CONCHO

January 16, 2021

Oil Conservation Division, District I
1625 N. French Drive
Hobbs, New Mexico 88240

Re: Closure Report
Columbus Federal 21H & 22H CTB (8.17.20)
Tracking#: NRM2024753227
GPS: 32.0926, -103.5564
Unit Letter B, Section 34, Township 25 South, Range 33 East
Lea County, New Mexico

To Whom it May Concern,

COG Operating, LLC (COG) is pleased to submit the following closure report in response to a release that occurred at the Columbus Federal 21H & 22H CTB, located in Unit Letter B, Section 34, Township 25 South, Range 33 East Lea County, New Mexico.

BACKGROUND

The release was discovered on August 17, 2020. An initial C-141 report was submitted and accepted by the New Mexico Oil Conservation Division (NMOCD). The release was caused by a gasket failure. The release occurred within the lined facility with overspray onto the pad. A vacuum truck was dispatched to remove all freestanding fluids. Approximately thirty-eight (38) barrels of crude was released with thirty-four (34) barrels being recovered. The initial C-141 and final C-141 are attached in Appendix A.

GROUNDWATER

Published Information

A search of a groundwater database maintained by The New Mexico Office of the State Engineer (NMOSE) and the United States Geological Survey (USGS) was conducted to determine the average depth to groundwater within a one (1) Mile radius of the Release Site and identify any registered water wells within a 1/2 Mile of the Release Site. There is a NMOSE well located approximately half mile to the northeast of the release, with a reported depth of 110' below surface. The information for this well is found in Appendix B.

Windmill – Static Water Level

In addition, a windmill was located approximately 0.4-mile northeast of the site. During inspection, the windmill was inactive and had access to the well to collect a static water level. COG collected a static water level of 135 feet below surface.

Resistivity Survey – Depth to Water

COG contacted WSP to perform an Electrical Resistivity (ER) Survey to investigate and determine the depth to groundwater in the area using this technique. COG wanted to evaluate and confirm this alternative method as part of the site characterization to determine depth of groundwater. To confirm, the windmill static water level of 135'

was used to compare the findings. The ER Survey generated a subsurface visually presentation (2-D model) to determine the depth of groundwater. The ER Survey Report is shown in Appendix B.

Referring to the ER Survey Report, the data showed a presence of groundwater at 131 feet below surface to confirm the findings. Based on the results, COG will be using the ER Survey as an alternative method or technique to establish depth of groundwater on future sites, if approved.

REGULATORY

A risk-based evaluation and site determinations were performed in accordance to the New Mexico Oil Conservation Division (NMOCD) Rule (Title 19 Chapter 15 Part 29) for releases on oil and gas development and production in New Mexico (effective August 14, 2018). According to the site characterization evaluation, the affected area has low potential for cave and karst, and no other receptors (water wells, playas, water course, lake beds or ordinance boundaries) were located within each specific boundaries or distance from the site. The delineation and closure criteria are listed below:

General Site Characterization and Groundwater:

Site Characterization	Average Groundwater Depth (ft.)
Low Karst	134 feet

Delineation and Closure Criteria:

Remedial Action Levels (RALs)	
Chlorides	20,000 mg/kg
TPH (GRO and DRO and MRO)	2,500 mg/kg
TPH (GRO and MRO)	1,000 mg/kg
Benzene	10 mg/kg
Total BTEX	50 mg/kg

INITIAL ASSESMENT

- A total of seven (7) backhoe trenches (T-1 through T-7) were collected at multiple depths to evaluate the release area. The sample results are shown in Table 1. Referring to Table 1, the samples indicated that the overspray areas on the pad were all below regulatory levels for TPH, BTEX and chlorides.

REMEDIATION PLAN

All samples were below the Table 1 closure criteria concentrations and thus no remediation will occur at the site.

SITE RECLAMATION AND RESTORATION

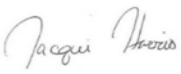
All fluids remained on the pad and no reclamation at the site is required.

CLOSURE REQUEST

COG Operating, LLC respectfully requests that the New Mexico Oil Conservation Division grant closure approval for the Columbus Federal 21H & 22H CTB that occurred on August 17, 2020 (Tracking # NRM2024753227).

