Souder, Miller & Associates ♦ 201 S. Halagueno St.♦ Carlsbad, NM 88220 (575) 689-8801

November 25, 2024 PROJECT # 5E33088 BG# 1

EMNRD – Oil Conservation Division
506 W. Texas Ave
Artesia, NM 88210

SUBJECT: Closure Request Report for the Billiken 6 CTB 1, Incident ID # nAPP2427041103, Lea County, New Mexico.

1.0 Introduction

On behalf of Devon Energy Production Company, LP (Devon), Souder, Miller & Associates (SMA) has prepared this Closure Request Report that describes the corrective actions for a produced water incident related to oil and gas production activities at the Billiken 6 CTB 1 (Billiken), nAPP2427041103, that occurred on September 24, 2024. The spill area is located at N 32.07635, W -103.411119.

Devon completed a release notification to the New Mexico Energy, Minerals, and Natural Resources Department– Oil Conservation Division (OCD) via Operators Electronic Permitting and Payment Portal on September 26, 2024, for the submission of Notice of Release (NOR), followed by the submission of the Form C-141, Release Notification on September 30, 2024. This letter provides a description of the spill assessment and includes a request for spill closure.

Table 1: Release Information and Closure Criteria

Name	Billiken 6 CTB 1	Company	Devon Energy Production Company, LP
API Number	fAPP213637205	Location	D-6-26S-35E/32.07635, -103.411119
Incident Number	nAPP2427041103	Land Status	Federal
Date of Release	September 24, 2024	Lease Number	NMNM125401
Source of Release	Pinhole in water transfer pump		
Released Volume	20 bbls	Recovered Volume	20 bbls
NMOCD Closure Criteria	Depth to Groundwater >100 feet bgs (below ground surface)		

2.0 Background

On September 24, 2024, a pinhole leak was discovered in the swedge threads of the water transfer pump. The total volume of released fluids was 20 barrels (bbls) of produced water. The release occurred within the secondary lined containment at Billiken. Initial response activities were conducted by the operator, including source elimination, photographs of standing fluids, recovery of approximately 20 bbls of produced water, and verification that the affected area was properly exposed and cleaned for visual

observation. Documentation of the liner inspection, including photographs, is provided in the Site Assessment Report in Attachment 1.

3.0 Site Geology and Vegetation

The Geologic Map of New Mexico by New Mexico Bureau of Geology and Mineral Resources indicates the surface geology at the incident location area is comprised of primarily Qep–Eolian and piedmont deposits (Holocene to middle Pleistocene), interlayed eolian sands, and piedmont-slope deposits. Soil texture is classified as Pyote and Maljamar fine sands. Ecological settings include vegetation of mixed grasses, dominating in aspect is sand bluestem and giant dropseeds with Havard panicum and dropseeds, shrubs, and forbs. Sand bluestem and giant dropseed are dominant, while panicum and dropseeds are subdominant. Sand shinnery oak and soapweed yucca are dominant and sub-dominant shrubs consist of sand sagebrush. Sand bluestem, giant dropseed, Harvad panicum, plains bristlegrass, sand paspalum, and fourwing saltbrush are present in substantial amounts. The grass cover is not continuous, but uniform across undisturbed areas. Grass coverage is variable in shifting sands and large irregular dunes produce considerable variation in the distribution and composition of the plant community. Common features of the sandhills sites include large natural bare areas or blowouts.

The surrounding geography and terrain are associated with plains, dunes, fan piedmonts, and interdunal areas with landforms consisting of sand dunes, hillslopes, and dunes at elevations between 3,000 and 3,900 feet above sea level. The annual average rainfall and precipitation ranges between 10 to12 inches. The soil in the release location area consists of fine sand to fine loamy sand, to a sandy clay loam, and a limiting layer of cemented material that tends be well drained, with negligible to very low run off, and low available water supply.

4.0 Site Information and Closure Criteria

The Billiken is located approximately 14 miles west of Jal, New Mexico, on Federal (BLM) land at an elevation of approximately 3,266 feet above mean sea level (amsl). SMA completed site assessment/characterization pursuant to 19.5.29.11-12 NMAC to determine potential environmental impacts and closure criteria. Site assessment and characterization results are included in Attachments 1 and 2.

There is no surface water located on site or within closure criteria parameters of the site. The nearest significant watercourse, as defined in 19.15.17.7.P NMAC, is the Jal Lake located approximately 13 miles east of the site (U.S. Fish and Wildlife Service, National Wetlands Inventory, 2024). There are no continuous flowing watercourses or significant watercourses, lakebeds, sinkholes, playa lakes, or other critical water or community features as outlined in Paragraph (4) of Subsection C of 19.15.29.11 NMAC.

Depth to ground water was determined using a previously reported and measured temporary borehole on site, C-4846-POD1, for a depth of 101 feet bgs. The temporary borehole was completed on July 17, 2024. Documentation in reference to site characterization and depth to groundwater is included in Attachment 2.

Based on data included in the closure criteria determination worksheet, the incident at Billiken is not subject to the requirements of 19.15.29.11.A.4 NMAC. The closure criteria for the site are the constituent concentration limits associated with greater than 100 feet depth to groundwater as stated in Table 1 of 19.15.29.12 NMAC.

5.0 Remediation Activities

Notification of the liner inspection, scheduled for October 30, 2024, was provided to Devon through email by SMA personnel on October 28, 2024. Devon provided notification to OCD and the Bureau of Land Management (BLM) through the ENMRD Electronic Permitting and Payment Portal for Operators on October 28, 2024. Notification documentation is included in Attachment 3.

On October 30, 2024, SMA personnel performed a visual inspection of the secondary containment to verify liner integrity as outlined in in Paragraph (5)(a) of Subsection A of 19.15.29.11 NMAC.

Visual observation of the liner was completed on all sidewalls and base of the containment, around equipment, and all seams of the liner. The inspection included looking for any potential perforations in the liner that could lead to a breach of the secondary containment. Observations concluded no signs of any cuts, rips, tears, or weathering of the liner condition needs repairs or replacement, and liner integrity was confirmed. Photo documentation of the liner inspection is in the Site Assessment Report (Attachment 1).

6.0 Conclusions and Recommendations

Based on the liner inspection and assessment, SMA concludes the liner integrity is adequate to contain the spill related to incident nAPP2427041103, and there is no evidence of release to the environment. Based on the professional activities and site assessment, Devon Energy Production Company, respectfully requests closure on the incident that occurred at Billiken 6 CTB 1.

7.0 Scope and Limitations

The scope of our services included: visual inspection for liner integrity; regulatory liaison; and preparing this report. All work has been performed in accordance with generally accepted professional environmental consulting practices for oil and gas releases in the Permian Basin in New Mexico.

If there are any questions regarding this report, please contact Stephanie Hinds at (505) 302-1127 or Monica Peppin at (575) 909-3418.

Submitted by:
SOUDER, MILLER & ASSOCIATES

Monica Peppin
Project Manager

Reviewed by:

Stephanie Hinds, P.E.
Senior Engineer

REFERENCES:

New Mexico Office of the State Engineer (NMOSE) online water well database
Httpe://gis.ose.state.nm.us/gisapps/ose_pod_locations/
USGS National Water Information System: Web interface online water well database
https://nwis.waterdata.usgs.gov/nwis/gwlevels?site_no=321205103544701&agency_cd=USGS&format=html
U.S. Fish and Wildlife Service: National Wetlands Inventory
Wetlands Mapper | U.S. Fish & Wildlife Service
New Mexico State Land Office: Land Status
NMSLO Land Status
United States Department of Agriculture: Natural Resources Conservation Service: Web Soil Survey
https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

USDA, USGS The National Map: Orthoimagry: FEMA's National Flood Hazard Layer (NFHL) Viewer
https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd

ATTACHMENTS:

Attachment 1: Site Assessment Field Report
Attachment 2: Closure Criteria Determination Research
Attachment 3: Correspondence

ATTACHMENT 1: SITE ASSESSMENT FIELD REPORT

Site Assessment Report

INCIDENT ID: nAPP2427041103

SITE NAME: Billiken 6 CTB 1

CLIENT: Devon Energy

Oct 30, 2024 at 2:18 PM

Field Notes

- The site is located in Lea County, occurred/discovered on 9/24/24, 20 bbls were released and 20 bbls were recovered. The cause of release was due to a pinhole located on the water transfer pump discharge connection inside the lined containment. The liner was cleaned on 10/10/24 and Devon energy notified SMA that the liner was ready for inspection.
- Arrived on location at 1:40 pm to complete a liner inspection of the secondary lined containment. Completed photographs in a 360 view to get sufficient photos to determine if there were any type perforation that could lead to a potential breach.
- Inspection concluded that there were no rips, tears, cuts, or weathering that could have led to a breach of the secondary containment when the release occurred.

Photographs

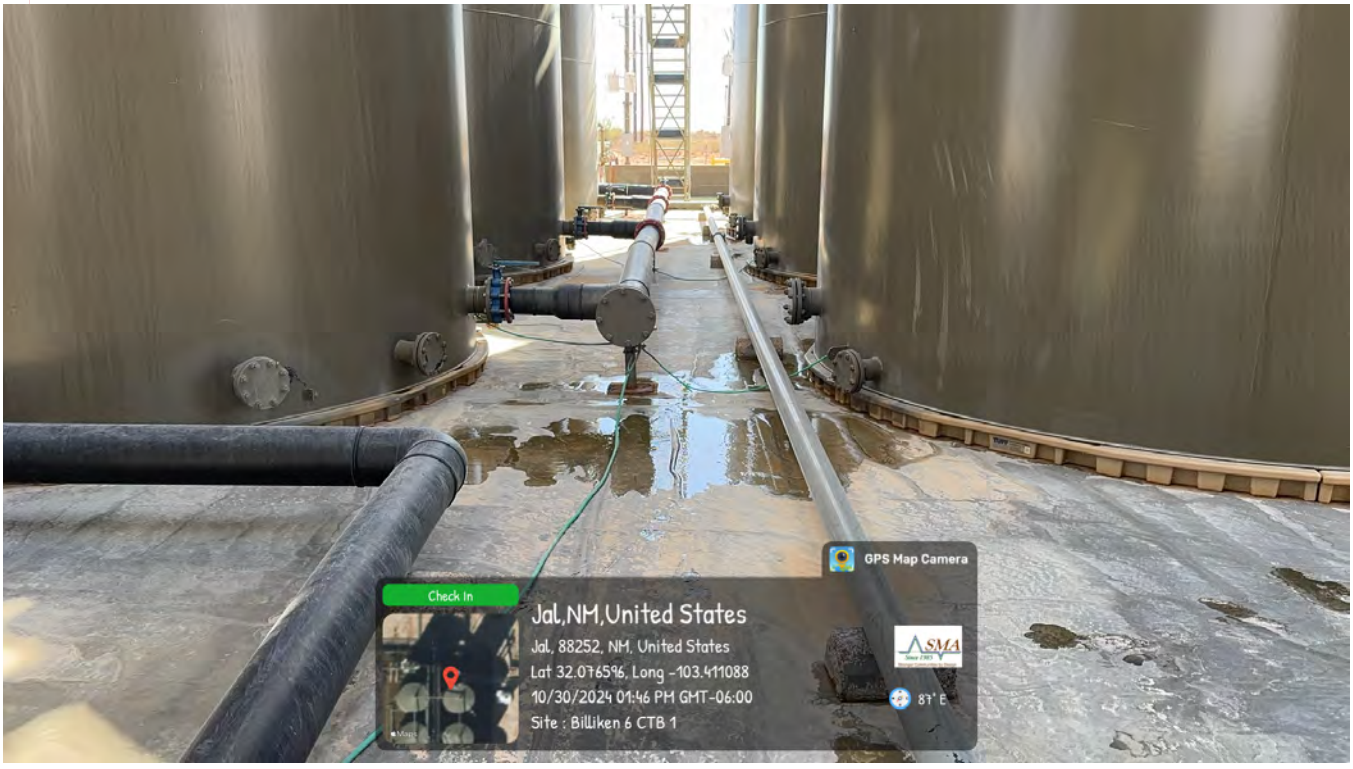


Photo #1: Liner between tanks.

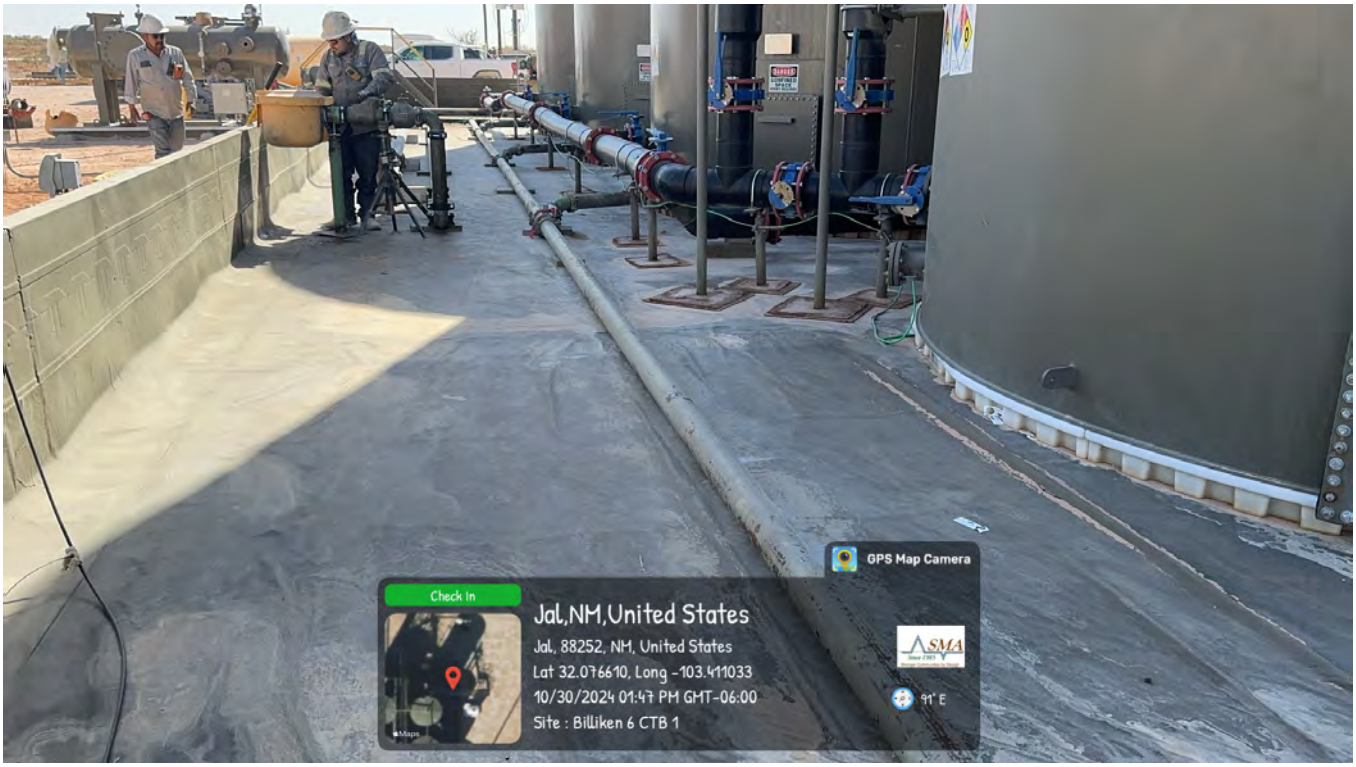


Photo #2: Liner on east side of containment.

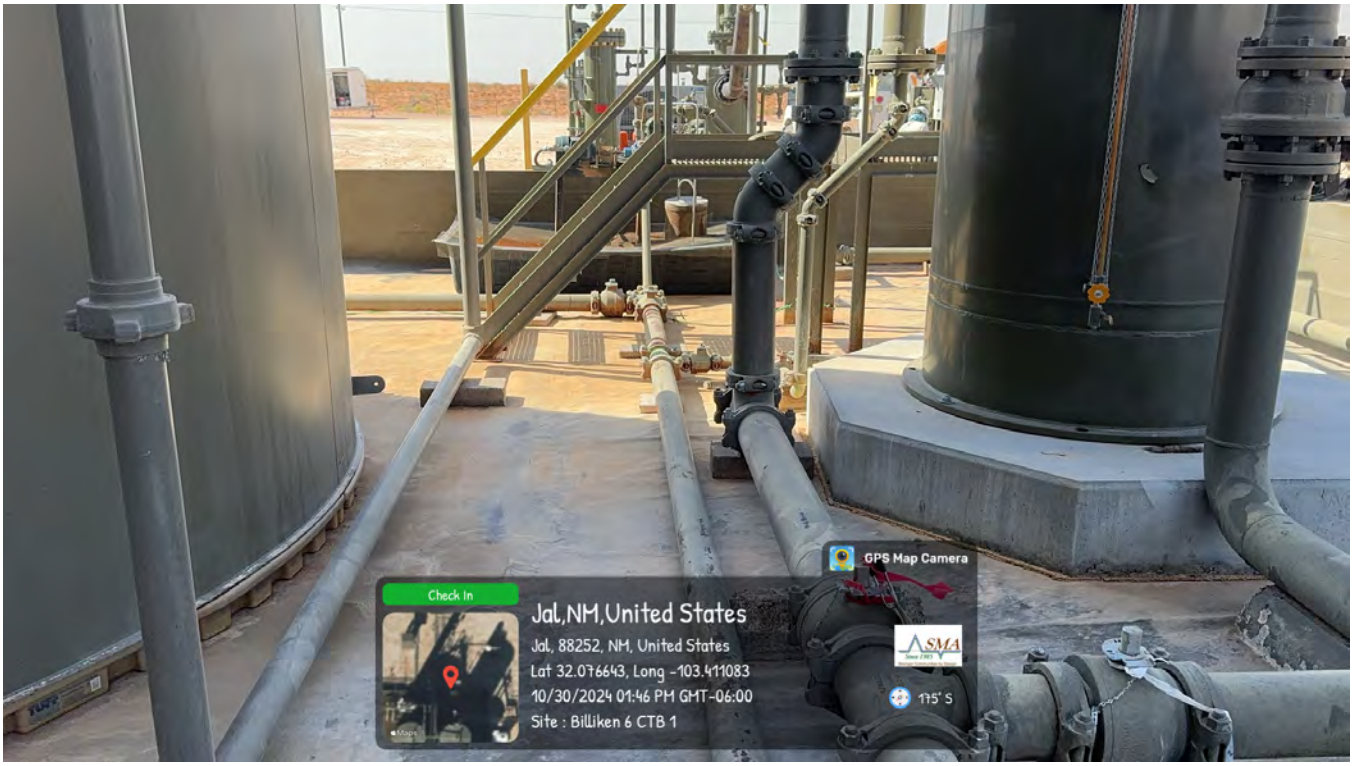


Photo #3: North side of containment.

