Return to Contents

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ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2711

440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden | Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Comments
S-15-B13	B13	10/29/18	1030	X		X			1			X		Remarks: #1
S-20-B13	B13		1040	X		X			1			X		#2
S-5-B2	B2		1115	X		X			1			X		#3
S-10-B2			1120	X		X			1			X		#4
S-15-B2			1125	X		X			1			X		
S-20-B2			1130	X		X			1			X		
~~S-25-B2~~ S-45-B2			1245	X		X			1			X		
S-30-B2			1145	X		X			1			X		
S-35-B2			1200	X		X			1			X		
S-40-B2	B2	10/29/18	1215	X		X			1			X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Standard 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)
Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )
Geotracker Global ID: N/A Log Code:
Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
Relinquished by:	Date	Time	Received by:	Date	Time
			[signature]	10/31/18	1000
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____			Received by:	Date	Time
Temperature upon receipt ____ °C			Custody Seals Intact? Yes No		

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2311

7440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden | Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Comments: only S-50-B2 has a 24 hr TAT

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	GRO by EPA Method 8015B	DRO by EPA Method 8015B	RCI	Title 22 Metals
S-50-B2	B2	10/29/18	1300	X		X			1		X	X		X	X	X	X

Remarks: 24 hr TAT

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Standard 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)
Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Geotracker EDF (X) EIM ( ) EQUIS ( )
Geotracker Global ID: N/A Log Code:
Other:

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	10/30/18	1500	FedEx	10/30/18	1500
[signature]			[signature]	10/31/18	1000

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____
Temperature upon receipt ____ °C

Received by: Date Time
Custody Seals Intact? Yes No

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# **18-10-2311**

1140 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden — Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen / Stephen Hunter

State of sample collection: New Mexico

COC#:

Comments:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	Analyses Requested: TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Remarks
S-5-B9	B9	10/29/18	0820	X		X				X	X	X		
S-10-B9	↓		0825	X		X				X	X	X		
S-15-B9	↓		0830	X		X				X	X	X		
S-20-B9	B9		0835	X		X				X	X	X		
S-5-B10	B10		0910	X		X				X	X	X		
S-10-B10	↓		0915	X		X				X	X	X		
S-15-B10	↓		0925	X		X				X	X	X		
S-20-B10	B10		0935	X		X				X	X	X		
S-5-B13	B13	↓	1015	X		X						X		
S-5-B13	B13	10/29/18	1020	X		X						X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

(Standard) 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)

Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )

Geotracker Global ID: N/A **Log Code:**

Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
				10/31/18	1000

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Temperature upon receipt ____°C

Custody Seals Intact? Yes No

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2311

40 Lincoln Way, Garden Grove, CA 92841-1427
ffice #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Page: 2 of 3

Facility#/SID:

e Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

xonMobil PM: Marla Madden | Cost Center/AFE:

nsultant/Office: Cardno - SCAL

nsultant PM and Phone #: David M. Purdy (949) 457-8941

ampler: Vincent Nguyen | Stephen Hunter

State of sample collection: New Mexico

COC#:

Comments:

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C	Remarks
S-15-B13	B13	10/29/18	1050	X		X			1			X		#1
S-20-B13	B13		1040	X		X			1			X		#2
S-5-B2	B2		1115	X		X			1			X		#3
S-10-B2			1120	X		X			1			X		#4
S-15-B2			1125	X		X			1			X		
S-20-B2			1130	X		X			1			X		
~~S-25-B2~~ S-45-B2			1245	X		X			1			X		
S-30-B2			1145	X		X			1			X		
S-35-B2	↓	↓	1200	X		X			1			X		
S-40-B2	B2	10/29/18	1215	X		X			1			X		

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
(Standard) 5 day 4day 72hour 48hour 24hour

Data Package Options (please circle if required)
Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )
Geotracker Global ID: N/A **Log Code:**
Other:

Relinquished by:	Date	Time	Received by:	Date	Time
Vincent Nguyen	10/30/18	1500	FedEx	10/30/18	1500
Relinquished by:	Date	Time	Received by:	Date	Time
			[illegible]	10/31/18	1000
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____			Received by:	Date	Time
Temperature upon receipt ____ °C			Custody Seals Intact? Yes No		

Return to Contents

eurofins | Calscience

ExxonMobil Analysis Request/Chain of Custody

ECI WO# 2311

7440 Lincoln Way, Garden Grove, CA 92841-1427
Office #: 714-895-5494

EMES Agreement #: A 2604415

PO #: 013613U118

Facility#/SID:

Site Address: NM K Battery No. 3, Vacuum Oil Field, Lea County, New Mexico

ExxonMobil PM: Marla Madden | Cost Center/AFE:

Consultant/Office: Cardno - SCAL

Consultant PM and Phone #: David M. Purdy (949) 457-8941

Sampler: Vincent Nguyen / Stephen Hunter

State of sample collection: New Mexico

COC#:

Comments: only S-50-B2 has a 24 hr TAT

Sample Identification	Geotracker Field Point Name	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Water	Other	Total # of Containers	TPH by EPA Method 8015B	BTEX by EPA Method 8260B	Chloride by Method 300.0M	SPLP by Method SM 4500-Cl C		GRO by EPA Method 8015B	DRO by EPA Method 8015B	RCI	Title 22 Metals		
S-50-B2	B2	10/29/18	1300	X		X			1		X	X			X	X	X	X		

Remarks: 24 hr TAT

21

Turnaround Time Requested (TAT) (please circle):
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Standard 5 day 4day 72hour 48hour (24hour)

Data Package Options (please circle if required)
Full Validation (Level III) (Level IV)

Please check requried EDD Format(s): Goetracker EDF (X) EIM ( ) EQUIS ( )
Geotracker Global ID: N/A **Log Code:**
Other:

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	10/30/18	1500	FedEx	10/30/18	1500
[signature]			[signature]	10/31/18	1000
Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____					
Temperature upon receipt ____ °C			Custody Seals Intact? Yes No		

Return to Contents

2311

ORIGIN ID:HOBA (949) 457-8950
CARDNO
20505 CRESCENT BAY DR
LAKE FOREST, CA 92630
UNITED STATES US

SHIP DATE: 30OCT18
ACTWGT: 40.40 LB
CAD: 006894246/SSFE1922
DIMS: 15x15x15 IN
BILL THIRD PARTY

TO CALSCIENCE ENV LAB
CALSCIENCE ENV LAB
7440 LINCOLN WAY

GARDEN GROVE CA 92841
(714) 895-5494
INV:
PO:
REF:
DEPT:

FedEx Express

J182118081501uv

3 of 3
MPS# 0263 7835 1457 6243
Mstr# 7835 1457 6221

0201

WED - 31 OCT 10:30A
PRIORITY OVERNIGHT

A7 APVA

92841
CA-US SNA

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WORK ORDER NUMBER: 18-10-2311

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: CARDNO

DATE: 10/31/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 2.2 °C (w/ CF): 2.2 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: VJ6P

CUSTODY SEAL:

Cooler ☑ Present and Intact ☐ Present but Not Intact ☐ Not Present ☐ N/A Checked by: VJ6P

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: VJ6P

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☐	☑	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☑ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☐	☑	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Acid/base preserved samples - pH within acceptable range	☐	☐	☑
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOA**h** ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB ☐ 125PB**znna** (pH__9)

☐ 250AGB ☐ 250CGB ☐ 250CGB**s** (pH__2) ☐ 250PB ☐ 250PB**n** (pH__2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s** (pH__2) ☐ 500PB

☐ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** (pH__2) ☐ 1AGB**s** (O&G) ☐ 1PB ☐ 1PB**na** (pH__12) ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☑ 8ozCGJ (C-17),(21) ☐ 16ozCGJ ☑ Sleeve (S) ☐ EnCores® (___) ☐ TerraCores® (___) ☐ _____ ☐ _____ ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, Labeled/Checked by: VJ6P

s = H_2SO_4, **u** = ultra-pure, **x** = Na_2SO_3+$NaHSO_4.H_2O$, **znna** = Zn $(CH_3CO_2)_2$ + NaOH Reviewed by: HMW

eurofins | Calscience

WORK ORDER NUMBER: 18-10- 2311

SAMPLE ANOMALY REPORT

DATE: 10/31/2018

SAMPLES, CONTAINERS, AND LABELS:

Comments

- ☐ Sample(s) NOT RECEIVED but listed on COC
- ☐ Sample(s) received but NOT LISTED on COC
- ☐ Holding time expired (list client or ECI sample ID and analysis)
- ☐ Insufficient sample amount for requested analysis (list analysis)
- ☐ Improper container(s) used (list analysis)
- ☐ Improper preservative used (list analysis)
- ☐ pH outside acceptable range (list analysis)
- ☐ No preservative noted on COC or label (list analysis and notify lab)
- ☐ Sample container(s) not labeled
- ☐ Client sample label(s) illegible (list container type and analysis)
- ☑ Client sample label(s) do not match COC (comment)
  - ☐ Project information
  - ☑ Client sample ID
  - ☐ Sampling date and/or time
  - ☑ Number of container(s)
  - ☐ Requested analysis
- ☐ Sample container(s) compromised (comment)
  - ☐ Broken
  - ☐ Water present in sample container
- ☐ Air sample container(s) compromised (comment)
  - ☐ Flat
  - ☐ Very low in volume
  - ☐ Leaking (not transferred; duplicate bag submitted)
  - ☐ Leaking (transferred into ECI Tedlar™ bags*)
  - ☐ Leaking (transferred into client's Tedlar™ bags*)

* Transferred at client's request.

(-10) Labeled as S-10-B13 Date/time matched.