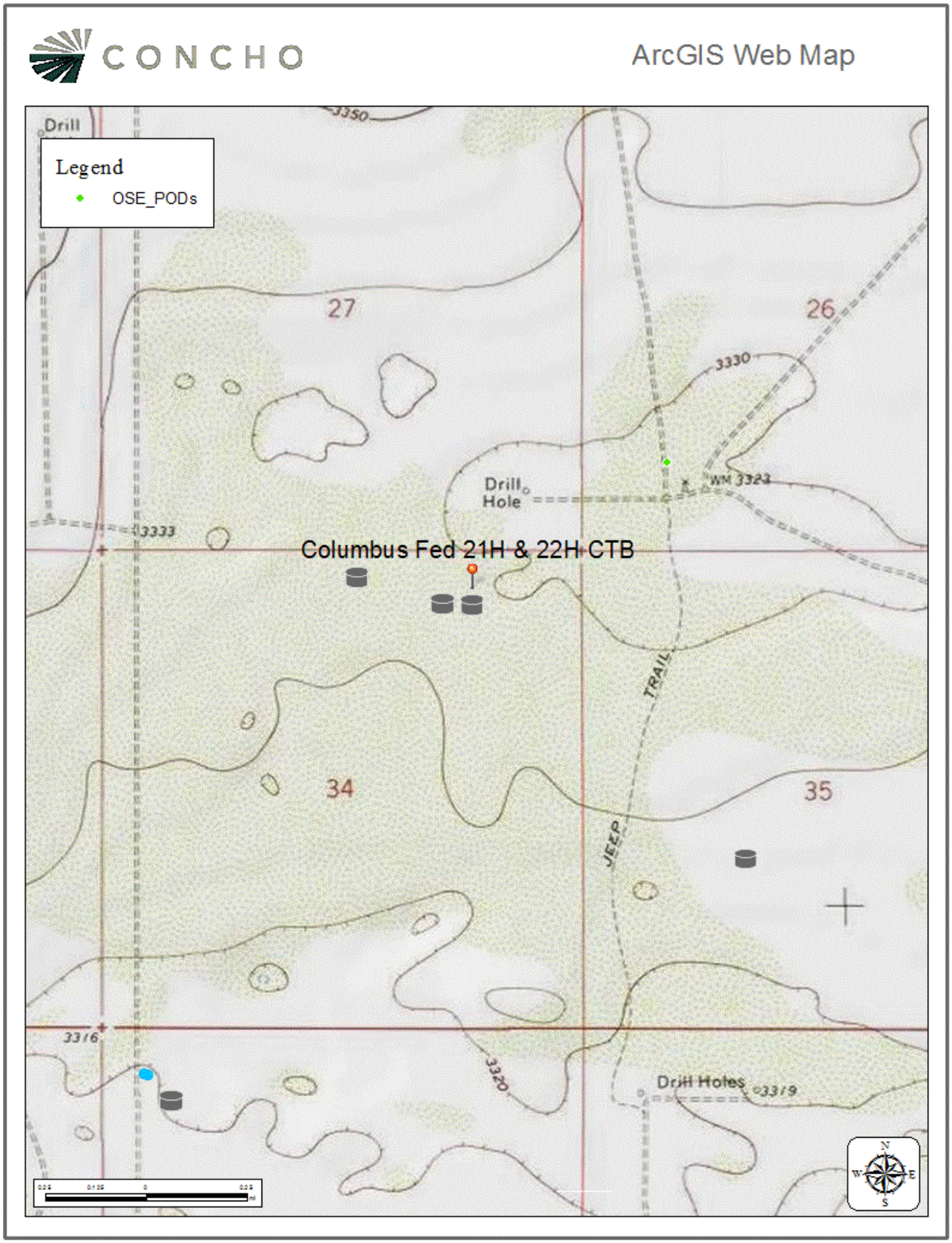
Should you have any questions or concerns on the closure report, please do not hesitate to contact me.

Sincerely,



Jacqui Harris
Senior HSE Coordinator
Jharris2@concho.com

Maps



COG Operating LLC.