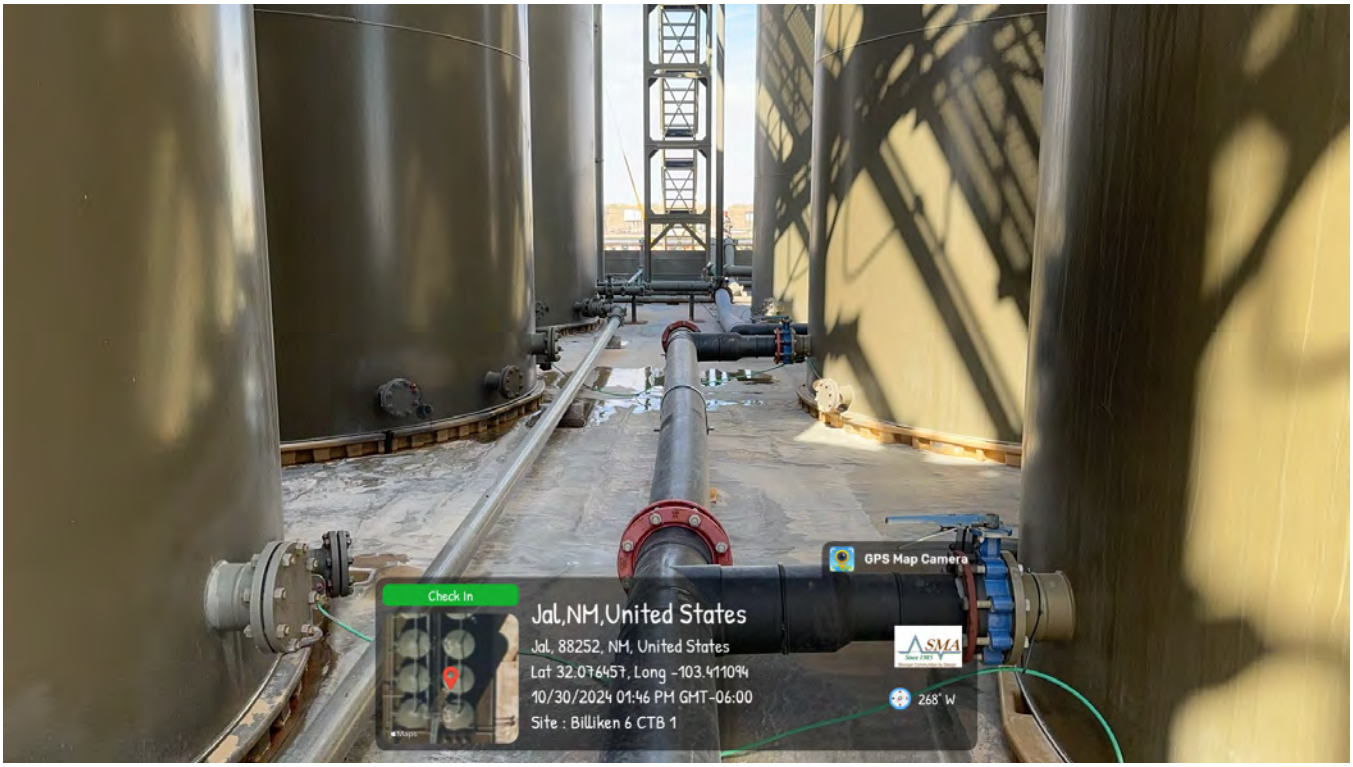


Photo #4: In between tanks facing north.

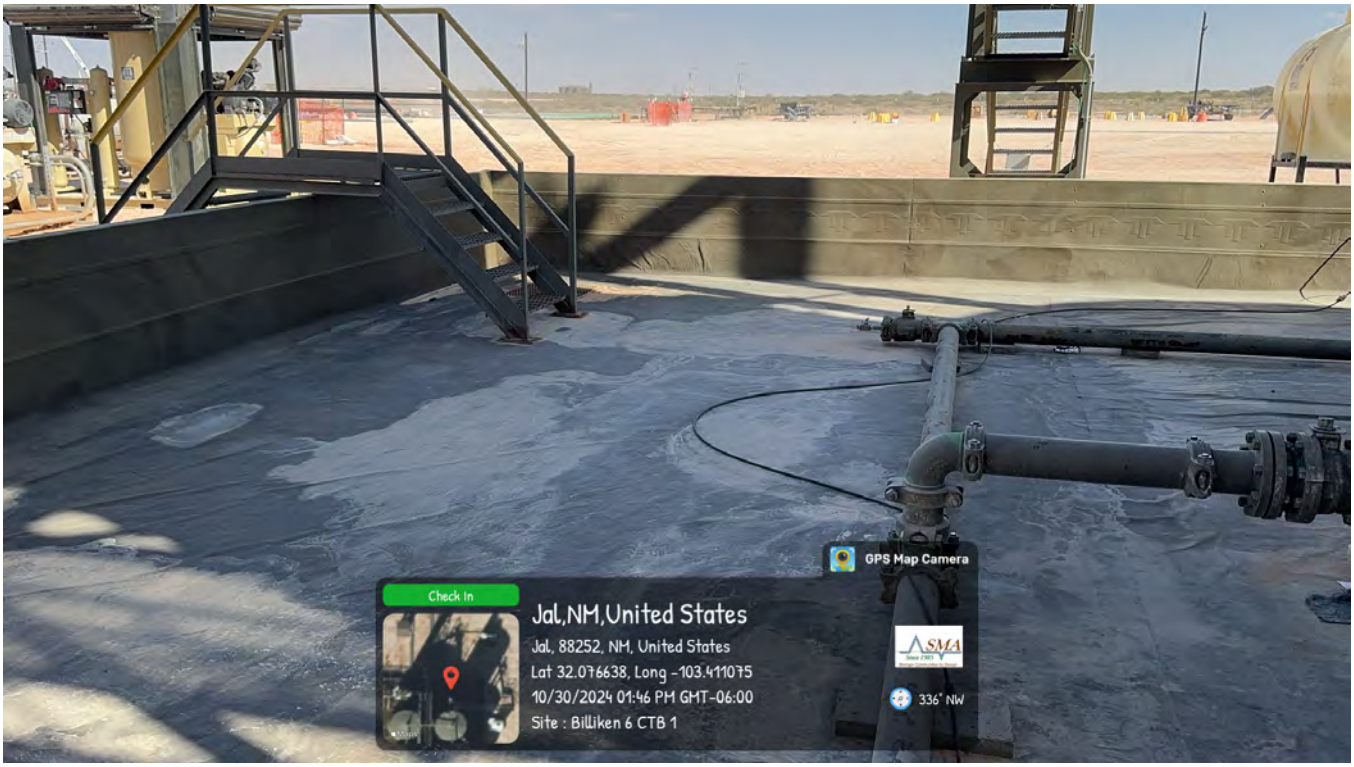


Photo #5: Northeast corner of containment.

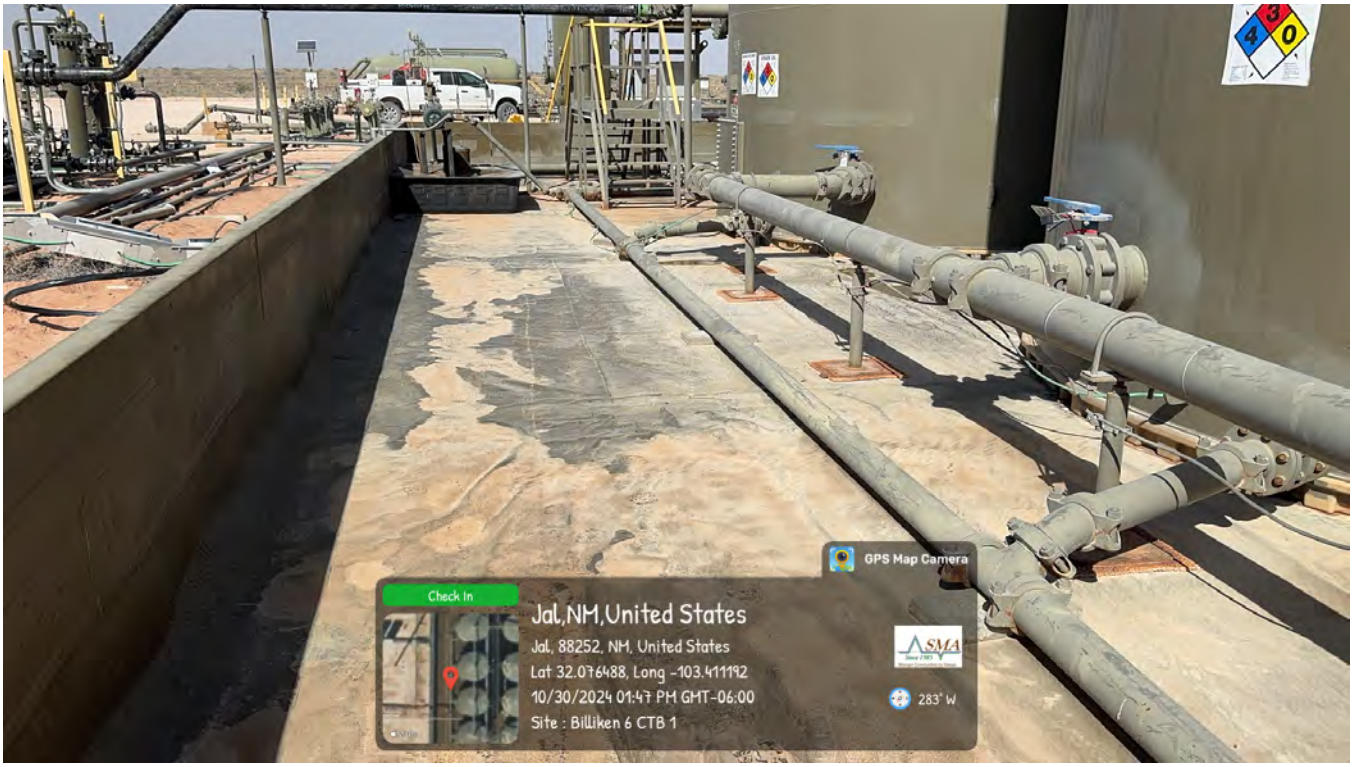


Photo # 6: West side of containment facing north.

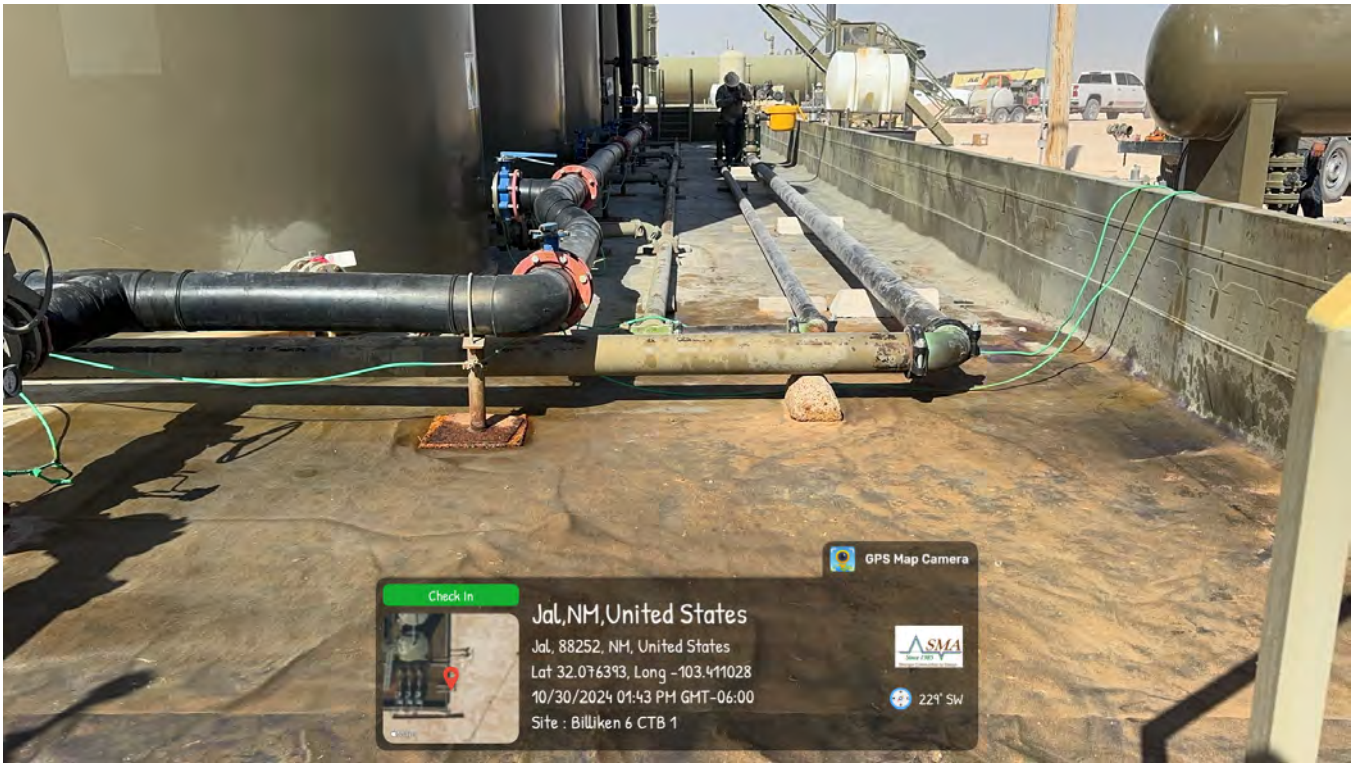


Photo #7: East side of containment facing north.

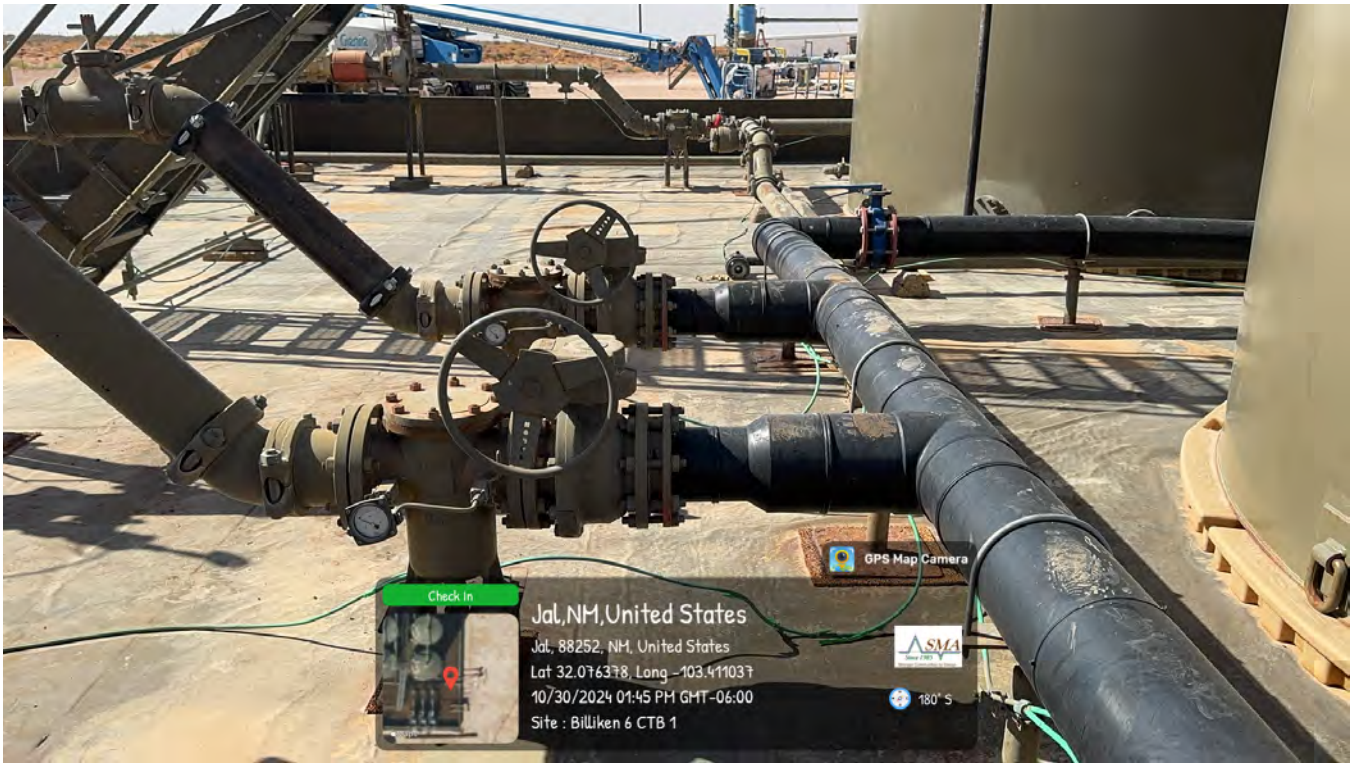


Photo #8: South end of containment facing west.

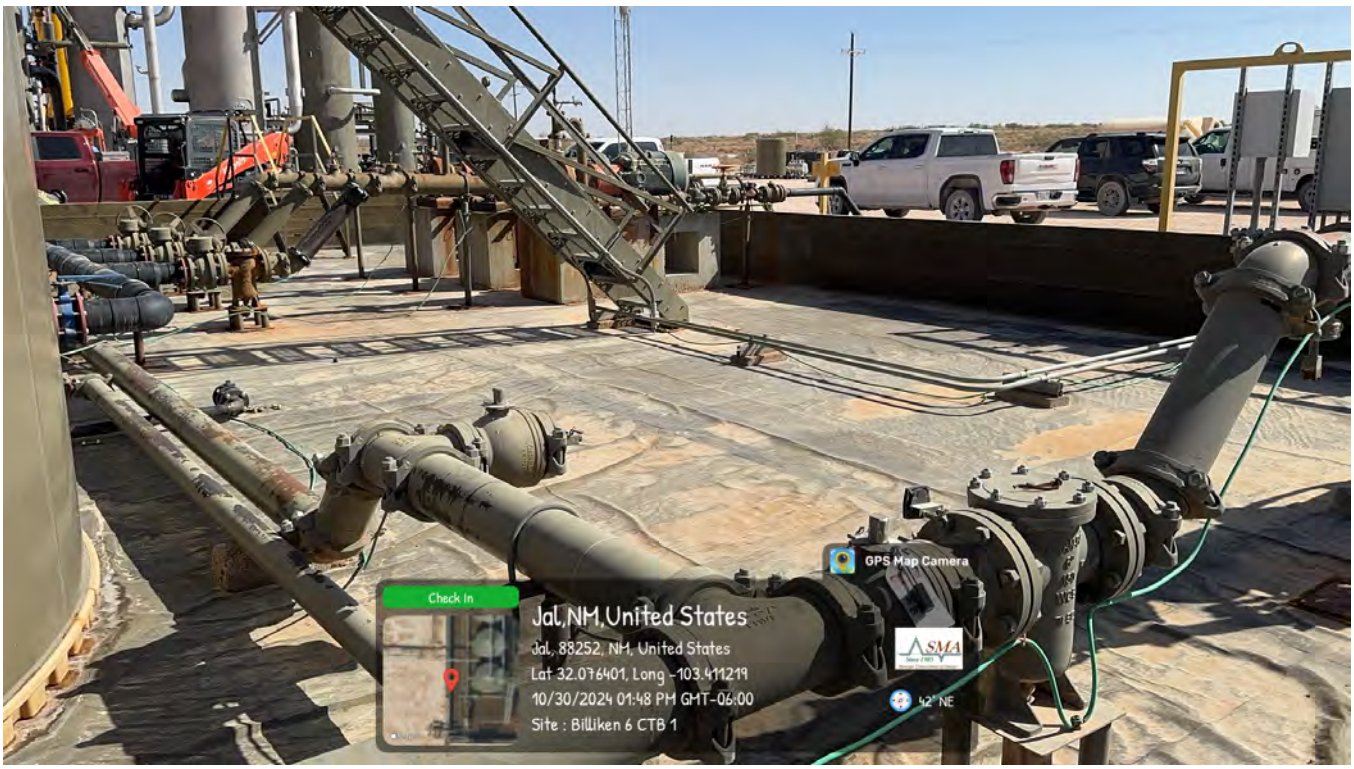


Photo #9: South side of containment facing southeast.