(-1) to (-10) Received 1 container only.

MISCELLANEOUS: (Describe)

Comments

HEADSPACE:

(Containers with bubble > 6 mm or ¼ inch for volatile organic or dissolved gas analysis)

ECI Sample ID	ECI Container ID	Total Number**	ECI Sample ID	ECI Container ID	Total Number**

(Containers with bubble for other analysis)

ECI Sample ID	ECI Container ID	Total Number**	Requested Analysis

Comments: _____

Reported by: WGL

Reviewed by: HMW

** Record the total number of containers (i.e., vials or bottles) for the affected sample.

Return to Contents

APPENDIX K

SURVEY DATA

COORDINATE TABLE

COORDINATES VALUES SHOWN ARE RELATIVE TO THE NORTH AMERICAN DATUM 1983, "NEW MEXICO EAST ZONE". ELEVATIONS ARE RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM 1988

SOIL BORE	COORDINATES	ELEVATIONS
SB #1	652408.2 N 804946.7 E	3954.8'
SB #2	652380.9 N 804949.1 E	3955.4'
SB #3	652358.2 N 804959.3 E	3955.6'
SB #4	652448.8 N 804950.2 E	3954.3'
SB #5	652476.7 N 804955.0 E	3953.6'
SB #6	652370.8 N 805034.6 E	3956.4'
SB #7	652448.3 N 805068.6 E	3954.4'
SB #8	652470.0 N 805176.8 E	3954.4'
SB #9	652373.5 N 805185.1 E	3955.5'
SB #10	652327.3 N 805164.2 E	3955.9'
SB #11	652416.1 N 805211.0 E	3955.3'
SB #12	652428.9 N 805339.9 E	3954.4'
SB #13	652392.4 N 805361.3 E	3954.3'

N

LEGEND:

- ⊕ – DENOTES CARDNO BENCHMARK
- ⊕ SB #1 – DENOTES SOIL BORE HOLE LOCATION
- ⋈ – DENOTES VALVE
- ⊕ – DENOTES RISER

RONALD J. EIDSON NEW MEXICO 3239 REGISTERED

I, RONALD J. EIDSON, NEW MEXICO PROFESSIONAL SURVEYOR No. 3239, DO HEREBY CERTIFY THAT THIS SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

RONALD J. EIDSON Ronald J Eidson DATE: 12/10/2018

100 0 100 200 Feet

Scale:1"=100'

PROVIDING SURVEYING SERVICES SINCE 1946

JOHN WEST SURVEYING COMPANY

412 N. DAL PASO HOBBS, N.M. 88240

(575) 393-3117 www.jwsc.biz

TBPLS# 10021000

CARDNO

TOPOGRAPHIC SURVEY
13 SOIL BORES LOCATED IN NW/4 SE/4 SECTION 32, TOWNSHIP 17 SOUTH, RANGE 35 EAST, N.M.P.M.
LEA COUNTY, NEW MEXICO

Survey Date: 10/30/18	CAD Date: 12/07/18	Drawn By: ACK
W.O. No.: 18111195	Rev: .	Rel. W.O.:	Sheet 1 of 1

APPENDIX L

WASTE DISPOSAL DOCUMENTATION

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: D0035
2. Page 1 of: 1
3. Emergency Response Phone: 800-322-5085
4. Manifest Tracking Number: 003382444 GBF

GENERATOR

5. Generator's Name and Mailing Address
ExxonMobil Oil Corporation
6941 Atlanta Avenue, #384
Huntington Beach, CA 92646
Generator's Phone: 713-964-4935

Generator's Site Address (if different than mailing address)
ExxonMobil Oil Corporation
Former State K Tank Battery No. 3, Vacuum Oil Field
Lea County, New Mexico

6. Transporter 1 Company Name: Alamo 1
U.S. EPA ID Number: TXR000060442

7. Transporter 2 Company Name: Alamo 1
U.S. EPA ID Number: TXR000060442

8. Designated Facility Name and Site Address
Republic Tessman Landfill
7000 IH 10 East
San Antonio, TX 78219
Facility's Phone: 210-661-4104
U.S. EPA ID Number: TXR000084614

7/14/10

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non-regulated soil		DM	4	P	~~OUTS-319-1~~
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1. Profile # 5119181932 7 Exp. 5/2/19

Alamo 1 Job # AR18-01355

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Stephen Hunter
Signature: Stephen Hunter
Month: 11 Day: 01 Year: 18

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Joseph Chavez
Signature:
Month: 11 Day: 1 Year: 18

Transporter 2 Printed/Typed Name: Mitchell Wreath
Signature:
Month: 11 Day: 20 Year: 18

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Brittany Pitz
Signature:
Month: 11 Day: 20 Year: 18

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Operator:	OGRID:
XTO ENERGY, INC 6401 Holiday Hill Road Midland, TX 79707	5380
	Action Number: 2179
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
bbillings	None	7/12/2021