Columbus Fee 021 & 022 CTB
32.092657 -103.555344
Lea County, NM

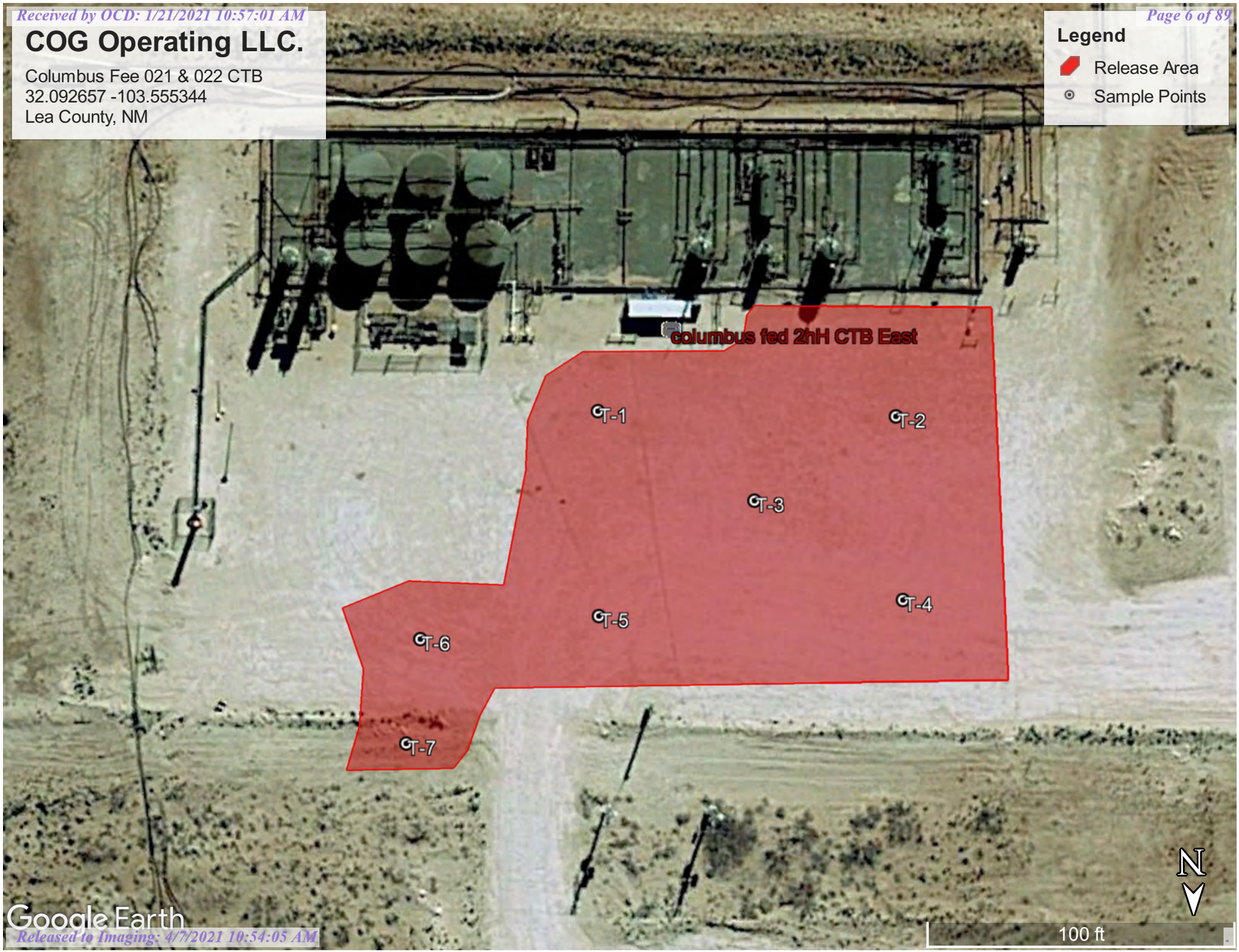


Table of Analytical Data

Table 1
COG Operating LLC.
Columbus Federal 21H & 22H CTB
Lea County, New Mexico

Sample ID	Sample Date	TPH (mg/kg)							Benzene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
		GRO	DRO	MRO	*Total*	GRO	DRO	*Total*			
Average Depth to Groundwater (ft) - 51'-100' Low Karst											
NMOCD RAL Limits (mg/kg)		**-**	**-**	**-**	***2500***	**-**	**-**	***1,000***	***10***	***50***	***20,000***
T-1 0-5'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00201	<0.00201	46.9
T-1 1'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00198	<0.00198	21.5
T-1 1.5'	9/14/2020										13.9
T-1 2'	9/14/2020										10.5
T-2 0-5'	9/14/2020	<49.9	73.3	<49.9	73.3	<49.9	73.3	73.3	<0.00199	<0.00199	178
T-2 1'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00198	<0.00198	14.8
T-2 1.5'	9/14/2020										10.8
T-2 2'	9/14/2020										9.73
T-3 0-5'	9/14/2020	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<0.00201	<0.00201	29.0
T-3 1'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00200	<0.00200	16.4
T-3 1.5'	9/14/2020										16.5
T-3 2'	9/14/2020										16.4
T-4 0-5'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00199	<0.00199	18.2
T-4 1'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00200	<0.00200	17.4
T-4 1.5'	9/14/2020										16.8
T-4 2'	9/14/2020										21.6
T-4 3'	9/14/2020										39.7
T-5 0-5'	9/14/2020	<49.9	<49.9	<49.9	<49.9	<49.9	<49.9	<49.9	<0.00199	<0.00199	40.5
T-5 1'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00198	<0.00198	16.9
T-5 1.5'	9/14/2020										<5.00
T-5 2'	9/14/2020										<5.02
T-6 0-5'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00200	<0.00200	18.6
T-6 1'	9/14/2020	<49.9	55.3	<49.9	55.3	<49.9	55.3	55.3	<0.00199	<0.00199	20.8
T-6 1.5'	9/14/2020										21.0
T-6 2'	9/14/2020										24.0
T-6 3'	9/14/2020										24.8
T-7 0.5'	9/14/2020	<49.9	<49.9	<49.9	<49.9	<49.9	<49.9	<49.9	<0.00199	<0.00199	<5.04
T-7 1'	9/14/2020	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<0.00200	<0.00200	<4.99
T-7 1.5'	9/14/2020										<5.01
T-7 2'	9/14/2020										<5.00

Appendix A

C-141

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

State of New Mexico
Energy Minerals and Natural Resources 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	OGRID
Contact Name	Contact Telephone
Contact email	Incident # *(assigned by OCD)*
Contact mailing address	

Location of Release Source

Latitude _____ Longitude _____
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	Site Type
Date Release Discovered	API# *(if applicable)*

Unit Letter	Section	Township	Range	County

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)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)
Cause of Release		

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: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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

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

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

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

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

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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

Printed Name: _____ Title: _____

Signature: Jacqui Harris _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

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

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

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

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

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

☐ Description of remediation activities

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

Printed Name: _____ Title: _____

Signature: Jacqui Harris _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: Chad Hensley Date: 04/07/2021

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

Closure Approved by: _____ Date: 04/07/2021

Printed Name: Chad Hensley Title: Environmental Specialist Advanced

Appendix B

Site Assessment Data

COG Operating

Karst Occurance Map
Columbus Federal 21H & 22H CTB
Lat: 32.0926, Long: -103.5564

Legend

Columbus Federal 21H & 22H CTB (8.17.20 Release)

National Flood Hazard Layer FIRMette

FEMA

103°33'42"W 32°5'49"N

103°33'4"W 32°5'18"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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

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 AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

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

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

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/3/2020 at 1:20 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