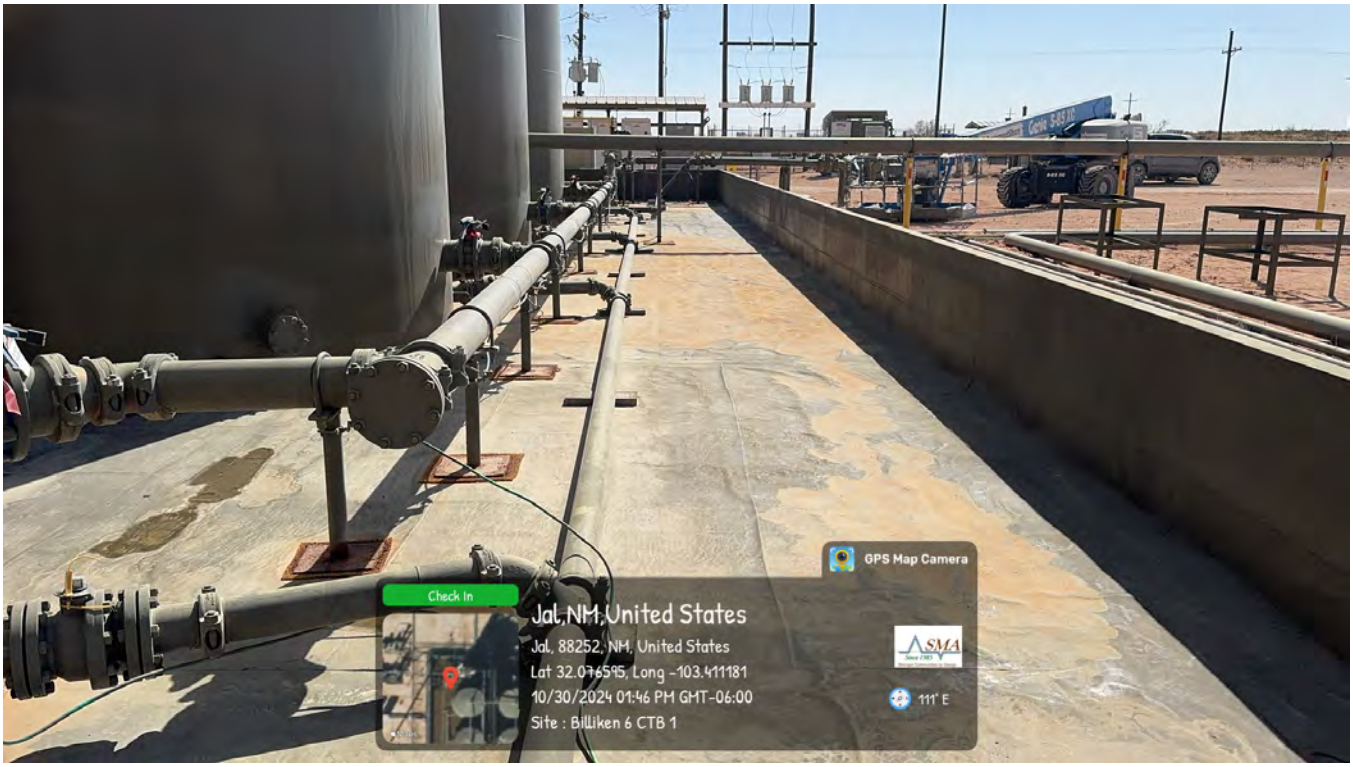


Photo #10: West side of containment facing south.

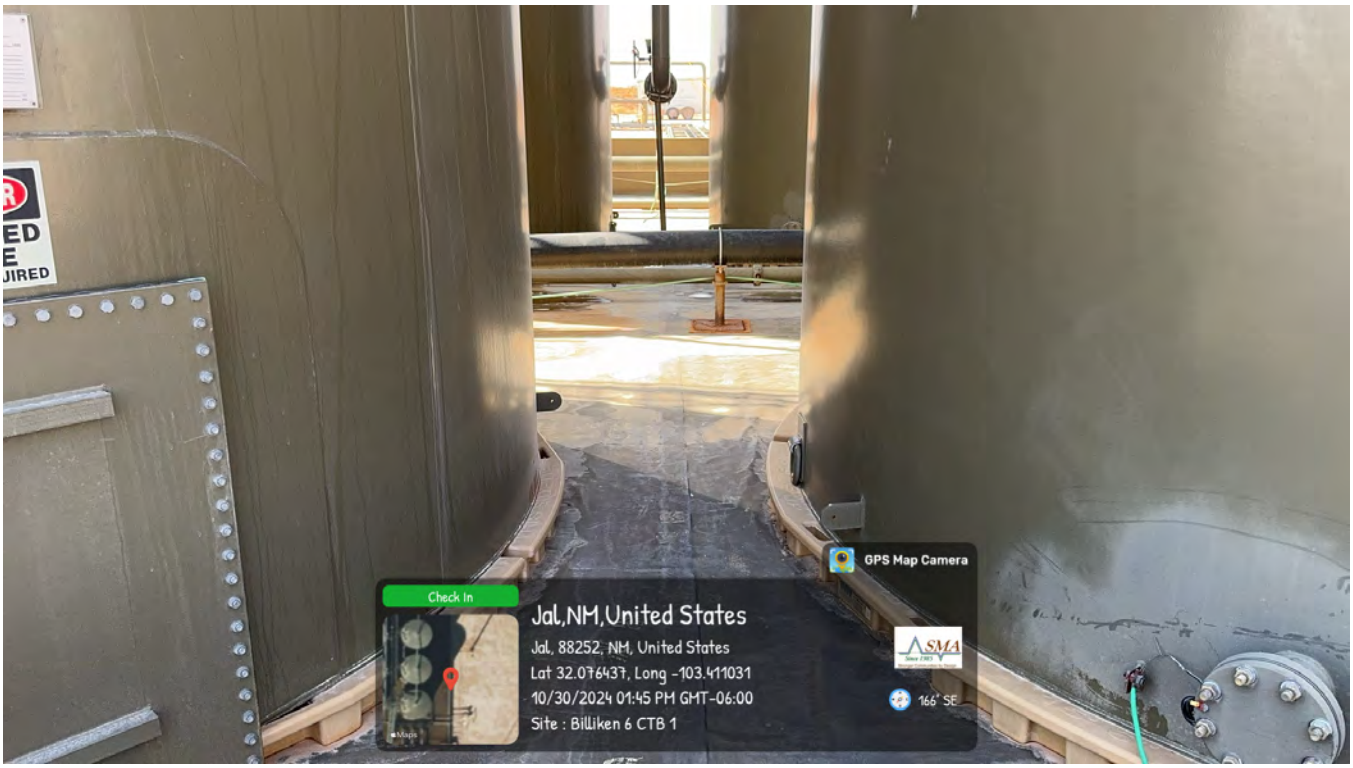


Photo # 11: In between tanks facing west.

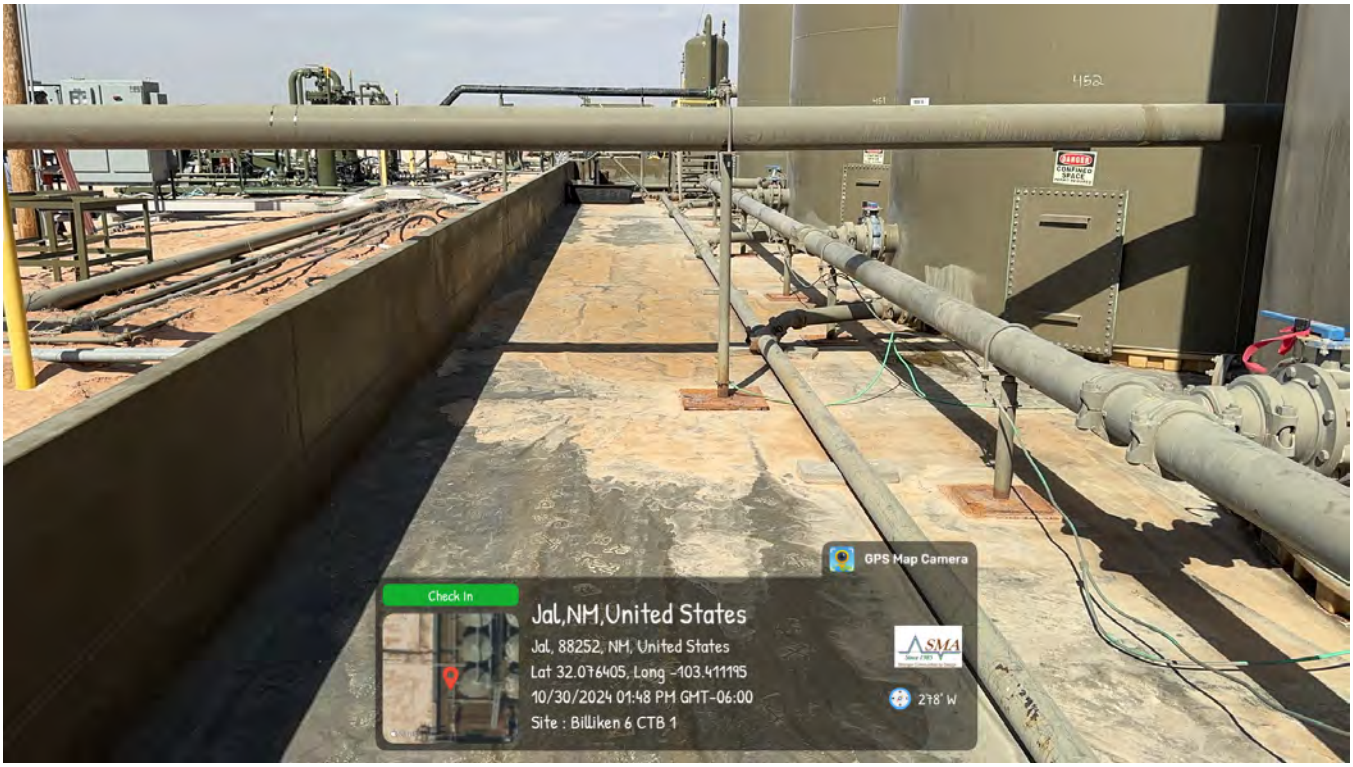


Photo #12: West side of containment closer to the southern end facing north.

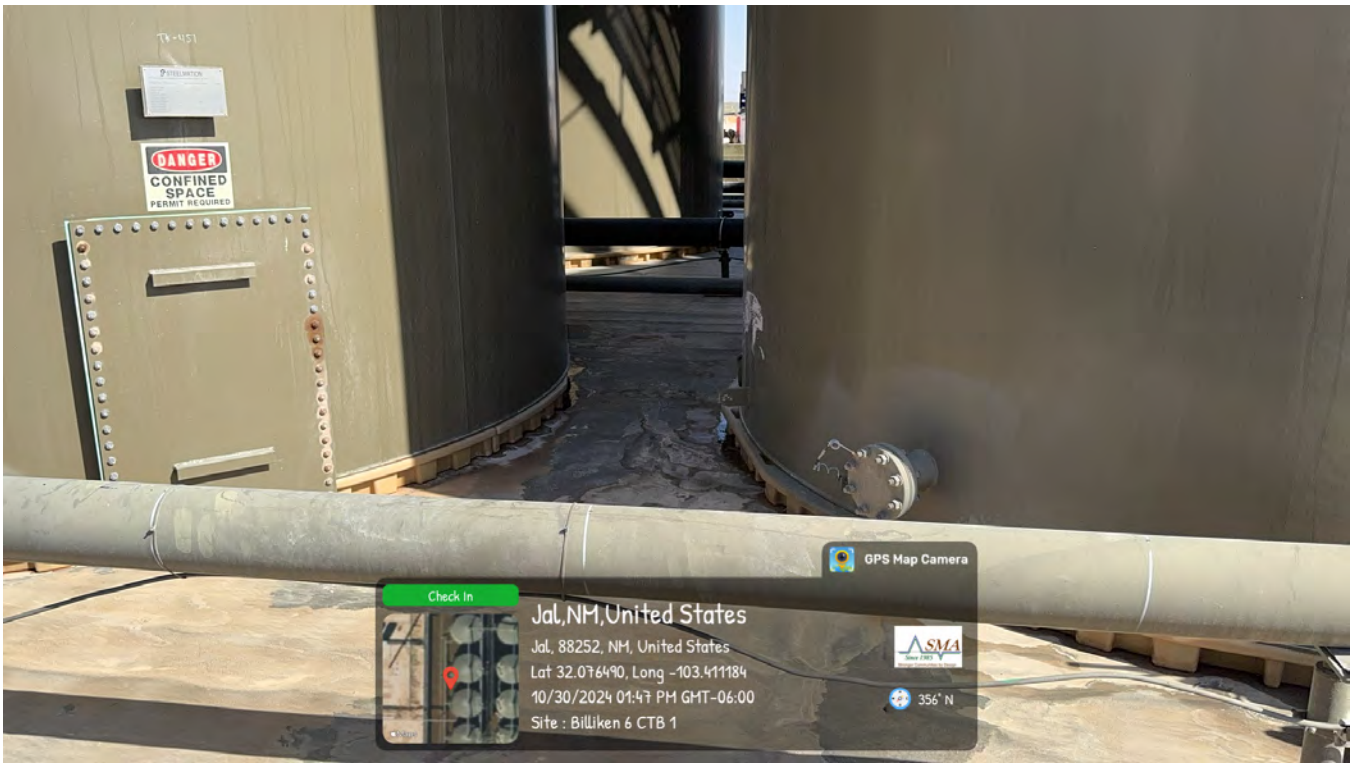


Photo #13: In between tanks facing east.

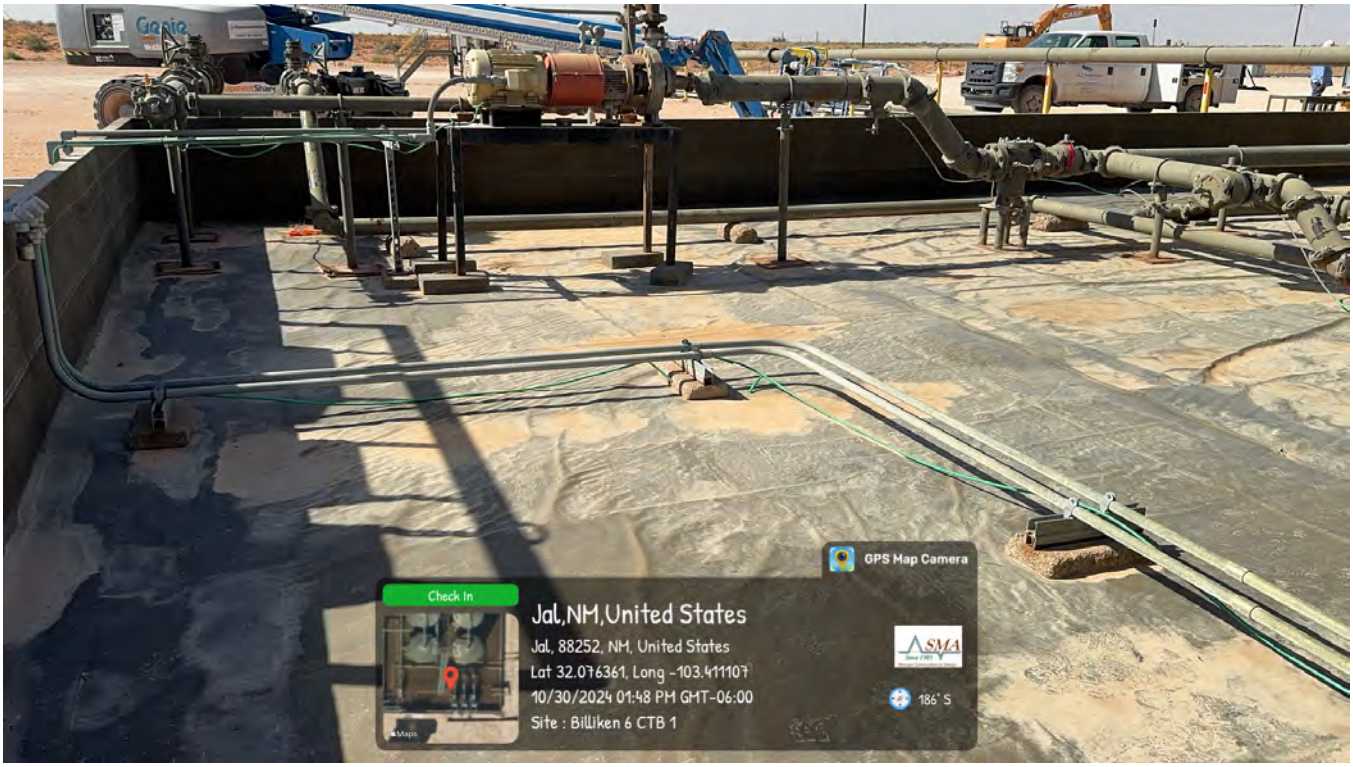


Photo #14: South end of containment facing west/southwest.

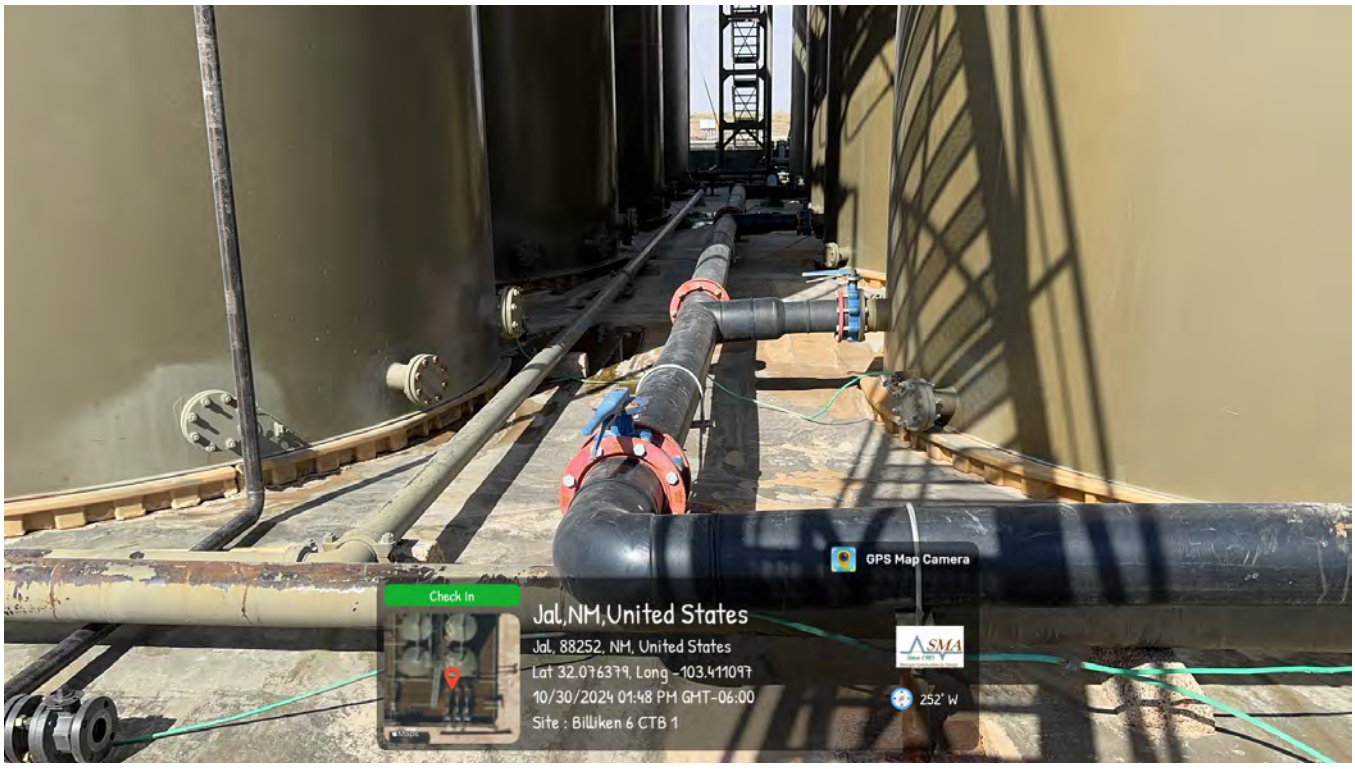


Photo #15: In between tanks facing north.

October 30, 2024 at 3:01 PM

Technician: Monica Peppin Signature:

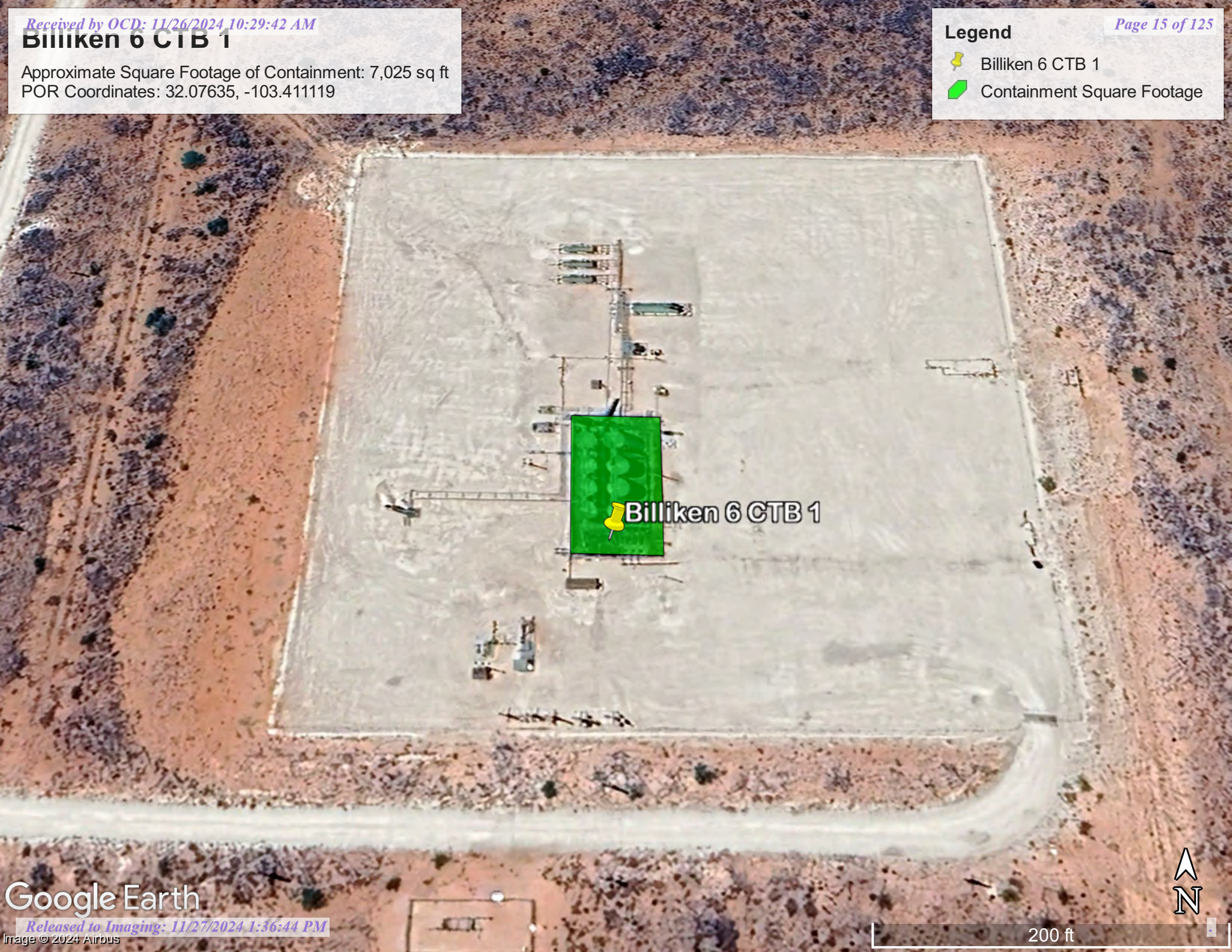
ATTACHMENT 2: CLOSURE CRITERIA DETERMINATION RESEARCH

Billiken 6 CTB 1

Approximate Square Footage of Containment: 7,025 sq ft
POR Coordinates: 32.07635, -103.411119

Legend

- Billiken 6 CTB 1
- Containment Square Footage



Mike A. Hamman, P.E.
State Engineer

Roswell Office
1900 WEST SECOND STREET
ROSWELL, NM 88201

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

Trn Nbr: 761418
File Nbr: C 04846

Jun. 11, 2024

STEPHANIE HINDS
SOUDER MILLER & ASSOCIATES
401 W BROADWAY
FARMINGTON, NM 87401

Greetings:

Your approved copy of the above numbered permit to drill a well for non-consumptive purposes is enclosed. You must obtain an additional permit if you intend to use the water. It is your responsibility to provide the contracted well driller with a copy of the permit that must be made available during well drilling activities.

Carefully review the attached conditions of approval for all specific permit requirements.

- If use of this well is temporary in nature and the well will be plugged at the end of the well usage, the OSE must initially approve of the plugging. If plugging approval is not conditioned in this permit, the applicant must submit a Plugging Plan of Operations for approval prior to the well being plugged. The Plugging Record must be properly completed and submitted to the OSE within 30 days of the well plugging.
- If the final intended purpose and condition requires a well ID tag and meter installation, the applicant must immediately send a completed meter report form to this office.
- The well record and log must be submitted within 30 days of the completion of the well or if the attempt was a dry hole.
- This permit expires and will be cancelled if no well is drilled and/or a well log is not received by the date set forth in the conditions of approval.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us.

Sincerely,

Rodolfo Chavez
(575)622-6521

Enclosure

explore

File No. C-04846 POD1

NEW MEXICO OFFICE OF THE STATE ENGINEER

WR-07 APPLICATION FOR PERMIT TO DRILL A WELL WITH NO WATER RIGHT

(check applicable boxes)

For fees, see State Engineer website: http://www.ose.state.nm.us

Purpose	☐ Pollution Control And/Or Recovery	☐ Ground Source Heat Pump	
☐ Exploratory Well (Pump test)	☐ Construction Site/Public Works Dewatering	☒ Other(Describe) Soil boring	
☐ Monitoring Well	☐ Mine Dewatering		

A separate permit will be required to apply water to beneficial use regardless if use is consumptive or nonconsumptive.

New Mexico Environment Department-Drinking Water Bureau (NMED-DWB) will be notified if a proposed exploratory well is used for public water supply.

☐ Check here if the borehole is anything other than vertical (directional boring or angle boring) and include a schematic of your design.

☒ Temporary Request - Requested Start Date: 8/5/2024 Requested End Date: 8/31/2024

Plugging Plan of Operations Submitted? ☒ Yes ☐ No

Note: If there is known artesian conditions, contamination or high mineral content at the drilling location, include the borehole log or a well log from an existing well at that location. If this information is not submitted, check box and attach form WD-09 to this form. ☐

1. APPLICANT(S)

Name: Devon Energy Corp	Name: Souder Miller & Associates
Contact or Agent: Dale Woodall ☐ check here if Agent	Contact or Agent: Stephanie Hinds ☒ check here if Agent
Mailing Address: 333 West Sheridan Avenue	Mailing Address: 401 W. Broadway
City: Oklahoma City	City: Farmington
State: Oklahoma Zip Code: 73102	State: NM Zip Code: 87401
Phone: (405) 318-4697 ☐ Home ☒ Cell Phone (Work):	Phone: 505-793-7079 ☐ Home ☒ Cell Phone (Work):
E-mail (optional): dale.woodall@dvn.com	E-mail (optional): stephanie.hinds@soundermiller.com

FOR OSE INTERNAL USE Application for Permit, Form WR-07 Rev 02/29/2024

File No. C-04846	Trn No: 761438	Receipt No: 2-46919
Trans Description (optional):		
Sub-Basin: CUB	POW/LOG Due Date: 6/11/25	

Page 1 of 2

4. **SPECIFIC REQUIREMENTS:** The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application.

Exploratory*:
Is proposed well a future public water supply well?
☐ Yes ☐ NO
If Yes, an application must be filed with NMED-DWB concurrently.
☐ Include a description of any proposed pump test, if applicable.

Monitoring*:
☐ Include the reason for the monitoring well, and,
☐ The duration of the planned monitoring.

Pollution Control and/or Recovery
☐ Include a plan for pollution control/recovery, that includes the following:
☐ A description of the need for the pollution control or recovery operation
☐ The estimated maximum period of time for completion of the operation
☐ The annual diversion amount
☐ The annual consumptive use amount
☐ The maximum amount of water to be diverted and injected for the duration of the operation
☐ The method and place of discharge
☐ The method of measurement of water produced and discharged
☐ The source of water to be injected
☐ The method of measurement of water injected
☐ The characteristics of the aquifer
☐ The method of determining the resulting annual consumptive use of water and depletion from any related stream system
☐ Proof of any permit required from the New Mexico Environment Department
☐ An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.

Construction De-Watering:
☐ Include a description of the proposed dewatering operation
☐ The estimated duration of the operation,
☐ The maximum amount of water to be diverted
☐ A description of the need for the dewatering operation, and
☐ A description of how the diverted water will be disposed of.

Ground Source Heat Pump:
☐ Include a description of the geothermal heat exchange project.
☐ The number of boreholes for the completed project and required depths.
☐ The time frame for constructing the geothermal heat exchange project, and
☐ The duration of the project.
☐ Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.

Mine De-Watering:
☐ Include a plan for pollution control/recovery, that includes the following:
☐ A description of the need for mine dewatering.
☐ The estimated maximum period of time for completion of the operation
☐ The source(s) of the water to be diverted
☐ The geohydrologic characteristics of the aquifer(s)
☐ The maximum amount of water to be diverted per annum
☐ The maximum amount of water to be diverted for the duration of the operation
☐ The quality of the water
☐ The method of measurement of water diverted
☐ The recharge of water to the aquifer
☐ Description of the estimated area of hydrologic effect of the project
☐ The method and place of discharge
☐ An estimation of the effects on surface water rights and underground water rights from the mine dewatering project
☐ A description of the methods employed to estimate effects on surface water rights and underground water rights
☐ Information on existing wells, rivers springs, and wetlands within the area of hydrologic effect.

* If exploration or monitoring drilling activity is required by NMED, then you must also submit the NMED Work Plan)

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Stephanie Hinds, Souder, Miller & Associates, on behalf of Devon Energy Corp
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief

Stephanie Hinds Digitally signed by Stephanie Hinds Date: 2024.06.04 09:27:54 -08'00'
Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is

☑ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 11th day of June 20 24 for the State Engineer

MIKE A. HAMMAN, P.E.
State Engineer

By K. Parekh
Signature

KASHYAP PAREKH
Print

Title: WATER RESOURCE MANAGER I
Print

FOR OSE INTERNAL USE Application for Permit, Form WR-07 Version 02/29/2024

File No. C-04846 POD1 Trn No 761438

Page 3 of 3

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

17-16 Construction of a water well by anyone without a valid New Mexico Well Driller License is illegal, and the landowner shall bear the cost of plugging the well by a licensed New Mexico well driller. This does not apply to driven wells, the casing of which does not exceed two and three-eighths inches outside diameter.

17-1A Depth of the well shall not exceed the thickness of the valley fill.

17-1 No water shall be appropriated and beneficially used under this permit.

17-6 The well authorized by this permit shall be plugged completely using the following method per Rules and Regulations Governing Well Driller Licensing, Construction, Repair and Plugging of Wells; Subsection C of 19.27.4.30 NMAC unless an alternative plugging method is proposed by the well owner and approved by the State Engineer upon completion of the permitted use. All pumping appurtenance shall be removed from the well prior to plugging. To plug a well, the entire well shall be filled from the bottom upwards to ground surface using a tremie pipe. The bottom of the tremie shall remain submerged in the sealant throughout the entire sealing process, other placement methods may be acceptable and approved by the state engineer. The well shall be plugged with an office of the state engineer approved sealant for use in the plugging of non-artesian wells. The well driller shall cut the casing off at least four (4) feet below ground surface and fill the open hole with at least two vertical feet of approved sealant. The driller must fill or cover any open annulus with sealant. Once the sealant has cured, the well driller or well owner may cover the seal with soil. A Plugging Report for said well shall be filed with the Office of the State Engineer in a District Office within 30 days of completion of the plugging.

Trn Desc: C 04846 POD1

File Number: C 04846
Trn Number: 761438

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

17-A The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.

17-B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with 72-12-12 NMSA 1978. A licensed driller shall not be required for the construction of a well driven without the use of a drill rig, provided that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter.

17-C The well driller must file the well record with the State Engineer and the applicant within 30 days after the well is drilled or driven. It is the well owner's responsibility to ensure that the well driller files the well record.
The well driller may obtain the well record form from any District Office or the Office of the State Engineer website.

17-P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between hydrogeologic zones.

17-Q The State Engineer retains jurisdiction over this permit.

17-R Pursuant to section 72-8-1 NMSA 1978, the permittee shall allow the State Engineer and OSE representatives entry upon private property for the performance of their respective duties, including access to the ditch or acequia to measure flow and also to the well for meter reading and water level measurement.

Trn Desc: C 04846 POD1

File Number: C 04846
Trn Number: 761438

NEW MEXICO STATE ENGINEER OFFICE
PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL (Continued)

LOG The Point of Diversion C 04846 POD1 must be completed and the Well Log filed on or before 06/11/2025

IT IS THE PERMITTEE'S RESPONSIBILITY TO OBTAIN ALL AUTHORIZATIONS AND PERMISSIONS TO DRILL ON PROPERTY OF OTHER OWNERSHIP BEFORE COMMENCING ACTIVITIES UNDER THIS PERMIT.

ACTION OF STATE ENGINEER

Notice of Intention Rcvd:
Formal Application Rcvd: 05/20/2024
Date Returned - Correction:
Date Rcvd. Corrected:
Pub. of Notice Ordered:
Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 11 day of Jun A.D., 2024

Mike A. Hamman, P.E., State Engineer

By: K. Parekh
KASHYAP PAREKH

Trn Desc C 04846 POD1

File Number: C 04846
Trn Number: 761439

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Carlsbad Field Office
620 E. Greene St.
Carlsbad, NM 88220-6292

In Reply Refer To:
3162.4 (NM-080)
NMNM125401

May 16, 2024

NM Office of the State Engineer
1900 W. Second St.
Roswell, NM 88201

Re: BILLIKEN 6 FEDERAL 1H CTB
Sec 6, TS 26S, RE 35E
Lea County, New Mexico
30-025-42685
32.07865, -103.41259

To Whom It May Concern:

The above well location and the immediate area mentioned above requires advanced soil boring to take place at approximately 101 feet below ground surface. The boring will be secured and left open for 72 hours at which time DEVON ENERGY PRODUCTION COMPANY LP will assess for the presence or absence of groundwater. Temporary PVC well material will be placed to total depth of the boring and secured at the surface. If water is encountered at any point during the boring, installation of the soil boring will be plugged using Portland Type I/II neat cement less than 6.0 gallons of water per 94lb sack. If no water is encountered, then the soil boring will be plugged. The Bureau of Land Management (landowner) authorizes the access of the area to accomplish depth to groundwater determination of this site.

If you have any questions contact Crisha Morgan, at 575-234-5987.

Sincerely,

CRISHA MORGAN Digitally signed by CRISHA MORGAN
Date: 2024.05.16 12:08:56 -06'00'

Crisha A. Morgan
Certified Environmental Protection Specialist

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
ROSWELL

Mike A. Hamman, P.E.
State Engineer

DISTRICT II
1900 West Second St.
Roswell, New Mexico 88201
Phone: (575) 622-6521
Fax: (575) 623-8559

June 11, 2024

Devon Energy
333West Sherian Ave
Oklahoma City, OK 73102

RE: Well Plugging Plan of Operations for well no. C-4846-Pod1

Greetings:

Enclosed is your copy of the Well Plugging Plan of Operations for the above referenced well subject to the attached Conditions of Approval. The proposed method of operation is found to be acceptable and in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells 19.27.4 NMAC adopted June 30, 2017 by the State Engineer, subject to the attached Conditions of Approval.

Within 30 days after the well is plugged, the well driller is required to file a complete plugging record with the OSE and the permit holder.

Sincerely,

Samantha Davis
Water Resources Professional III

WELL PLUGGING PLAN OF OPERATIONS

NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. This form may be used to plug a single well, or if you are plugging multiple monitoring wells on the same site using the same plugging methodology.

Alert! Your well may be eligible to participate in the Aquifer Mapping Program (AMP)-NM Bureau of Geology geoinfo.nmt.edu/resources/water/ ogsm/ if within an area of interest and meets the minimum construction requirements, such as there is still water in your well, and the well construction reflected in a well record and log is not compromised, contact AMP at 575-835-5038 or -6951, or by email nmbg-waterlevels@nmt.edu, prior to completing this prior form. Showing proof to the OSE that your well was accepted to this program, may delay the plugging of your well until a later date.

I. FILING FEE: There is no filing fee for this form.

II. GENERAL / WELL OWNERSHIP: ☐ Check here if proposing one plan for multiple monitoring wells on the same site and attaching WD-08m

Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: TBD C-4846-Pod1

Name of well owner: Devon Energy Corp

Mailing address: 333 West Sheridan Avenue County:

City: Oklahoma City State: Oklahoma Zip code: 73102

Phone number: 4053184697 E-mail: dale.woodall@dvn.com

III. WELL DRILLER INFORMATION:

Well Driller contracted to provide plugging services: Scarborough

New Mexico Well Driller License No.: WD-1188 Expiration Date: 3/31/2024 3/31/2024

IV. WELL INFORMATION: ☑ Check here if this plan describes method for plugging multiple monitoring wells on the same site and attach supplemental form WD-08m and skip to #2 in this section.

Note: A copy of the existing Well Record for the well(s) to be plugged should be attached to this plan.

1) GPS Well Location: Latitude: 32 deg, 04 min, 38.32 sec
Longitude: -103 deg, 24 min, 39.97 sec, NAD 83

2) Reason(s) for plugging well(s):

Soil boring to determine depth to ground water

3) Was well used for any type of monitoring program? N/A If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging.

4) Does the well tap brackish, saline, or otherwise poor quality water? N/A If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: N/A feet below land surface / feet above land surface (circle one)

6) Depth of the well: 101 feet

7) Inside diameter of innermost casing: N/A inches

8) Casing material: N/A

9) The well was constructed with:

☐ an open-hole production interval, state the open interval:

☐ a well screen or perforated pipe, state the screened interval(s):

10) What annular interval surrounding the artesian casing of this well is cement-grouted? N/A

11) Was the well built with surface casing? N/A If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? If yes, please describe:

12) Has all pumping equipment and associated piping been removed from the well? N/A If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING: ☐ If plugging method differs between multiple wells on same site, a separate form must be completed for each method.

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical information, such as geophysical logs, that are necessary to adequately describe the proposal. Attach a copy of any signed OSE variance to this plugging plan.

Also, if this planned plugging plan requires a variance to 19.27.4 NMAC, attach a detailed variance request signed by the applicant.

1) Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well:

Pressure grout with bentonite cement slurry using a tremmie pipe from bottom of hole to surface

2) Will well head be cut-off below land surface after plugging?

VI. PLUGGING AND SEALING MATERIALS:

Note: The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant. Attach a copy of the batch mix receipt from the cement company and/or product description for specialty cement mixes or any sealant that deviates from the list of ONE approved sealants.

1) For plugging intervals that employ cement grout, complete and attach Table A.

2) For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.

3) Theoretical volume of grout required to plug the well to land surface:

4) Type of Cement proposed: type I/II Portland cement

5) Proposed cement grout mix: 5.5 gallons of water per 94 pound sack of Portland cement.

6) Will the grout be: ___ batch-mixed and delivered to the site

___ mixed on site

7) Grout additives requested, and percent by dry weight relative to cement:

6% bentonite

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

VIII. SIGNATURE:

I, Stephanie Hinds, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Stephanie Hinds — Digitally signed by Stephanie Hinds, Date: 2024.05.08 12:26:57 -07'00' — May 8, 2024

Signature of Applicant — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

X Approved subject to the attached conditions.