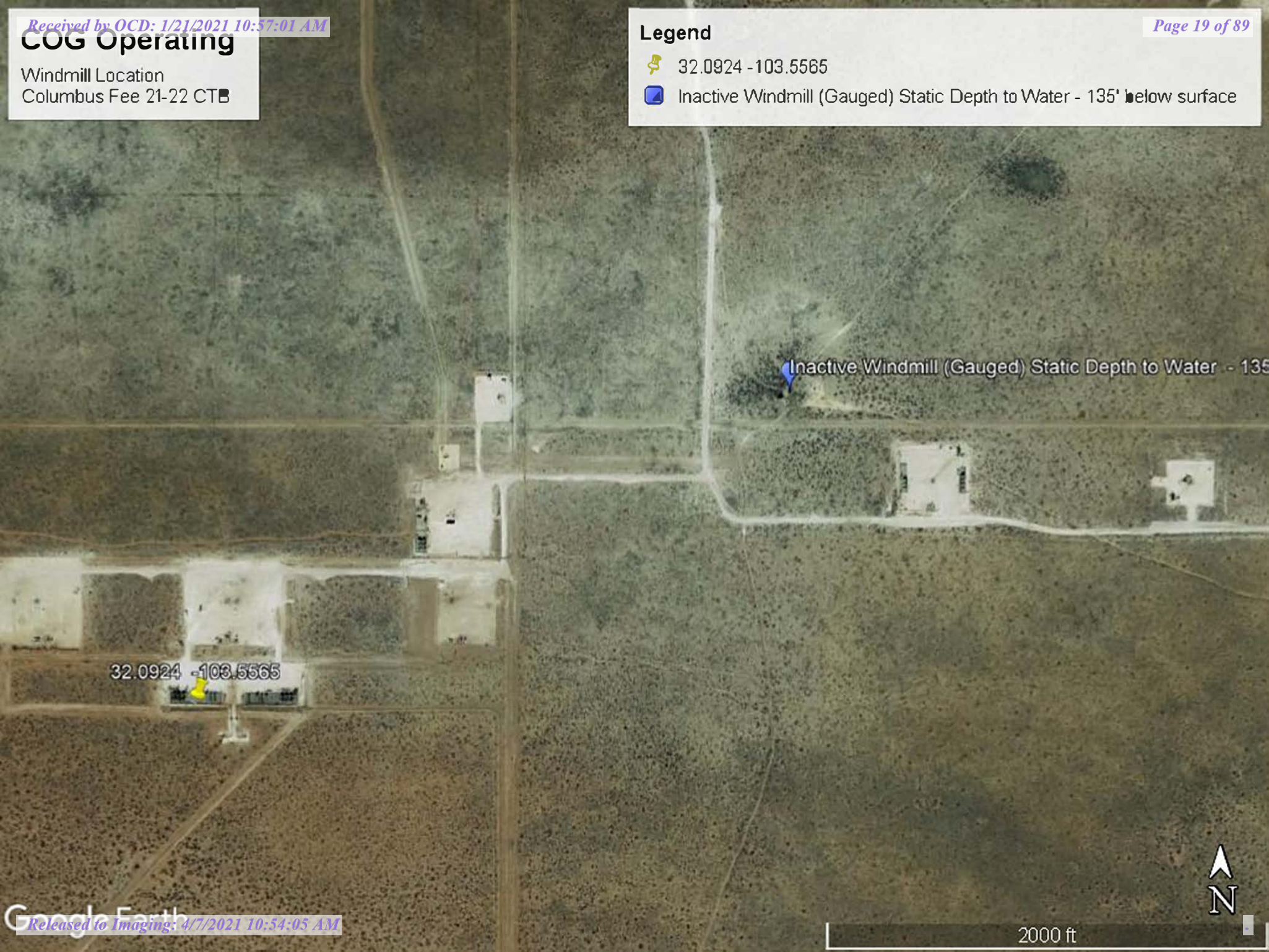

CONCHO
ArcGIS Web Map
Legend
OSE_PODs
Mine Workings
OSE POD # 2313
Distance: 0.5 Miles
Columbus Fed 21H & 22H
3332 ft
N
W
E
S

COG Operating

Windmill Location
Columbus Fee 21-22 CTB

Legend

- 32.0924 -103.5565
- Inactive Windmill (Gauged) Static Depth to Water - 135' below surface



WSP USA
3300 North "A" Street
Building 1, Unit 222
Midland, Texas 79705
432.704.5178

December 9, 2020

Ike Tavarez
COG Operating LLC
600 W Illinois Avenue
Midland, TX 79701

Re: Electrical Resistivity Depth to Groundwater Survey
Columbus Federal 21H and 22H Central Tank Battery
Lea County, New Mexico

Dear Mr. Tavarez:

WSP USA Inc. (WSP) (formerly LT Environmental, Inc.), on behalf of Concho Operating LLC (COG), presents the following results of a depth to groundwater survey using electrical resistivity (ER) imagining at the Columbus Federal 21H and 22H Central Tank Battery (CTB) (Site) Figure 1. The Site is located in Units A and B of Section 34 in Township 25 South, Range 33 East, in Lea County, New Mexico.

WSP conducted a two-dimensional (2-D) ER survey on December 8, 2020, to provide supplemental information for depth to groundwater as part of site characterization requirements following a release at the Site. COG identified a nearby windmill and measured the depth to water below the windmill, which was approximately 135 feet bgs. An ER survey was selected as an alternative method to subsurface drilling for accurately confirming depth to groundwater using non-destructive ER imaging. The results of this survey correlate to the recent measurement at the windmill, providing additional subsurface information and supporting the use of the technology for site characterization purposes.

Electrical Resistivity Theory

The background for applying ER geophysical technique to identify groundwater is based on the flow of electrical current through the underlying media, creating measurements and producing a 2-D model, presented as a cross-section, of the subsurface. As the current migrates through the underlying media, a potential difference (apparent resistivity) in current is measured. The apparent resistivity is dependent on properties of the subsurface, including porosity, saturation, and concentration of total dissolved solids (TDS).