_____ Not approved for the reasons provided on the attached letter

Witness my hand and official seal this 11th day of June 2024

Mike A. Hamman, P.E., New Mexico State Engineer

By: Samantha Davis

Water Resources Professional III

TABLE A – For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			
Bottom of proposed interval of grout placement (ft bgl)			
Theoretical volume of grout required per interval (gallons)			
Proposed cement grout mix gallons of water per 94-lb sack of Portland cement			
Mixed on-site or batch-mixed and delivered?			
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
ROSWELL
1900 West Second St.
Roswell, New Mexico 88201
Phone: (575) 622-6521
Fax: (575) 623- 8559

Applicant has identified wells, listed below, to be plugged.
John Scarborough Drilling Inc. (WD-1188)
will perform the plugging.

Permittee: Devon Energy
NMOSE Permit Number: C-4846-Pod1

NMOSE File	Casing diameter (inches)	Well depth (feet bgl)	Approximate static water level (feet bgl)	Latitude	Longitude
C-4846-Pod1	2" (Soil Boring)	101	Unknown	32 04 38.32	103 24 39.97

Specific Plugging Conditions of Approval for Well located in Lea County, New Mexico.

1. Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4 NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE). Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.

2. Ground Water encountered: The total Theoretical volume of sealant required for abandonment of soil boring well is approximately 17.0 gallons. Total minimum volume of necessary sealant shall be calculated upon sounding the actual pluggable depth of well, which is estimated at 105 feet.

3. Dry Hole: The total Theoretical volume of sealant required for abandonment of soil boring well is approximately 2.0 gallons. Total minimum volume of necessary sealant shall be calculated upon sounding the actual pluggable depth of well, which is estimated at 10 feet.

4. **Ground Water encountered:** Type I/II Portland cement mixed with 5.2 to 6.0 gallons of fresh water per 94-lb sack of cement is approved for the plugging the well.

5. **Dry Hole:** (a) Drill cuttings up to ten feet of land surface, (b) 10 feet to 0 feet – Hydrated bentonite. The bentonite shall be hydrated separately with its required increments of water prior to being mixed into the cement slurry.

6. Sealant shall be placed by pumping through a tremie pipe extended to near well bottom and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column upwards from below. Tremie pipe may be pulled as necessary to retain minimal submergence in the advancing column of sealant.

7. Should cement "shrinks-back" occur in the well, use of a tremie for topping off is required for cement placement deeper than 20 feet below land surface or if water is present in the casing. The approved sealant for topping off is identified in condition 3 & 4 of these Specific Conditions of Approval.

8. Any open annulus encountered surrounding the casing shall also be sealed by the placement of the approved sealant. When plugging shallow wells with no construction or environmental concerns, and if the well record on a well to be plugged shows a proper 20-foot annular seal, a plugging plan can propose the use of clean fill material to a nominal 30 feet bgs, then placing an OSE approved sealant to surface. Lacking that information, we would require an excavation of at least 2-feet which shall then be filled in its entirety with sealant to surface.

9. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.

10. NMOSE witnessing of the plugging of the shallow well will not be required.

11. Any deviation from this plan must obtain an approved variance from this office prior to implementation.

12. A Well Plugging Record itemizing actual abandonment process and materials used shall be filed with the State Engineer within 30 days after completion of well plugging. For the plugging record, please resurvey coordinate location for well and note coordinate system for GPS unit. Please attach a copy of these plugging conditions.

The NMOSE Well Plugging Plan of Operations is hereby approved with the aforesaid conditions applied.

Witness my hand and seal this 11th day of June, 2024

Mike A. Hamman, P.E. State Engineer

By: _____

Samantha Davis
Water Resources Professional III

PLUGGING RECORD

NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL / WELL OWNERSHIP:

State Engineer Well Number: C-04846-POD1

Well owner: Devon Energy Corp Phone No.: 405-318-4697

Mailing address: 333 West Sheridan Avenue

City: Oklahoma City State: Oklahoma Zip code: 73102

II. WELL PLUGGING INFORMATION:

1) Name of well drilling company that plugged well: Scarborough

2) New Mexico Well Driller License No.: WD-1188 Expiration Date: 3/21/2026

3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): Scott Scarborough

4) Date well plugging began: 7/24/24 Date well plugging concluded: 7/24/24

5) GPS Well Location: Latitude: 32 deg, 04 min, 38.32 sec
Longitude: -103 deg, 24 min, 39.97 sec, WGS 84

6) Depth of well confirmed at initiation of plugging as: 101 ft below ground level (bgl), by the following manner: Meter tape with water detection sensor

7) Static water level measured at initiation of plugging: N/A ft bgl

8) Date well plugging plan of operations was approved by the State Engineer: 6/11/2024

9) Were all plugging activities consistent with an approved plugging plan? yes If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):

10) Log of Plugging Activities - Label vertical scale with depths, and indicate separate plugging intervals with horizontal lines as necessary to illustrate material or methodology changes. Attach additional pages if necessary.

For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
	Bentonite Chips (0'-101')	103	103	tremie pipe	no casing

MULTIPLY		BY		AND OBTAIN
cubic feet	x	7.4805	=	gallons
cubic yards	x	201.97	=	gallons

III. SIGNATURE:

I, Lane Scarborough, say that I am familiar with the rules of the Office of the State Engineer pertaining to the plugging of wells and that each and all of the statements in this Plugging Record and attachments are true to the best of my knowledge and belief.

Signature of Well Driller

8/9/2024
Date

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NO (WELL NO.)	WELL TAG ID NO	OSE FILE NO(S)
C-4846-POD1		

WELL OWNER NAME(S)	PHONE (OPTIONAL)
Devon Energy Corp	405-318-4697

WELL OWNER MAILING ADDRESS	CITY	STATE	ZIP
333 West Sheridan Avenue	Oklahoma City	OK	73102

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	32	04	38.32	N
	LONGITUDE	-103	24	39.97	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

2. DRILLING & CASING INFORMATION

LICENSE NO	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-1188	John Scarborough	John Scarborough Drilling Inc.

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
7/17/2024	7/17/2024	101	101	0

COMPLETED WELL IS: ☐ ARTESIAN *add Centralizer info below ☑ DRY HOLE ☐ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 0

DATE STATIC MEASURED: 7/22/2024

DRILLING FLUID: ☐ AIR ☑ MUD ✓ ADDITIVES - SPECIFY: AQF-2 XG (Foaming agent)

DRILLING METHOD: ☑ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER - SPECIFY

CHECK HERE IF PITLESS ADAPTER IS INSTALLED ☐

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	101	5	Borehole				

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL *(if using Centralizers for Artesian wells- indicate the spacing below)	AMOUNT (cubic feet)	METHOD OF PLACEMENT
			N/A		

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 09/22/2022)

FILE NO	POD NO	TRN NO	
LOCATION		WELL TAG ID NO	PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	10		Red sand	Y ✓ N	0.00
10	20		Red sand, silty sand	Y ✓ N	0.00
20	30		Tan sand, silty sand w/ <10%gravel	Y ✓ N	0.00
30	40		Brown silty and	Y ✓ N	0.00
40	50		Brown silty sand	Y ✓ N	0.00
50	80		Brown silty sand	Y ✓ N	0.00
80	100		Red silty sand	Y ✓ N	0.00
100	101		Red silty sand	Y ✓ N	0.00
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA:

☐ PUMP ☐ AIR LIFT ☐ BAILER ☑ OTHER – SPECIFY: non-water bearing borehole

TOTAL ESTIMATED WELL YIELD (gpm): 0

5. TEST; RIG SUPERVISION

WELL TEST: TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

Scott Scarborough

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 30 DAYS AFTER COMPLETION OF WELL DRILLING:

Lane Scarborough — 8/9/2024

SIGNATURE OF DRILLER / PRINT SIGNEE NAME — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 09/22/2022)

FILE NO	POD NO	TRN NO	
LOCATION		WELL TAG ID NO	PAGE 2 OF 2

U.S. Fish and Wildlife Service
National Wetlands Inventory

Billiken 6 CTB 1

Nearest Watercourse: Jal Lake Park
Distance: 13 miles/68,569 feet

November 20, 2024

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

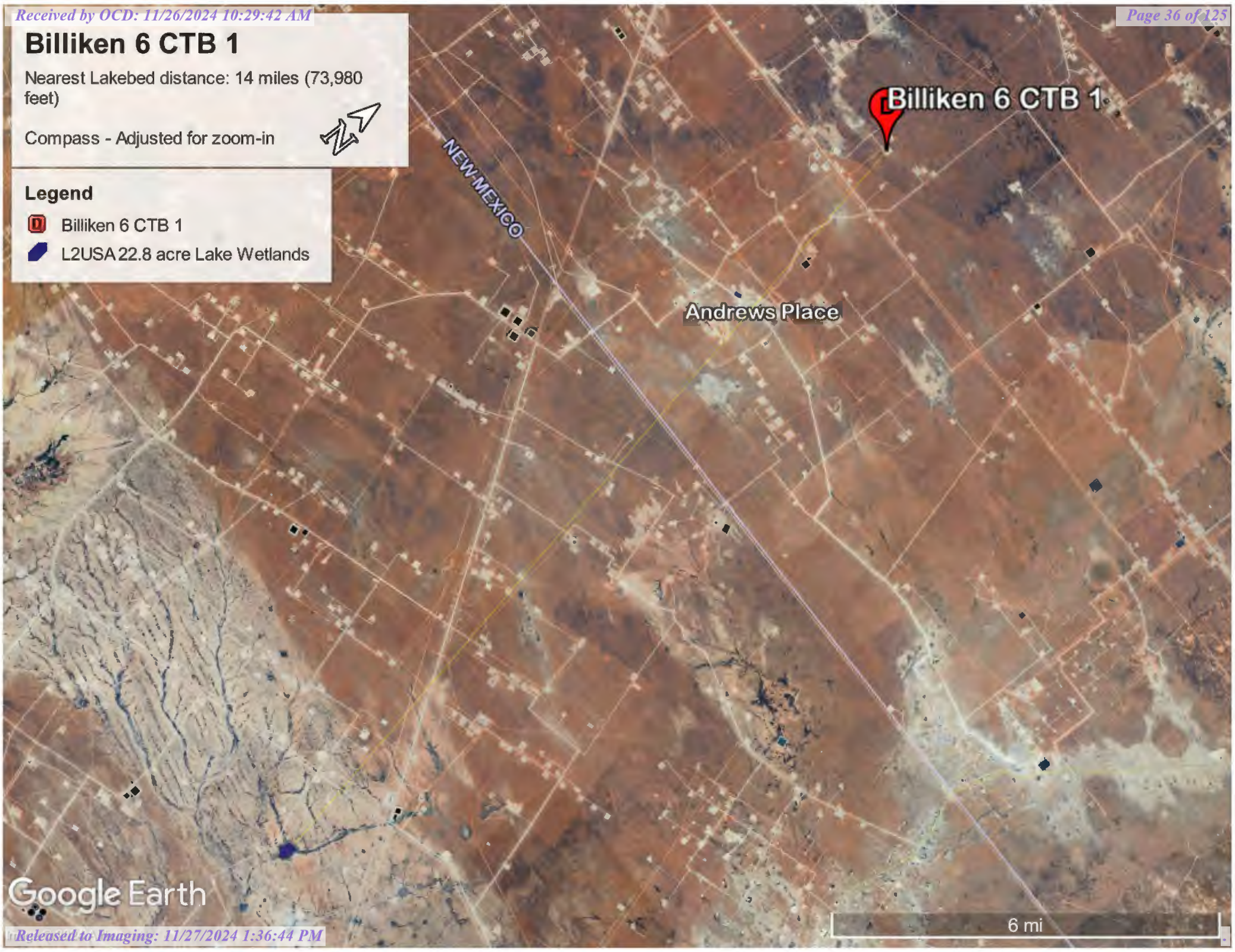
Billiken 6 CTB 1

Nearest Lakebed distance: 14 miles (73,980 feet)

Compass - Adjusted for zoom-in

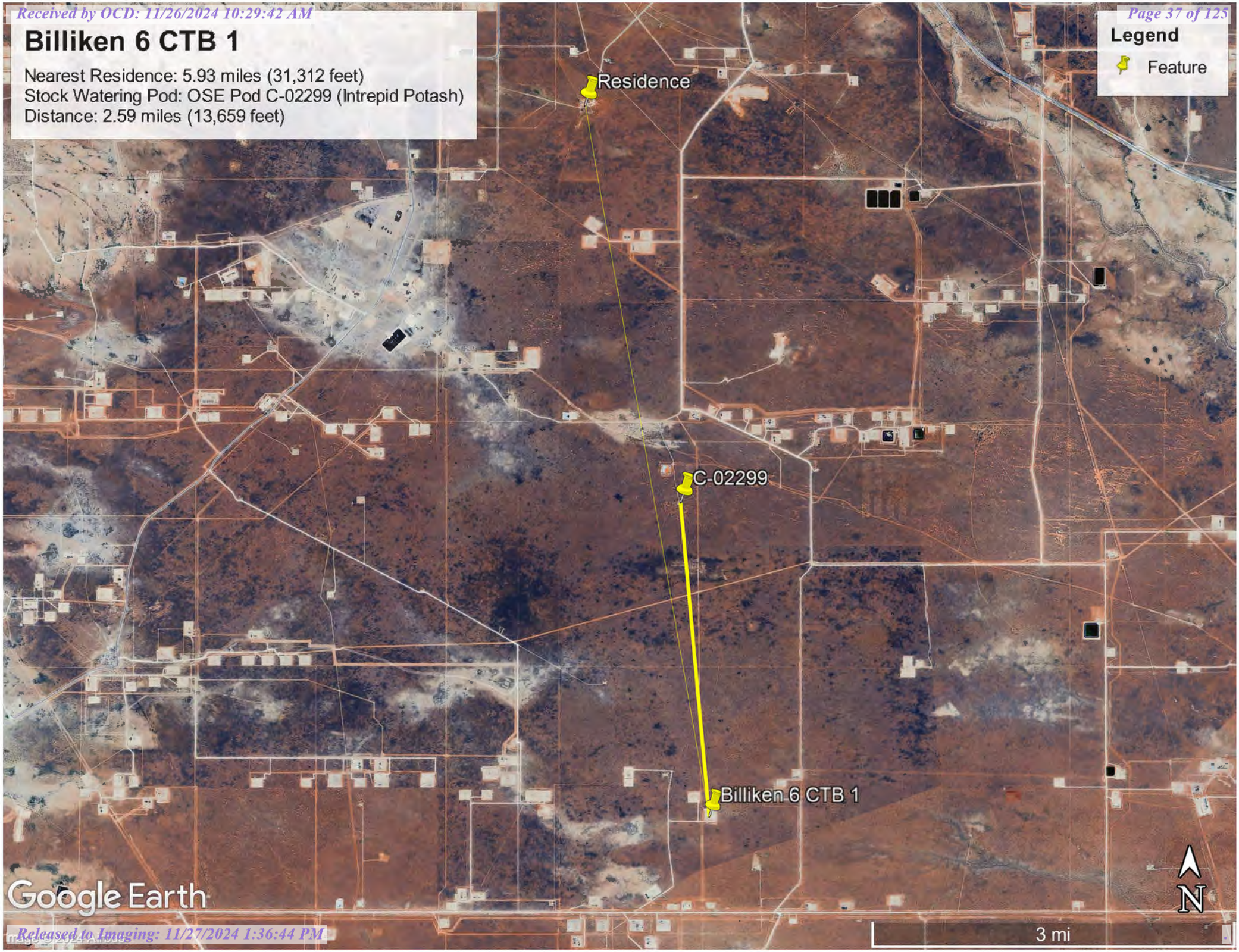
Legend

- Billiken 6 CTB 1
- L2USA 22.8 acre Lake Wetlands



Billiken 6 CTB 1

Nearest Residence: 5.93 miles (31,312 feet)
Stock Watering Pod: OSE Pod C-02299 (Intrepid Potash)
Distance: 2.59 miles (13,659 feet)



File No. C-2299

NEW MEXICO OFFICE OF THE STATE ENGINEER

CHANGE OF OWNERSHIP OF WATER RIGHT (NON-72-12-1) FOR (check one):

Important: Acceptance of the form for filing by the State Engineer does not constitute verification of the right conveyed.

☐ **Individual**	☐ **Corporation**
☐ **Trustee**	☐ **Partnership**
☐ **Estate**	☒ **Limited Liability Co.**

1. OWNER OF RECORD (Seller)

Name: Dinwiddie Cattle Company, LLC		Name:	
Phone: ☐ Home ☐ Cell Phone (Work):		Phone: ☐ Home ☐ Cell Phone (Work):	
a. Owner of Record File No: C-2299	**b.** Sub-file No.:		**c.** Cause No.:

2. NEW OWNER (Buyer) Note: If more owners need to be listed, attach a separate sheet. Attached? ☐ Yes

Name: Intrepid Potash-New Mexico, LLC		Name:	
Contact or Agent: check here if Agent ☐ Katie Keller		Contact or Agent: check here if Agent ☐	
Mailing Address: 1001 17th Street, Suite 1050		Mailing Address:	
City: Denver		City:	
State: Colorado	Zip Code: 80202	State:	Zip Code:
Phone: ☐ Home ☐ Cell Phone (Work): (303) 996-6160		Phone: ☐ Home ☐ Cell Phone (Work):	
E-mail (optional):		E-mail (optional):	

Required: Submit warranty deed(s) or other instrument(s) of conveyance properly recorded with the county clerk's office.

3. PURPOSE OF USE & AMOUNT CONVEYED

Check all that apply: ☐ Domestic ☐ Industrial ☒ Livestock ☐ Commercial ☐ Irrigation ☐ Other Uses (specify): _____ ☐ Municipal	Amount of Water (acre-feet per annum): If more details are needed, type 'See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: 3.0 Consumptive Use: 3.0 Other (include units): _____
Owner of record has conveyed all or part of said right (please check one) ☒ All ☐ Part	

FOR OSE INTERNAL USE — Change of Ownership, Form wr-02, Rev 11/15/17

File No.: C-2299	Trn. No.: 452933	Well Tag ID No. (if applicable): N/A
Trans Desc. (optional): COWF	Sub-Basin: CUB	Receipt No.: 2-40888

4. LIST ALL KNOWN POINT(S) OF DIVERSION (POD) FOR THE WATER RIGHT CONVEYED

OSE POD No.	Well Tag ID No.	Subdivision and/or Lat/Long or Easting/Northing	Section	Township	Range
C. 2299		SE SE NE	24	25S	34E

Check all that apply: ☒ Well ☐ Pump ☐ Ditch Name _____ ☐ River Course _____

5. PLACE(S) OF USE (list each individually)

a. NA Acres of Irrigated Land Described as Follows (applicable to irrigation use only):

b. Legally Described By: ☐ Public Land Survey System (PLSS) ☐ Hydrographic Survey Report or Map ☐ Irrigation or Conservation District Map ☐ Subdivision PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey or District, **and/or** Name and County of Subdivision	c. PLSS Section **and/or** Map No. **and/or** Lot No.	d. PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	e. PLSS Range	f. Acres	g. Priority
					12/31/1949

h. Other description relating place of use to common landmarks, streets, or other:
Well is located on property commonly known as the Dinwiddie Ranch.

I. Place of use is on land owned by:

j. Are there other sources of water for these lands? No ☐ Yes ☐ If yes, describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease

6. ADDITIONAL STATEMENTS OR EXPLANATIONS

Water Rights deed of conveyance is attached.

FOR OSE INTERNAL USE Change of Ownership, Form wr-02, Rev 11/15/17

File No.: C-2299	Trn. No.: 652933	Well Tag ID No. (if applicable): N/A
Trans Desc. (optional): COWNF	Sub-Basin: CUB	Receipt No.: 82-40888

7. CONSENT TO LAWFUL CHANGE IN PLACE AND/OR PURPOSE OF USE

(to be completed only if it is an irrigation water right and has been conveyed separate from the land to which it was appurtenant.)

(I, We) the above owner(s) of record, hereby consent to a lawful change in the place and/or purpose of use of the above-described water right:

Signature Signature

ACKNOWLEDGEMENT FOR INDIVIDUAL

I, We (name of owner(s)), _____
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Signature Signature

State of _____)
ss.
County of _____)

This instrument was acknowledged before me this _____ day of _____ A.D., 20 _____, by (name of owner(s)):

Notary Public:
My commission expires:

ACKNOWLEDGEMENT FOR CORPORATION

I, We (name of owner(s)), Margaret McCandless
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Margaret E. McCandless
Officer Signature Officer Signature

State of Colorado)
ss.
County of Denver)

This instrument was acknowledged before me this 17th day of May A.D., 20 19, by the following on behalf of said corporation.

Name of Officer: Margaret McCandless
Title of Officer: VP & General Counsel and Corporate Secretary
Name of Corporation Acknowledging: Intrepid Potash-New Mexico, LLC
State of Corporation: New Mexico

YOLANDA M BARRIENTOS
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20044032943
MY COMMISSION EXPIRES SEPTEMBER 15, 2020

Notary Public: Yolanda M Barrientos
My commission expires: 9/15/2020

FOR OSE INTERNAL USE Change of Ownership, Form wr-02, Rev 11/15/17

File No.: C-2299	Trn. No.: 652933	Well Tag ID No. (if applicable): N/A
Trans Desc. (optional): COWNF		Sub-Basin: CUB Receipt No.: 8-40883

Page 3 of 3

99

LEA COUNTY, NM
KEITH MANES, COUNTY CLERK
000840958
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BY CRESLEY SPEARS

WARRANTY DEED

DINWIDDIE CATTLE COMPANY, LLC, a New Mexico limited liability company ("***Grantor***"), for consideration paid, grants and assigns, subject to the express reservations and restrictions below, to INTREPID POTASH-NEW MEXICO, LLC, a New Mexico limited liability company, having an address of c/o Intrepid Potash Inc., 1001 17th Street, Suite 1050, Denver, CO 80202 ("***Grantee***"), an undivided one hundred (100%) percent interest, the following:

(a) that certain real property more particularly described on Exhibit A attached hereto and by this reference made a part hereof (the "***Fee Land***"), together with any and all rights of any kind or character appurtenant thereto;

(b) all structures, buildings, and other improvements, and any fixtures and systems, including windmills, tanks, barns, pens, fences, gates, sheds, outbuildings and corrals (collectively, the "***Improvements***"), located on the Fee Land, including those Improvements identified on Schedule 1 to Exhibit A;

(c) the wells, tanks, booster stations, generators and pumping facilities (collectively, the "***Facilities***") located on the Fee Land, including those Facilities identified on Schedule 2 to Exhibit A;

(d) all flow lines, pipelines, gathering systems, meters and appurtenances thereto constituting a part of the Facilities or used or held for use in connection with the operation of the Facilities (collectively, the "***Pipelines***") located on the Fee Land, including those Pipelines identified on Schedule 3 to Exhibit A;

(e) all pits for storage of groundwater ("***Freshwater Storage Pits***") located on the Fee Land, including those identified on Schedule 4 to Exhibit A;

(f) all wells utilized to dispose of produced water recovered as a byproduct of oil and gas exploration and production ("***SWD Wells***") located on the Fee Land, including those identified on Schedule 5 to Exhibit A;

(g) the right to drill disposal wells to any depth beneath the surface, including a permanent easement for use (collectively, the "***Disposal Rights***"), on the Fee Land, for the purpose of injecting produced water from oil and gas wells located either on or off the Fee Land;

(h) all easements, rights-of-way, servitudes, and other rights, privileges, and appurtenances (collectively, the "***Easements***") on or appurtenant to the Fee Land;

(i) all metallic and non-metallic minerals and mineral substances that are commonly mined or quarried by surface mining methods and/or used for industrial, building or construction purposes, including clay, limestone, building stone, all other stone, aggregate, soil, near-surface coal, near surface lignite, sand, gravel, caliche, and near-surface shale, to the extent, and including as, part of the surface estate thereof or as part of the mineral estate thereof, including any severed or unsevered interest of Grantor therein, together with all of Grantor's rights of ingress and egress thereto and therefrom (the "***Asset Minerals***"), in, on or under the Fee Land;

(j) all wind rights and solar rights of any kind or character, including all such rights that are choate, inchoate, vested, unvested, harvested, unharvested, captured, uncaptured, reduced to possession, not reduced to possession, appropriated, unappropriated, used or useful for the generation of electricity or production of heat or not so used or useful, or applied to beneficial use or not so applied (the "***Wind and Solar Rights***"), appurtenant, on or relating to the Fee Land,

BUT SUBJECT TO, all reservations, restrictions, encumbrances and other matters set forth on Exhibit B, **with warranty covenants.**

FOR THE SAME CONSIDERATION, Grantor does hereby assign to Grantee the following (including all after-acquired title of Grantor):

(a) the agricultural leases issued by Commissioner of Public Lands, State of New Mexico described in Exhibit C attached hereto and by this reference made a part hereof (the "***State Leases***"), as well as a leasehold estate in the real property described in Exhibit C, pursuant and subject to the State Leases (the "***State Lease Land***");

(b) all Improvements, Facilities, Pipelines, Water Rights, Freshwater Storage Pits, SWD Wells, Disposal Rights (with respect to produced water from oil and gas wells located either on or off the State Lease Land), Easements, Asset Minerals, and Wind and Solar Rights appurtenant, on or relating to the State Lease Land;

(c) all licenses and permits from governmental authorities, and any amendments thereto, which are directly or indirectly related to or connected with the Fee Land and the State Lease Land (and the Improvements located on such Fee Land and State Lease Land), the Water Rights, the Asset Minerals, and any other assets conveyed herein, or the development or use of any of the foregoing,

with special warranty covenants.

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FOR THE SAME CONSIDERATION, Grantor does hereby assign to Grantee all Grantor's interests (including all after-acquired title of Grantor) in all water rights appurtenant to, associated with, held, used or useful in connection with, or with points of diversion and/or places of use on the Fee Land or the State Lease Land (collectively, the "***Water Rights***").

Grantor is not making any warranties of any kind or character, express or implied, with respect to the Water Rights.

EXCLUDING from said conveyance any and all pipelines, flow lines, gathering systems, meters, and appurtenances owned by third parties;

SAVE AND EXCEPT FROM THIS CONVEYANCE AND RESERVING TO GRANTOR:

1. **Mineral Estate Reservation:** All right, title and interest, in and to the oil, gas and other hydrocarbons, whether in liquid or gaseous form, and other minerals in, on, or under and that may be produced from the Fee Land, and not previously reserved, including any interest therein of any kind or character, and any rights appurtenant thereto of any kind or character, including, but not limited to, all executive and leasing rights therein, EXCEPTING the Asset Minerals and appurtenant rights thereto which are conveyed by this Warranty Deed to Grantee, *provided, that*, Grantor agrees that Grantor's implied easement to explore for and produce the non-hydrocarbon reserved minerals will not be exercised in any manner which interferes in any way with the operations of Grantee; and

2. **SWD Royalty Reservation:**

a. Unless and until Grantee enters into any Adjacent Disposal Venture, as defined below, a 10% royalty, proportionally reduced as to Grantee's interests, on Grantee's undivided interest share of all saltwater disposal revenue received by Grantee from any salt water disposal wells developed from and after the Execution Date on any portion of the Fee Land or the Lease Land, as defined below; and

b. From and after the date that Grantee enters into any Adjacent Disposal Venture, a 10% royalty, proportionally reduced as to Grantee's interests, on Grantee's undivided interest share of all saltwater disposal revenue received by Grantee from any salt water disposal wells developed from and after the Execution Date on any portion of the Fee Land, Lease Lands, Beckham Ranch, described below, and/or McCloy Ranch, described below, (in each case, to the extent covered by the Adjacent Disposal Venture) pursuant to and in accordance with such Adjacent Disposal Venture.

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Whether or not Grantee has entered into any Adjacent Disposal Venture, and notwithstanding anything to the contrary herein, the SWD Royalty shall (A) expire and terminate without any other action by Grantor or Grantee on the date that is 20 years following the Execution Date, and (B) explicitly exclude any and all revenues arising from that certain Saltwater Disposal Lease and Easement Agreement dated February 1, 2014, by and between Grantor and BC&D Operating, Inc., covering a portion of the Land comprising Township 25 South, Range 36 East, Section 17: NE/4 located in Lea County, New Mexico, as amended.

As used in this Reservation, the following terms have the following meanings:

"***Adjacent Disposal Venture***" means any joint venture, joint development arrangement, or other similar contractual relationship between (a) Grantee, its successors and assigns, on the one hand, and (b) the owner(s) of the Beckham Ranch and/or McCloy Ranch, on the other hand, that is entered into in order to exploit, develop and market the Disposal Rights granted to Grantee under this Warranty Deed and any similar rights underlying the Beckham Ranch and/or McCloy Ranch. Notwithstanding anything in the foregoing to the contrary, for purposes of defining the SWD Royalty, the term "Adjacent Disposal Venture" shall only cover the Disposal Rights granted to Grantee under this Warranty Deed and similar rights (and revenues therefrom) with respect to the Fee Land, the Lease Lands, the Beckham Ranch, and/or the McCloy Ranch, as applicable, and not any other assets or rights that may be held by Grantee or such owner(s) of the Beckham Ranch and/or McCloy Ranch.

"***Beckham Ranch***" means the geographic area situated in Lea County, New Mexico generally described and depicted on the map attached as Exhibit D hereto.

"***McCloy Ranch***" means the geographic area situated in Lea County, New Mexico generally described and depicted on the map attached as Exhibit E hereto.

"***Lease Lands***" means the State Lease Land and the leasehold estate in, or other interest in or right to, the real property subject to the Bureau of Land Management grazing allotment permits described on Exhibit F hereto.

To the extent permitted by law, Grantee shall be subrogated to Grantor's rights in and to representations, warranties and covenants given by others with respect to the interests conveyed herein, and Grantor hereby grants and transfers to Grantee, its successors and assigns, in the same undivided percentages referenced above and to the extent so transferable and permitted by law, the benefit of and the right to enforce the covenants, representations and warranties, if any, which Grantor is entitled to enforce with respect to said interests.

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This Warranty Deed is expressly made subject to the terms and conditions of that certain Purchase and Sale Agreement, dated February 5, 2019, by and among Grantor, Sherbrooke Partners LLC ("***Sherborroke***") and Grantee (as such may be amended and/or modified from time to time, the "***Purchase and Sale Agreement***") (which terms and conditions shall control in the event of a conflict with the terms and conditions of this Warranty Deed). Prior to the Execution Date hereof, Sherbrooke has assigned all of its rights in and to the Purchase and Sale Agreement to Grantee. The Purchase and Sale Agreement contains certain representations, warranties, covenants, indemnities and agreements between the parties, some of which may survive the delivery of this Warranty Deed, as more particularly provided for therein, but third parties may conclusively rely on this Warranty Deed to vest title to the Real Property in Grantee as described herein.

[Signature and Acknowledgement Page Follows]

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IN WITNESS WHEREOF, Grantor and Grantee have caused these presents to be executed as of this 1st day of May, 2019 (the "*Execution Date*"), by its duly authorized agent, but effective for all purposes as of 12:00 A.M., Mountain Standard Time, on March 1, 2019.

GRANTOR:

DINWIDDIE CATTLE COMPANY, LLC,
a New Mexico limited liability company

By: _____
John Thomas (Tommy) Dinwiddie
Managing Member

STATE OF NEW MEXICO)
)
COUNTY OF LEA)

This instrument was acknowledged before me on May 1, 2019, by John Thomas (Tommy) Dinwiddie, as Managing Member of Dinwiddie Cattle Company, LLC, a New Mexico limited liability company.

(Seal, if any)

Notary Public

My Commission Expires:

OFFICIAL SEAL
Amanda Baker
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 10-9-21

[Signature and Acknowledgment Page to Warranty Deed]

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GRANTEE:

INTREPID POTASH – NEW MEXICO, LLC,
a New Mexico limited liability company

By: _____
Robert P. Jornayvaz III
President and Chief Executive Officer

STATE OF NEW MEXICO)
) ss.
COUNTY OF LEA)

This instrument was acknowledged before me on May 1, 2019, by Robert P. Jornayvaz III, as President and Chief Executive Officer of Intrepid Potash – New Mexico, LLC, a New Mexico limited liability company.

_____
Notary Public

(Seal, if any)

My Commission Expires:

OFFICIAL SEAL
Amanda Baker
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 6-7-21

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[Signature and Acknowledgment Page to Warranty Deed]

EXHIBIT A

ATTACHED TO AND MADE A PART OF THAT CERTAIN WARRANTY DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

FEE LAND

TOWNSHIP 25 SOUTH, RANGE 33 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 33: SW¼, W½E½
Section 34: E½SE¼
Section 35: S½NW¼, SW¼, W½SE¼

TOWNSHIP 26 SOUTH, RANGE 33 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 3: E½NE¼, SE¼, NW¼, E½SW¼, W½SW¼
Section 4: N½, N½S½, S½S½
Section 10: NW¼, NE¼, E½SW¼, W½SE¼
Section 11: W½
Section 12: S½NE¼, SE¼
Section 14: W½

TOWNSHIP 25 SOUTH, RANGE 34 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 13: NE¼, W½NW¼, NE¼NW¼
Section 24: S½NE¼, SE¼

TOWNSHIP 26 SOUTH, RANGE 34 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 5: W½SW¼, N½N½, S½NW¼
Section 6: E½

TOWNSHIP 25 SOUTH, RANGE 35 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 1: All
Section 12: NW¼NE¼, S½NE¼, NE¼SW¼, E½NW¼, N½SE¼, LESS AND EXCEPT A Parcel of land situated in Section 12, Township 25 South, Range 35 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the Northeast corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 1877+60.31 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Section 12, T25S, R35E, and Section 7, T25S, R36E, NMPM, whence the Quarter Section Corner common to Section 12, T25S, R35E, and Section 7, T25S, R36E bears N00°29'00"W, 197.73 feet distance; thence, S00°29'00"E, 79.00 feet distance to a point on the Centerline Station 1877+85.12 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°29'00"E, 26.15 feet distance to the southeast corner of the parcel of land herein described being a point on the existing northerly right-of-way line of N.M. Project S-1271(1); thence, N 72°10'57"W, 4,167.36 feet distance to the southwest corner of the parcel of land herein described; thence N00°29'57"W, 26.27 feet distance to a point on the Centerline Station 1836+17.71 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, N00°29' 57"W, 79.00 feet distance to the northwest corner of the parcel of land

EXHIBIT A

ATTACHED TO AND MADE A PART OF THAT CERTAIN WARRANTY DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

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herein described; thence, S72°10'51"E, 4,167.43 feet distance to the Point of Beginning of the parcel of land herein described, said tract referenced in Warranty Deed filed October 14, 2008, in Book 1604, Page 922, Lea County Records, Lea County, New Mexico.

Section 13: S½
Section 14: S½SE¼, NE¼SE¼
Section 17: N½, N½SW¼, SE¼
Section 18: S½NE¼
Section 20: N½NE¼
Section 21: NW¼
Section 23: E½
Section 24: W½, NE¼, N½SE¼
Section 27: SW¼
Section 28: SE¼
Section 33: NE¼
Section 34: NW¼

TOWNSHIP 24 SOUTH, RANGE 36 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 31: N½, W½SW¼

TOWNSHIP 25 SOUTH, RANGE 36 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 4: All
Section 5: All
Section 6: All
Section 7: W½NE¼, SE¼, NW¼, LESS AND EXCEPT A Parcel of land situated in the SE¼ of Section 7, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the northeast corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 1933+20.00 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 7 and 8, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 7 and 8, T25S, R36E bears N00°28'22"W, 1,924.28 feet distance; thence, S00°28'22"E, 78.99 feet distance to a point on the Centerline Station 1933+44.80 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°28'22"E, 25.98 feet distance to the southeast corner of the parcel of land herein described being a point on the existing northerly right-of-way line of N.M. Project S-1271 (I); thence, N 72°10'57"W, 2,782.07 feet distance to the southwest corner of the parcel of land herein described; thence, N00°22'04"W, 26.05 feet distance to a point on the Centerline Station 1905+62.75 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, N00°22'04"W, 78.94 feet distance to the northwest

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corner of the parcel of land herein described; thence, S72°10'51"E, 2,781.90 feet distance to the Point of Beginning of the parcel of land herein described, said tract being referenced on that certain Warranty Deed filed in Book 1604, Page 925, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 8: All, LESS AND EXCEPT A Parcel of land situated in Section 8, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the northwest corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 1933+20.00 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 7 and 8, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 7 and 8, T25S, R36E bears N00°28'22"W, 1,924.28 feet distance; thence, S72°10'51"E, 125.70 feet distance to the point of curvature; thence, Southeasterly, 3,601.12 feet distance along the arc of a 00°30'27" degree curve bearing to the left (said arc having a radius of 11,290.00 feet, a central angle of 18°16'31" and a chord which bears S81°19'07"E, 3,585.87 feet distance) to the point of tangency; thence, N89°32'38"E, 1,628.77 feet distance to the northeast corner of the parcel of land herein described being a point on the line common to Sections 8 and 9, T25S, R36E, NMPM ; thence, S00°29'31"E, 75.00 feet distance to a point on the Centerline Station 1986+99.56 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°29'31"E, 23.15 feet distance to the southeast corner of the parcel of land herein described being the Section Corner common to Sections 8, 9, 16 and 17, T25S, R36E; thence, S89°28'12"W, 1,271.62 feet distance to a point on the existing northerly right-of-way line of N.M. project S-1271(1); thence, S89°32'36"W, 355.84 feet distance to the point of curvature; thence, Northwesterly 3634.43 feet distance along the arc of a 00°30'10" degree curve bearing to the right (said arc having a radius of 11,395.10 feet, a central angle of 18°16'28" and a chord which bears N81°19'11"W, 3619.05 feet distance) to the point of tangency; thence N72°10'57"W, 92.60 feet distance to the Southwest corner of the parcel of land herein described being a point on the line common to Sections 7 and 8, T25S, R36E; thence N00°28'22"W, 25.98 feet distance to a point on the Centerline Station 1933+44.80 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence N00°28'22"W, 78.99 feet distance to the point of beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 928, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

EXHIBIT A

ATTACHED TO AND MADE A PART OF THAT CERTAIN WARRANTY DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

FEE LAND

Section 9: All, LESS AND EXCEPT a Parcel of land situated in Section 9, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the northwest corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 1986+99.51 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 8 and 9, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 8 and 9, T25S, R36E bears N00°29'31"W, 2540.67 feet distance; thence N89°32'38"E, 5279.26 feet distance to the Northeast corner of the parcel of land herein described being a point on the line common to Sections 9 and 10, T25S, R36E, NMPM; thence S00°31'36"E, 75.00 feet distance to a point on the Centerline Station 2039+78.87 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence S00°31'36"E, 12.92 feet distance to the Southeast corner of the parcel of land herein described as being the Section corner common to Sections 9, 10, 15 and 16, T25S, R36E; thence S89°25'58"W, 2639.66 feet distance to the Quarter Section corner common to Sections 9 and 16, T25S, R36E; thence S89°25'58"W, 2,639.66 feet distance to the Southwest corner of the parcel of land herein described being the Section corner common to Sections 8, 9, 16 and 17, T25S, R36E; thence N00°29'31"W, 23.15 feet distance to a point on the Centerline Station 1986+99.56 of N.M. Project No. AC-GRIP-(TPM)-127(23)38; thence N00°29'31"W, 75.00 feet distance to the point of beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 934, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 10: W½, LESS AND EXCEPT a Parcel of land situated in the SW1/4 of Section 10, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the northwest corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 2039+78.78 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 9 and 10, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 9 and 10, T25S, R36E bears N00°31'36"W, 2,551. 77 feet distance; thence, N89°32'38"E, 2,642.51 feet distance to the northeast corner of the parcel of land herein described being a point on the north-south center line of Section 10, T25S, R36E; thence, S00°23'06"E, 75.00 feet distance to a point on the Centerline Station 2066+21.19 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°23'06"E, 7.76 feet distance to the Southeast corner of the parcel of land herein described being the Quarter Section Corner common to Sections 10 and 15, T25S, R36E; thence,

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FEE LAND

S89°25'55"W, 2,642.30 feet distance to the southwest corner of the parcel of land herein described being the Section Corner common to Sections 9, 10, 15 and 16, T25S, R36E; thence, N00°31'36"W, 12.92 feet distance to a point on the Centerline Station 2039+78.87 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, N00°31' 36"W, 75.00 feet distance to the Point of Beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 940, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 14: N½, LESS AND EXCEPT a Parcel of land situated in Section 14, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the northwest corner of the parcel of land herein described being a point on the line common to Sections 14 and 15, T25S, R36E, NMPM, a point 73.38 feet to the left of, northeasterly and opposite Construction Centerline Station 2093+28.20 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, whence the Quarter Section Corner common to Sections 10 and 11, T25S, R36E bears N00°31'31"W, 3,068.49 feet distance; thence, S55°16'31"E, 206.82 feet distance to the most easterly corner of the parcel of land herein described being a point on the existing northerly right-of-way line of N.M. Project S-1271(1); thence, N56°10'38"W, 204.57 feet distance to the southwest corner of the parcel of land herein described being a point on the line common to Sections 14 and 15, T25S, R36E N00°31'31"W, 3.94 feet distance to the northwest corner and Point of Beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 949, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation. AND FURTHER LESS AND EXCEPT a Parcel of land situated in Section 14, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows. Beginning at the southwest corner of the parcel of land herein described being a point on the line common to Sections 14 and 15, T25S, R36E, NMPM, a point 57.47 feet to the right of, southwesterly and opposite Construction Centerline Station 2094+17.64 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, whence the Quarter Section Corner common to Sections 14 and 15, T25S, R36E bears S00°31'31"E, 2,051.91 feet distance; thence, N00°31'31"W, 9.21 feet distance to the northwest corner of the parcel of land herein described being a point on the existing southerly right-of-way line of N.M. Project S-1271(1); thence, S56°10'38"E, 122.56 feet distance to the most easterly corner of the parcel of land herein described; thence, N59° 53'03"W,

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FEE LAND

117.61 feet distance to the southwest corner and Point of Beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 952, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 15: S½, and being Tract Two as referenced on that certain Claim of Exemption Plat filed March 22, 2019, in Book 2, Page 558, Survey Records, Lea County, New Mexico.