Because a controlling factor to the flow of electrical current through the subsurface is saturation, resistivity measurements can be correlated to water saturation and the connectivity of pore spaces between sediments. Using the resultant resistivity values with the visible presentation of the subsurface in the 2-D model, geophysicists are able to determine the depth of groundwater. A highly saturated lithology will enable the current to move with less resistance, resulting in lower resistivity values. When a material is completely saturated with fresh groundwater, the resistivity values typically range from 1 to 10 Ohm-Meter (ohm-m). As the salinity and TDS of the

groundwater increases, resistivity values can decrease below 1 ohm-m. A lithology with low porosity can also decrease resistivity values without the presence of groundwater. However, groundwater can be differentiated from unsaturated, less-porous lithology based on the direct resistivity values higher than 10 ohm-m, as well as geometry/distribution of those values in the cross-sections and geologic setting.

Electrical Resistivity Survey Methods

The ER survey was conducted using an Advanced Geosciences, Inc. (AGI) SuperSting™ Wifi R8 with a multi-electrode switchbox, with a 56-electrode array configured to a dipole-dipole array. Locations for each electrode along the survey line were collected using a Trimble R1 Global Positioning System (GPS). EarthImager™ 2D software was utilized to process the data and produce the models required to make the interpretations. The data was processed, analyzed, and interpreted by a geophysicist at WSP.

For this Site, the 2-D ER line (CONL) was oriented north to south and was conducted using a 13-foot electrode spacing for a total length of 735 feet, allowing for a total depth of investigation of 161 feet bgs. The location of the survey line is presented on Figure 2. The ER survey line was placed off the well pad in order to prevent interference from metallic infrastructure. If the resistivity survey line is placed near metallic infrastructure, a large amount of error can be recorded, due to “signal sapping”. This means the electrical current being injected into the subsurface will be pulled to the infrastructure rather than the electrodes, creating inaccurate data.

Resolution is controlled by electrode spacing and higher resolution is obtained at the expense of depth. The goal of this survey was to confirm the presence or absence of groundwater in the top 100 feet of the subsurface and to provide enough resolution to distinguish any shallow groundwater near 50 feet or less. Resolution is between 4 and 6.5 feet and total depth reached 161 feet, allowing those goals to be met.

Electrical Resistivity Survey Results

The results of the survey are presented in a cross-section on Figure 2. The cross-section displays measured resistivity values with colors distinguishing resistivity ranges defined by the scale to the right of the profile. Reds and yellows represent the higher value resistivity data points and blues represent the lower value resistivity data points. Please note the range of values presented on the scale. Low resistivity values, or blue colors, do not necessarily represent presence of saturation. The blue values are simply lower resistivity values than the other colors presented. The scale provided for this survey was chosen for best demonstration of the materials identified in the subsurface and ranges from 13.5 to 3,795 ohm-m. Based on the numerical resistivity values measured and the range and distribution of those resistivity values in the subsurface, the

following model of the subsurface is presented and illustrated on Figure 2 with dashed lines on the cross-section separating the identified materials:

- A porous unconsolidated material exists from ground surface to a depth of approximately 30 feet bgs. This unit corresponds to resistivity values ranging from 227 to 3,795 ohm-m and is depicted by shades of red, orange, yellow, and green in the upper portion of the cross-section.
- The unconsolidated material is underlain by a thin layer of finer grained sediment to a depth of approximately 60.5 feet bgs. This is represented by resistivity values ranging from 40 to 68 ohm-m and is depicted by the light to dark blue colors between 30 to 60.5 feet bgs. The bottom surface is undulating and appears to extend as deep at 78 feet bgs in some places. When a lithology contains more fine-grained and tightly compacted material, the ER values will demonstrate a decrease in resistivity due to the decrease in pore space. Although the values are lower than the overlying sediments, they are still demonstrating values well above the threshold for sediment saturation.
- From approximately 60.5 feet to 131 feet, a thick porous material is identified. This is represented by resistivity values ranging from 70 to 928 ohm-m and corresponds to the predominant yellow and green colors in the middle portion of the cross-section.
- At approximately 131 feet, the resistivity values decrease to approximately 13.5 ohm-m, indicating sediments that are at full saturation. This is represented by the dark blue colors along the bottom portion of the cross-section.

The ER survey identified the presence of groundwater at a depth of approximately 131 feet below ground surface. With the vertical resolution of 4 to 6.5 feet, the results of the ER survey correspond to the measured depth to water obtained by COG at the windmill of approximately 135 feet bgs and confirms groundwater is greater than 100 feet deep at the Site.

If you have any questions or comments, please do not hesitate to contact Ms. Ashley Ager at (970) 385-1096.

Sincerely,

WSP USA Inc.

Kaleb Henry

Kaleb Henry
Assistant Consultant, Geophysicist

Ashley L. Ager

Ashley L. Ager, P.G.
Managing Director, Geologist

Attachments:

Figure 1 Survey Location
Figure 2 Inverted Resistivity Cross-Section

FIGURES

LEGEND

- ELECTRODE POINT
- ELECTRICAL RESISTIVITY SURVEY LINE

IMAGE COURTESY OF ESRI

0 500 1,000
Feet

N

FIGURE 1
ELECTRICAL RESISTIVITY SURVEY LINE LOCATION
COLUMBUS FEDERAL 21H & 22H CTB
UNIT A SEC 34 T25S R33E
LEA COUNTY, NEW MEXICO
COG OPERATING LLC.

C:\Users\RRudolph\Desktop\31402909_FIG01_ER_SURVEY_2020.mxd

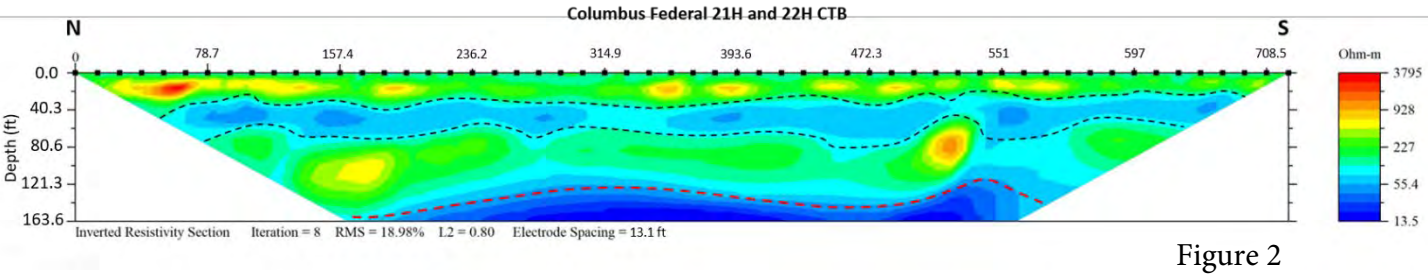

Columbus Federal 21H and 22H CTB
N
S
0
78.7
157.4
236.2
314.9
393.6
472.3
551
597
708.5
Depth (ft)
0.0
40.3
80.6
121.3
163.6
Ohm-m
3795
928
227
55.4
13.5
Inverted Resistivity Section
Iteration = 8
RMS = 18.98%
L2 = 0.80
Electrode Spacing = 13.1 ft

Figure 2

Appendix C

Analytical Reports

eurofins | Environment Testing Xenco

eurofins | Environment Testing Xenco

eurofins | Environment Testing Xenco

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CONCHO

One Concho Center/600/Illinois Avenue/Midland, Texas
Tel (432) 683-7443

167532

Client Name:	COG	**Site Manager:**	Ike Tavarez itavarez@concho.com Robert Grubbs Jr rgrubbs@concho.com
Project Name:	Columbus Fee 021 & 22 CTB (8-17-20)		
Project Location: (county, state)	Lea County, NM	**Project #:**	
Invoice to:	COG		
Receiving Laboratory:	Xenco	**Sampler Signature:**	Robert Grubbs Jr
Comments:			

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: 2020 DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	MATRIX	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	PRESERVATIVE METHOD	# CONTAINERS	FILTERED (Y/N)	TPH TX1005 (Ext to C35)	BTEX 8021B	TPH 8015M (GRO - DRO - MRO)	Chloride	Hold
	T-1 0.5'	9/14/2020			X				X		1			X	X	X	
	T-1 1'	9/14/2020			X				X		!			X	X	X	
	T-1 1.5'	9/14/2020			X				X		1					X	
	T-1 2'	9/14/2020			X				X		1					X	
	T-2 0.5'	9/14/2020			X				X		1			X	X	X	
	T-2 1'	9/14/2020			X				X		1			X	X	X	
	T-2 1.5'	9/14/2020			X				X		1					X	
	T-2 2'	9/14/2020			X				X		1					X	
	T-3 0.5'	9/14/2020			X				X		1			X	X	X	
	T-3 1'	9/14/2020			X				X		1			X	X	X	

Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:
Robert Grubbs Jr	9/15/2020	1047	BGW	9/15/20	1047
Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:
Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:

LAB USE ONLY

Sample Temperature 0.7/0.3 -0.4 TRS

REMARKS:

X	RUSH: Same Day **24 hr** 48 hr 72 hr
	Rush Charges Authorized
	Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

ORIGINAL COPY

CONCHO

One Concho Center/600/Illinois
Avenue/Midland, Texas
Tel (432) 683-7443

172582

Client Name:	COG	Site Manager:	Ike Tavarez itavarez@concho.com Robert Grubbs Jr rgrubbs@concho.com
Project Name:	Columbus Fee 021 & 22 CTB (8-17-20)		
Project Location: (county, state)	Lea County, NM	Project #:	
Invoice to:	COG		
Receiving Laboratory:	Xenco	Sampler Signature:	Robert Grubbs Jr
Comments:			

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: 2020 DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	MATRIX	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	PRESERVATIVE METHOD	PRESERVATIVE METHOD	# CONTAINERS	FILTERED (Y/N)	TPH TX1005 (Ext to C35)	BTEX 8021B	TPH 8015M (GRO - DRO - MRO)	Chloride	Hold
	T-3 1.5'	9/14/2020			X				X			1					X	
	T-3 2'	9/14/2020			X				X			!					X	
	T-4 0.5'	9/14/2020			X				X			1			X	X	X	
	T-4 1'	9/14/2020			X				X			1			X	X	X	
	T-4 1.5'	9/14/2020			X				X			1					X	
	T-4 2'	9/14/2020			X				X			1					X	
	T-4 3'	9/14/2020			X				X			1					X	X
	T-5 0.5'	9/14/2020			X				X			1			X	X	X	
	T-5 1'	9/14/2020			X				X			1			X	X	X	
	T-5 1.5'	9/14/2020			X				X			1					X	

Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:
Robert Grubbs Jr	9/15/2020	1017	Brad	9/15/20	1017
Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:
Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:

LAB USE ONLY

Sample Temperature 0.7/0.3

REMARKS:

X	RUSH: Same Day 24 hr 48 hr 72 hr
	Rush Charges Authorized
	Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

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CONCHO

One Concho Center/600/Illinois
Avenue/Midland, Texas
Tel (432) 683-7443

1072523

Client Name:	COG	Site Manager:	Ike Tavarez itavarez@concho.com Robert Grubbs Jr rgrubbs@concho.com
Project Name:	Columbus Fee 021 & 22 CTB (8-17-20)		
Project Location: (county, state)	Lea County, NM	Project #:	
Invoice to:	COG		
Receiving Laboratory:	Xenco	Sampler Signature:	Robert Grubbs Jr
Comments:			

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: 2020 DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	MATRIX	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	PRESERVATIVE METHOD	# CONTAINERS	FILTERED (Y/N)	TPH TX1005 (Ext to C35)	BTEX 8021B	TPH 8015M (GRO - DRO - MRO)	Chloride	Hold
	T-5 2'	9/14/2020			X				X		1					X	
	T-6 0.5'	9/14/2020			X				X		1			X	X	X	
	T-6 1'	9/14/2020			X				X		1			X	X	X	
	T-6 1.5'	9/14/2020			X				X		1					X	
	T-6 2'	9/14/2020			X				X		1					X	
	T-6 3'	9/14/2020			X				X		1					X	X
	T-7 0.5'	9/14/2020			X				X		1			X	X	X	
	T-7 1'	9/14/2020			X				X		1			X	X	X	
	T-7 1.5'	9/14/2020			X				X		1					X	
	T-7 2'	9/14/2020			X				X		1					X	

Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:
Robert Grubbs Jr	9/15/2020	1047	BTM	9/15/20	1047
Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:
Relinquished by:	Date:	Time:	Relinquished by:	Date:	Time:

LAB USE ONLY

Sample Temperature 0.7/0.3

REMARKS:

X	RUSH: Same Day 24 hr 48 hr 72 hr
	Rush Charges Authorized
	Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

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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

Action 15223

CONDITIONS OF APPROVAL

Operator:			OGRID:	Action Number:	Action Type:
COG OPERATING LLC	600 W Illinois Ave	Midland, TX79701	229137	15223	C-141

OCD Reviewer	Condition
chensley	The OCD will approve depth to water (DTW) as established by OSE POD 2313 and appreciates COG usage of EM surveys as a supporting data for depth to water findings. However, the OCD will continue to request DTW be confirmed by bore to depth of water or a verified data, aka data of OSE.