Section 16: All, LESS AND EXCEPT a Parcel of land situated in Section 16, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the southwest corner of the parcel of land herein described being a point on the line common to Sections 16 and 17, T25S, R36E, NMPM, a point 24.78 feet to the right of, southerly and opposite Construction Centerline Station 1986+99.58 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38 and a point on the existing northerly right-of-way line of N.M. Project S-1271(1); thence, N00°29'31"W, 1.62 feet distance to the northwest corner of the parcel of land herein described being the Section Corner common to Sections 8, 9, 16 and 17, T25S, R36E; thence N89°25'58"E, 2639.66 feet distance to the Quarter Section corner common to Sections 9 and 16, T25S, R36E; thence N89°25'58"E, 2639.66 feet distance to the northeast corner of the parcel of land herein described being the Section Corner common to Sections 9, 10, 15 and 16, T25S, R36E; thence S00°29'56"E, 11.81 feet distance to the Southeast corner of the parcel of land herein described; thence S89°32'36"W, 5279.32 feet distance to the Southwest corner and point of beginning of the parcel of land herein described, said tract of land referenced in that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 937, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 17: All, LESS AND EXCEPT a Parcel of land situated in Section 17, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the northeast corner of the parcel of land herein described being the Section Corner common to Sections 8, 9, 16 and 17, T25S, R36E, a point 23.15 feet to the right of, southerly and opposite Construction Centerline Station 1986+99.58 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°29'31"E, 1.62 feet distance to the Southeast corner of the parcel of land herein described being a point on the existing Northerly right of way line of N.M. Project S-1271(1); thence S89°32'36"W, 1271.62 feet distance to the most westerly corner of the parcel of land herein described; thence N89°28'12"E,

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BY CRESLEY SPEARS

EXHIBIT A

ATTACHED TO AND MADE A PART OF THAT CERTAIN WARRANTY DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

FEE LAND

1271.62 feet distance to the point of beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 931, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC a New Mexico limited liability company to New Mexico Department of Transportation.

Section 18: Lots 3, 4, E½SW¼, NE¼, E½SE¼, W½SE¼
Section 19: NW¼
Section 20: All
Section 21: All
Section 22: All
Section 23: W½, W½E½
Section 25: A tract of land beginning at the Southwest corner of Section 25; thence North 363 feet; thence East 363 feet; thence South 363 feet and thence West 363 feet to the point of beginning.
Section 26: W½, W½NE¼, W½SE¼, W½E½SE¼
Section 35: All
Section 36: All

TOWNSHIP 26 SOUTH, RANGE 36 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 1: N½, SW¼, NW¼SE¼
Section 9: All – Less and Except that portion of said Section 9 described in that certain Warranty Deed filed June 6, 2016, in Book 2031, Page 11, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC to EOG Resources, Inc.
Section 10: All – Less and Except that portion of said Section 10 described in that certain Warranty Deed filed June 6, 2016, in Book 2031, Page 11, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC to EOG Resources, Inc.
Section 13: All
Section 24: All
Section 25: All
Section 36: All

TOWNSHIP 26 SOUTH, RANGE 37 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 6: S½ Lot 2 and All of Lot 3

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BY CRESLEY SPEARS

WATER RIGHTS AND PERMITS DEED

DINWIDDIE CATTLE COMPANY, LLC, a New Mexico limited liability company ("**Grantor**"), for consideration paid, grants to **INTREPID POTASH - NEW MEXICO, LLC**, a New Mexico limited liability company, having an address of c/o Intrepid Potash Inc., 1001 17th Street, Suite 1050, Denver, CO 80202 ("**Grantee**"), an undivided 100% interest, in the following described property associated with real property in Lea County, New Mexico (including all after-acquired title of Grantor in and to any of the following):

All wells, water, water rights, rights to appropriate, use and or sell water, and other rights, under the New Mexico State Engineer ("**State Engineer**") file and permit numbers set forth on **Exhibit A** attached hereto and by this reference made a part hereof; water rights, rights to appropriate, use and/or sell water, flood rights, and other rights relating to water, whether perfected or unperfected, decreed or undecreed, adjudicated or unadjudicated, licensed or unlicensed, permitted or unpermitted, declared or undeclared, Mendenhall, surface or underground, appropriated or unappropriated, appropriative or non-appropriative, or other, appurtenant to, associated with, held, used or useful in connection with, or with points of diversion and/or places of use on, that certain real property more particularly described on **Exhibit B** attached hereto and by this reference made a part hereof (the "**Land**"); (iii) water storage rights, water sales and water supply contracts, water taps, water withdrawal rights, water diversion rights and other rights in and to, or relating to, the use or sale of water produced on or from the Land; (iv) rights, claims and entitlements associated with the historical beneficial use of water on or produced from the Land; (v) pending and approved applications to the State Engineer for permits, including but not limited to Grantor's 10/23rd interest in application CP-1687, and permits issued by the State Engineer, for any purpose, including the appropriation of water from points of diversion on the Land or the use of water on the Land, to drill wells on the Land for any purpose, including exploration for water and monitoring water levels and/or water quality, (vi) canals and canal rights, ditches and ditch rights, springs and spring rights, and reservoirs and reservoir rights, located or having a place of use on, relating to water or water rights associated with, or with points of diversion and/or places of use on, the Land; (vii) shares of stock and other interests in any irrigation, ditch or reservoir company that delivers, has delivered or may in the future deliver, water to the Land; (viii) rights, titles and interests in, to and under water wells (including wells to produce water for domestic, livestock, commercial, industrial, exploration, monitoring and/or irrigation purposes) located on or associated with water or water rights held, used or useful in connection with or with places of use on, the Land; (ix) points of diversion, water well bores, water exploration drill holes, pumps, pumping stations, motors, casing, tubing, pipes, pipelines, irrigation equipment and facilities, livestock, game and other animal watering equipment and facilities, electric generation and transmission equipment and facilities, tanks, dams, weirs, other diversion works, ditches, gates, chutes, turnouts, and other equipment, facilities and property, utilities, and structures and devices associated with or used or useful in connection with the exploration for or the production, conveyance, measurement, storage or use of water; (x) easements, rights-of-way, licenses, permits, servitudes, agreements, covenants, leases, and contract rights used or held in connection with the ownership or operation of the foregoing; and (xi) rents, income, profits, proceeds and

products of and from any of the foregoing (the property described above is herein collectively called the "**Water Rights**").

Grantor is not making any warranties of any kind or character, express or implied, with respect to the Water Rights.

To the extent permitted by law, Grantee shall be subrogated to Grantor's rights in and to representations, warranties and covenants given by others with respect to the Land and/or the Water Rights, and Grantor hereby grants and transfers to Grantee, its successors and assigns, to the extent so transferable and permitted by law, the benefit of and the right to enforce the covenants, representations and warranties, if any, which Grantor is entitled to enforce with respect to the Land and/or the Water Rights.

This Water Rights and Permits Deed is expressly made subject to the terms and conditions of that certain Purchase and Sale Agreement, dated February 5, 2019, by and among Grantor, Sherbrooke Partners LLC ("**Sherbrooke**") and Grantee (as such may be amended and/or modified from time to time, the "**Purchase and Sale Agreement**") (which terms and conditions shall control in the event of a conflict with the terms and conditions of this Water Rights and Permits Deed). Prior to the execution of this Water Rights and Permits Deed, Sherbrooke has assigned all of its rights in and to the Purchase and Sale Agreement to Grantee. The Purchase and Sale Agreement contains certain representations, warranties, covenants, indemnities and agreements between the parties, some of which may survive the delivery of this Water Rights and Permits Deed, as more particularly provided for therein, but third parties may conclusively rely on this Water Rights and Permits Deed to vest title to the Land and Water Rights in Grantee as described herein.

[SIGNATURE AND ACKNOWLEDGMENT PAGE FOLLOWS]

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BY CRESLEY SPEARS

IN WITNESS WHEREOF, Grantor and Grantee have caused these presents to be executed as of this 1st day of May, 2019, but effective for all purposes as of 12:00 A.M., Mountain Standard Time, on March 1, 2019.

GRANTOR:

DINWIDDIE CATTLE COMPANY, LLC, a New Mexico limited liability company

By: _____
John Thomas (Tommy) Dinwiddie
Managing Member

State of New Mexico)
) ss.
County of Lea)

This instrument was acknowledged before me on May 1, 2019, by John Thomas (Tommy) Dinwiddie, as Managing Member of Dinwiddie Cattle Company, LLC, a New Mexico limited liability company.

_____
Notary Public

(Seal, if any)

My Commission Expires:

OFFICIAL SEAL
Amanda Baker
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 10-9-21

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[Signature and Acknowledgment Page to Water Rights and Permits Deed]

GRANTEE:

INTREPID POTASH – NEW MEXICO, LLC,
a New Mexico limited liability company

By: _____
Robert P. Jornayvaz III
President and Chief Executive Officer

State of New Mexico)
) ss.
County of Lea)

This instrument was acknowledged before me on May 1, 2019, by Robert P. Jornayvaz III, as President and Chief Executive Officer of Intrepid Potash – New Mexico, LLC, a New Mexico limited liability company.

_____
Notary Public

(Seal, if any)

My Commission Expires: _____

OFFICIAL SEAL
Amanda Baker
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 1-29-21

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BY CRESLEY SPEARS

[Signature and Acknowledgment Page to Water Rights and Permits Deed]

EXHIBIT A

ATTACHED TO AND)E A PART OF THAT CERTAIN WATER RIGHTS AND IITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

WATER RIGHTS

Basin	OSE Permit
JAL (Decl)	J-8
	J-9
	J-10
Jal (Permit))	J-11
Capitan (permit)	CP-1285
	CP-858
	CP-857
	CP-938
	CP-1380
	CP-1647
	CP-1049
	CP-1379
	CP-1378
Capitan (Decl)	CP-174
	CP-175
	CP-176
	CP-177
	CP-178
	CP-179
	CP-180
	CP-181
	CP-182
	CP-183
	CP-859
	CP-860
	CP-1658
Carlsbad	C-2285

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BY CRESLEY SPEARS

EXHIBIT A

ATTACHED TO AN DE A PART OF THAT CERTAIN WATER RIGHTS AN MITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

WATER RIGHTS

(decl)	C-2286
	C-2287
	C-2288
	C-2289
	C-2290
	C-2291
	C-2292
	C-2293
	C-2294
	C-2295
	C-2296
	C-2297
	C-2298
	C-2299
Carlsbad (permit)	C-3441
	C-3442

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EXHIBIT B

ATTACHED TO AN ...E A PART OF THAT CERTAIN WATER RIGHTS AN... ...ITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

FEE LAND

TOWNSHIP 25 SOUTH, RANGE 33 East, N.M.P.M., LEA COUNTY, NEW MEXICO:
Section 33: SW¼, W½E½
Section 34: E½SE¼
Section 35: S½NW¼, SW¼, W½SE¼

TOWNSHIP 26 SOUTH, RANGE 33 East, N.M.P.M., LEA COUNTY, NEW MEXICO:
Section 3: E½NE¼, SE¼, NW¼, E½SW¼, W½SW¼
Section 4: N½, N½S½, S½S½
Section 10: NW¼, NE¼, E½SW¼, W½SE¼
Section 11: W½
Section 12: S½NE¼, SE¼
Section 14: W½

TOWNSHIP 25 SOUTH, RANGE 34 East, N.M.P.M., LEA COUNTY, NEW MEXICO:
Section 13: NE¼, W½NW¼, NE¼NW¼
Section 24: S½NE¼, SE¼

TOWNSHIP 26 SOUTH, RANGE 34 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO:
Section 5: W½SW¼, N½N½, S½NW¼
Section 6: E½

TOWNSHIP 25 SOUTH, RANGE 35 East, N.M.P.M., LEA COUNTY, NEW MEXICO:
Section 1: All
Section 12: NW¼NE¼, S½NE¼, NE¼SW¼, E½NW¼, N½SE¼, LESS AND EXCEPT A Parcel of land situated in Section 12, Township 25 South, Range 35 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the Northeast corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 1877+60.31 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Section 12, T25S, R35E, and Section 7, T25S, R36E, NMPM, whence the Quarter Section Corner common to Section 12, T25S, R35E, and Section 7, T25S, R36E bears N00°29'00"W, 197.73 feet distance; thence, S00°29'00"E, 79.00 feet distance to a point on the Centerline Station 1877+85.12 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°29'00"E, 26.15 feet distance to the southeast corner of the parcel of land herein described being a point on the existing northerly right-of-way line of N.M. Project S-1271(1); thence, N 72°10'57"W, 4,167.36 feet distance to the southwest corner of the parcel of land herein described; thence N00°29'57"W, 26.27 feet distance to a point on the Centerline Station 1836+17.71 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, N00°29' 57"W, 79.00 feet distance to the northwest corner of the parcel of land

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EXHIBIT B

ATTACHED TO AN DE A PART OF THAT CERTAIN WATER RIGHTS ANI MITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

herein described; thence, S72°10'51"E, 4,167.43 feet distance to the Point of Beginning of the parcel of land herein described, said tract referenced in Warranty Deed filed October 14, 2008, in Book 1604, Page 922, Lea County Records, Lea County, New Mexico.

Section 13: S½
Section 14: S½SE¼, NE¼SE¼
Section 17: N½, N½SW¼, SE¼
Section 18: S½NE¼
Section 20: N½NE¼
Section 21: NW¼
Section 23: E½
Section 24: W½, NE¼, N½SE¼
Section 27: SW¼
Section 28: SE¼
Section 33: NE¼
Section 34: NW¼

TOWNSHIP 24 SOUTH, RANGE 36 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 31: N½, W½SW¼

TOWNSHIP 25 SOUTH, RANGE 36 East, N.M.P.M., LEA COUNTY, NEW MEXICO:

Section 4: All
Section 5: All
Section 6: All
Section 7: W½NE¼, SE¼, NW¼, LESS AND EXCEPT A Parcel of land situated in the SE¼ of Section 7, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the northeast corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 1933+20.00 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 7 and 8, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 7 and 8, T25S, R36E bears N00°28'22"W, 1,924.28 feet distance; thence, S00°28'22"E, 78.99 feet distance to a point on the Centerline Station 1933+44.80 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°28'22"E, 25.98 feet distance to the southeast corner of the parcel of land herein described being a point on the existing northerly right-of-way line of N.M. Project S-1271 (I); thence, N 72°10'57"W, 2,782.07 feet distance to the southwest corner of the parcel of land herein described; thence, N00°22'04"W, 26.05 feet distance to a point on the Centerline Station 1905+62.75 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, N00°22'04"W, 78.94 feet distance to the northwest corner of the parcel of land herein described; thence, S72°10'51"E, 2,781.90 feet distance to the Point of Beginning of the parcel of land herein described, said tract

EXHIBIT B

ATTACHED TO AND ...E A PART OF THAT CERTAIN WATER RIGHTS AND ...ITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

being referenced on that certain Warranty Deed filed in Book 1604, Page 925, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 8: All, LESS AND EXCEPT A Parcel of land situated in Section 8, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the northwest corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 1933+20.00 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 7 and 8, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 7 and 8, T25S, R36E bears N00°28'22"W, 1,924.28 feet distance; thence, S72°10'51"E, 125.70 feet distance to the point of curvature; thence, Southeasterly, 3,601.12 feet distance along the arc of a 00°30'27" degree curve bearing to the left (said arc having a radius of 11,290.00 feet, a central angle of 18°16'31" and a chord which bears S81°19'07"E, 3,585.87 feet distance) to the point of tangency; thence, N89°32'38"E, 1,628.77 feet distance to the northeast corner of the parcel of land herein described being a point on the line common to Sections 8 and 9, T25S, R36E, NMPM ; thence, S00°29'31"E, 75.00 feet distance to a point on the Centerline Station 1986+99.56 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°29'31"E, 23.15 feet distance to the southeast corner of the parcel of land herein described being the Section Corner common to Sections 8, 9, 16 and 17, T25S, R36E; thence, S89°28'12"W, 1,271.62 feet distance to a point on the existing northerly right-of-way line of N.M. project S-1271(1); thence, S89°32'36"W, 355.84 feet distance to the point of curvature; thence, Northwesterly 3634.43 feet distance along the arc of a 00°30'10" degree curve bearing to the right (said arc having a radius of 11,395.10 feet, a central angle of 18°16'28" and a chord which bears N81°19'11"W, 3619.05 feet distance) to the point of tangency; thence N72°10'57"W, 92.60 feet distance to the Southwest corner of the parcel of land herein described being a point on the line common to Sections 7 and 8, T25S, R36E; thence N00°28'22"W, 25.98 feet distance to a point on the Centerline Station 1933+44.80 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence N00°28'22"W, 78.99 feet distance to the point of beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 928, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

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Section 9: All, LESS AND EXCEPT a Parcel of land situated in Section 9, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the northwest corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline

EXHIBIT B

ATTACHED TO AN DE A PART OF THAT CERTAIN WATER RIGHTS ANI MITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

Station 1986+99.51 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 8 and 9, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 8 and 9, T25S, R36E bears N00°29'31"W, 2540.67 feet distance; thence N89°32'38"E, 5279.26 feet distance to the Northeast corner of the parcel of land herein described being a point on the line common to Sections 9 and 10, T25S, R36E, NMPM; thence S00°31'36"E, 75.00 feet distance to a point on the Centerline Station 2039+78.87 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence S00°31'36"E, 12.92 feet distance to the Southeast corner of the parcel of land herein described as being the Section corner common to Sections 9, 10, 15 and 16, T25S, R36E; thence S89°25'58"W, 2639.66 feet distance to the Quarter Section corner common to Sections 9 and 16, T25S, R36E; thence S89°25'58"W, 2,639.66 feet distance to the Southwest corner of the parcel of land herein described being the Section corner common to Sections 8, 9, 16 and 17, T25S, R36E; thence N00°29'31"W, 23.15 feet distance to a point on the Centerline Station 1986+99.56 of N.M. Project No. AC-GRIP-(TPM)-127(23)38; thence N00°29'31"W, 75.00 feet distance to the point of beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 934, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 10: W½, LESS AND EXCEPT a Parcel of land situated in the SW1/4 of Section 10, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows: Beginning at the northwest corner of the parcel of land herein described being a point 75.00 feet to the left of, northerly and opposite Construction Centerline Station 2039+78.78 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, said point being on the line common to Sections 9 and 10, T25S, R36E, NMPM, whence the Quarter Section Corner common to Sections 9 and 10, T25S, R36E bears N00°31'36"W, 2,551. 77 feet distance; thence, N89°32'38"E, 2,642.51 feet distance to the northeast corner of the parcel of land herein described being a point on the north-south center line of Section 10, T25S, R36E; thence, S00°23'06"E, 75.00 feet distance to a point on the Centerline Station 2066+21.19 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°23'06"E, 7.76 feet distance to the Southeast corner of the parcel of land herein described being the Quarter Section Corner common to Sections 10 and 15, T25S, R36E; thence, S89°25'55"W, 2,642.30 feet distance to the southwest corner of the parcel of land herein described being the Section Corner common to Sections 9, 10, 15 and 16, T25S, R36E; thence, N00°31'36"W, 12.92 feet distance to a point on the Centerline Station 2039+78.87 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, N00°31' 36"W, 75.00 feet distance to the Point of Beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 940, Lea

EXHIBIT B

ATTACHED TO AND MADE A PART OF THAT CERTAIN WATER RIGHTS AND [illegible] DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 14: N½, LESS AND EXCEPT a Parcel of land situated in Section 14, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the northwest corner of the parcel of land herein described being a point on the line common to Sections 14 and 15, T25S, R36E, NMPM, a point 73.38 feet to the left of, northeasterly and opposite Construction Centerline Station 2093+28.20 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, whence the Quarter Section Corner common to Sections 10 and 11, T25S, R36E bears N00°31'31"W, 3,068.49 feet distance; thence, S55°16'31"E, 206.82 feet distance to the most easterly corner of the parcel of land herein described being a point on the existing northerly right-of-way line of N.M. Project S-1271(1); thence, N56°10'38"W, 204.57 feet distance to the southwest corner of the parcel of land herein described being a point on the line common to Sections 14 and 15, T25S, R36E N00°31'31"W, 3.94 feet distance to the northwest corner and Point of Beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 949, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation. AND FURTHER LESS AND EXCEPT a Parcel of land situated in Section 14, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows. Beginning at the southwest corner of the parcel of land herein described being a point on the line common to Sections 14 and 15, T25S, R36E, NMPM, a point 57.47 feet to the right of, southwesterly and opposite Construction Centerline Station 2094+17.64 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38, whence the Quarter Section Corner common to Sections 14 and 15, T25S, R36E bears S00°31'31"E, 2,051.91 feet distance; thence, N00°31'31"W, 9.21 feet distance to the northwest corner of the parcel of land herein described being a point on the existing southerly right-of-way line of N.M. Project S-1271(1); thence, S56°10'38"E, 122.56 feet distance to the most easterly corner of the parcel of land herein described; thence, N59° 53'03"W, 117.61 feet distance to the southwest corner and Point of Beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 952, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

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BY GRESLEY SPEARS

Section 15: S½, and being Tract Two as referenced on that certain Claim of Exemption Plat filed March 22, 2019, in Book 2, Page 558, Survey Records, Lea County, New Mexico.

EXHIBIT B

ATTACHED TO AN DE A PART OF THAT CERTAIN WATER RIGHTS ANI RTS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

Section 16: All, LESS AND EXCEPT a Parcel of land situated in Section 16, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the southwest corner of the parcel of land herein described being a point on the line common to Sections 16 and 17, T25S, R36E, NMPM, a point 24.78 feet to the right of, southerly and opposite Construction Centerline Station 1986+99.58 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38 and a point on the existing northerly right-of-way line of N.M. Project S-1271(1); thence, N00°29'31"W, 1.62 feet distance to the northwest corner of the parcel of land herein described being the Section Corner common to Sections 8, 9, 16 and 17, T25S, R36E; thence N89°25'58"E, 2639.66 feet distance to the Quarter Section corner common to Sections 9 and 16, T25S, R36E; thence N89°25'58"E, 2639.66 feet distance to the northeast corner of the parcel of land herein described being the Section Corner common to Sections 9, 10, 15 and 16, T25S, R36E; thence S00°29'56"E, 11.81 feet distance to the Southeast corner of the parcel of land herein described; thence S89°32'36"W, 5279.32 feet distance to the Southwest corner and point of beginning of the parcel of land herein described, said tract of land referenced in that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 937, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC, a New Mexico limited liability company to New Mexico Department of Transportation.

Section 17: All, LESS AND EXCEPT a Parcel of land situated in Section 17, Township 25 South, Range 36 East, New Mexico Principal Meridian, Lea County, New Mexico, being more particularly described as follows:
Beginning at the northeast corner of the parcel of land herein described being the Section Corner common to Sections 8, 9, 16 and 17, T25S, R36E, a point 23.15 feet to the right of, southerly and opposite Construction Centerline Station 1986+99.58 of N.M. Project No. AC-GRIP-(TPM)-1271(23)38; thence, S00°29'31"E, 1.62 feet distance to the Southeast corner of the parcel of land herein described being a point on the existing Northerly right of way line of N.M. Project S-1271(1); thence S89°32'36"W, 1271.62 feet distance to the most westerly corner of the parcel of land herein described; thence N89°28'12"E, 1271.62 feet distance to the point of beginning of the parcel of land herein described, said tract of land being referenced on that certain Warranty Deed filed October 14, 2008, in Book 1604, Page 931, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC a New Mexico limited liability company to New Mexico Department of Transportation.

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BY CREALEY SPEARS

Section 18: Lots 3, 4, E½SW¼, NE¼, E½SE¼, W¼SE¼

Section 19: NW¼

Section 20: All

Section 21: All

Section 22: All

Section 23: W½, W½E½

EXHIBIT B

ATTACHED TO AND MADE A PART OF THAT CERTAIN WATER RIGHTS AND [illegible]ITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

Section 25: A tract of land beginning at the Southwest corner of Section 25; thence North 363 feet; thence East 363 feet; thence South 363 feet and thence West 363 feet to the point of beginning.
Section 26: W½, W½NE¼, W½SE¼, W½E½SE¼
Section 35: All
Section 36: All

TOWNSHIP 26 SOUTH, RANGE 36 East, N.M.P.M., LEA COUNTY, NEW MEXICO:
Section 1: N½, SW¼, NW¼SE¼
Section 9: All – Less and Except that portion of said Section 9 described in that certain Warranty Deed filed June 6, 2016, in Book 2031, Page 11, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC to EOG Resources, Inc.
Section 10: All – Less and Except that portion of said Section 10 described in that certain Warranty Deed filed June 6, 2016, in Book 2031, Page 11, Lea County Records, Lea County, New Mexico, executed by Dinwiddie Cattle Company, LLC to EOG Resources, Inc.
Section 13: All
Section 24: All
Section 25: All
Section 36: All

TOWNSHIP 26 SOUTH, RANGE 37 East, N.M.P.M., LEA COUNTY, NEW MEXICO:
Section 6: S½ Lot 2 and All of Lot 3

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BY CRESLEY SPEARS

EXHIBIT B

ATTACHED TO AND MADE A PART OF THAT CERTAIN WATER RIGHTS AND PERMITS DEED DATED EFFECTIVE MARCH 1, 2019 BETWEEN DINWIDDIE CATTLE COMPANY, LLC, AS GRANTOR, AND INTREPID POTASH-NEW MEXICO, LLC, AS GRANTEE

LAND

STATE LEASE LAND

STATE OF NEW MEXICO GRAZING LEASES:

1. GT-2459-0000 a copy of which is attached hereto as Exhibit B-1.
2. GM-2911 a copy of which is attached hereto as Exhibit B-2.
3. GT-0226-0000 a copy of which is attached hereto as Exhibit B-3.

FEDERAL LEASE LAND

BUREAU OF LAND MANAGEMENT GRAZING PERMITS:

1. Old Baldy – NM-76041 a copy of which is attached hereto as Exhibit B-4.
2. East Rattlesnake – NM-76033 a copy of which is attached hereto as Exhibit B-5.
3. Medlin-Wells – NM-76035 a copy of which is attached hereto as Exhibit B-6.

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BY GRESLEY SPEARS

John R. D Antonio, Jr., P.E.
State Engineer

Roswell Office
1900 WEST SECOND STREET
ROSWELL, NM 88201

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

Trn Nbr: 652933
File Nbr: C 02299

Jun. 19, 2019

KATIE KELLER
INTREPID POTASH NEW MEXICO LLC
1001 17TH STREET
SUITE 1050
DENVER, CO 80202

Greetings:

Enclosed is one original copy of a Change of Ownership of a Water Right submitted to this office for filing. This Change of Ownership is accepted for filing in accordance with Section 72-1-2.1, NMSA 1978 (1996 Supp.), effective May 15, 1996. The acceptance by the State Engineer Office does not constitute validation of the right claimed.

According to Section 72-1-2.1, NMSA 1978 (1996 Supp.), you must record this Change of Ownership with the clerk of the county in which the water is located. The filing shall be public notice of the existence and contents of the instruments so recorded.

Sincerely,

Deborah Jones
(575)622-6521

Enclosure

chngowrc

File No. CP-2299

NEW MEXICO OFFICE OF THE STATE ENGINEER

Update Well Location

Date: 05/15/2020 POD No.: C-2299 OSE Staff: Chris Angel

Instructions:

Use this form to correct or update POD location(s) based on In-Office Geospatial Applications. Update WATERS by creating a UWL transaction in the pertinent file number(s). Create and image a map, if necessary.

Current Location:

NM State Plane (NAD83) - In feet	NM West Zone ☐ NM Central Zone ☐ NM East Zone ☐	X (in feet): Y (in feet):		
UTM (NAD83) - In meters	UTM Zone 13N ☐ UTM Zone 12N ☐	Easting (in meters): Northing (in meters):		
Lat/Long (WGS84) - To 1/10th of second ☐ Check if seconds are decimal format	Lat:	deg	min	sec
	Long:	deg	min	sec
Other Location Information (complete the below, if applicable): PLSS Quarters or Halves: SESENE Section: 24 Township: 25 South Range: 34 East				
County: Lea Subasin: Carlsbad				

Updated Location:

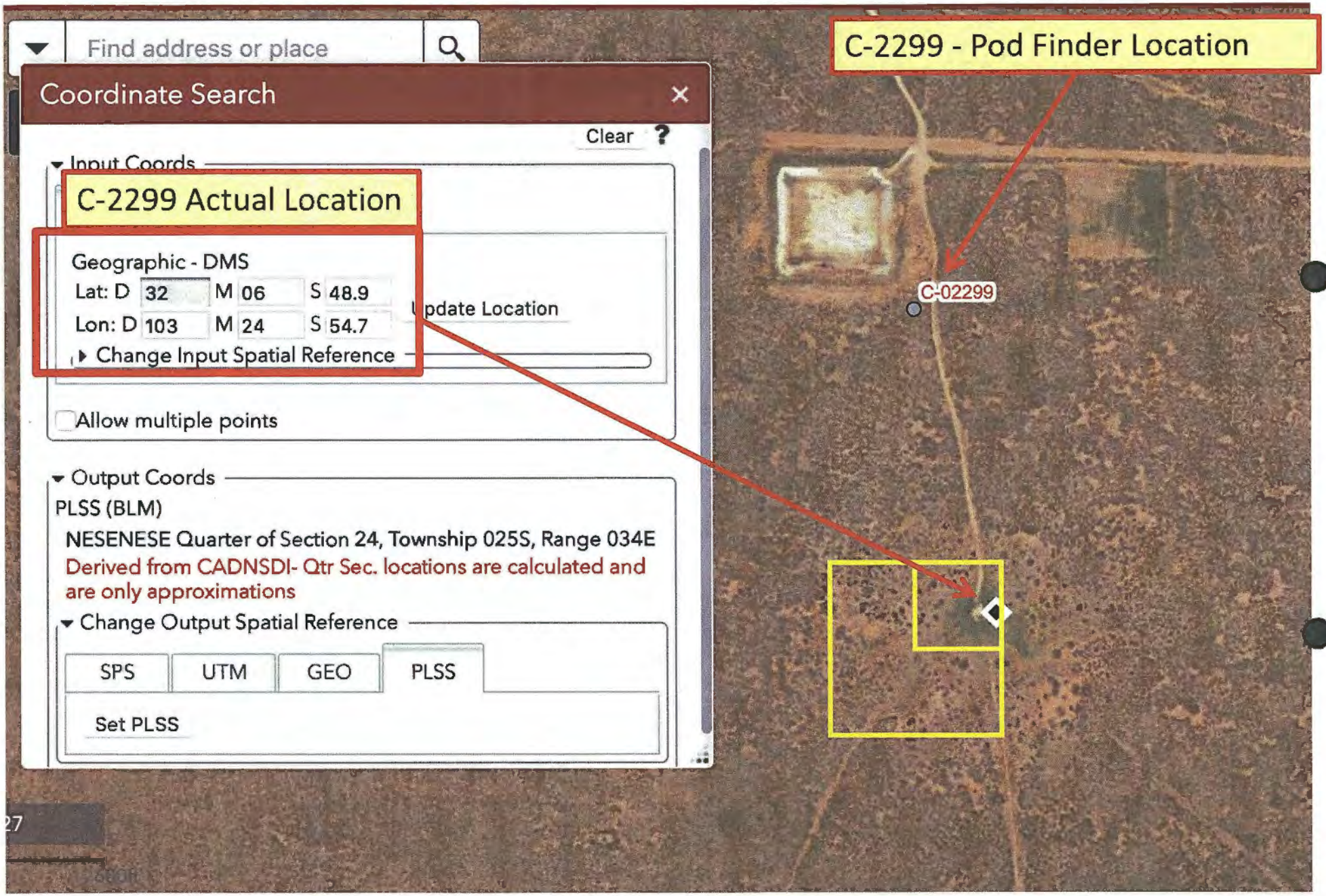
NM State Plane (NAD83) - In feet	NM West Zone ☐ NM Central Zone ☐ NM East Zone ☐	X (in feet): Y (in feet):		
UTM (NAD83) - In meters	UTM Zone 13N ☐ UTM Zone 12N ☐	Easting (in meters): Northing (in meters):		
Lat/Long (WGS84) - To 1/10th of second ☐ Check if seconds are decimal format	Lat: 32	deg 06	min 48.9	sec
	Long: 103	deg 24	min 54.7	sec
Other Location Information (complete the below, if applicable): PLSS Quarters or Halves: Section: Township: Range:				
County: Lea Subasin: Carlsbad				

Comments:

A GPS was used to locate the well on the attached map.

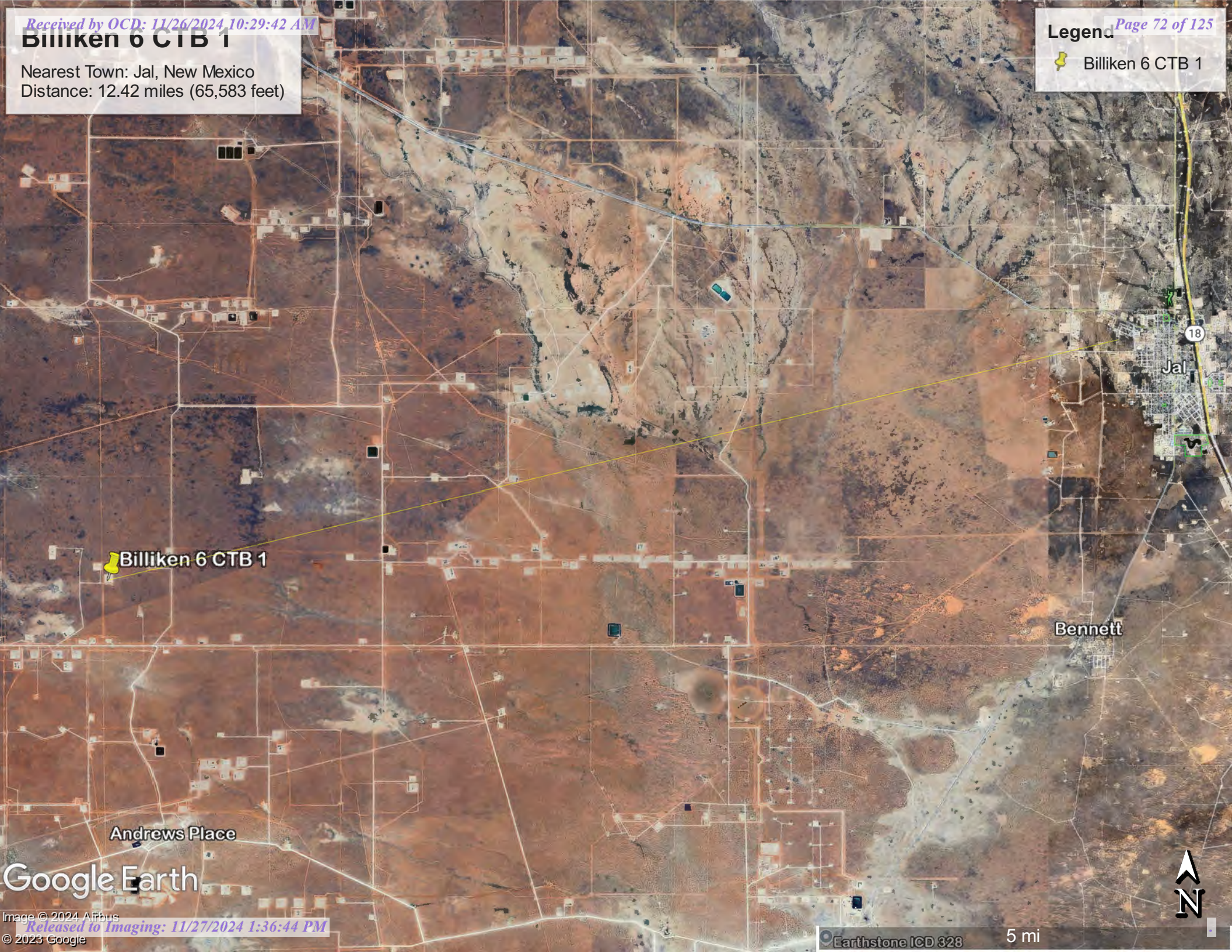
Update Well Location Form, Rev. 12/11/18

File No.: CP-2299 Trn. No.: 673682



Billiken 6 CTB 1

Nearest Town: Jal, New Mexico
Distance: 12.42 miles (65,583 feet)



U.S. Fish and Wildlife Service
National Wetlands Inventory

Billiken 6 CTB 1

Nearest Wetland: Emergent Wetland
Distance: 0.63 miles/3,332 feet

November 20, 2024

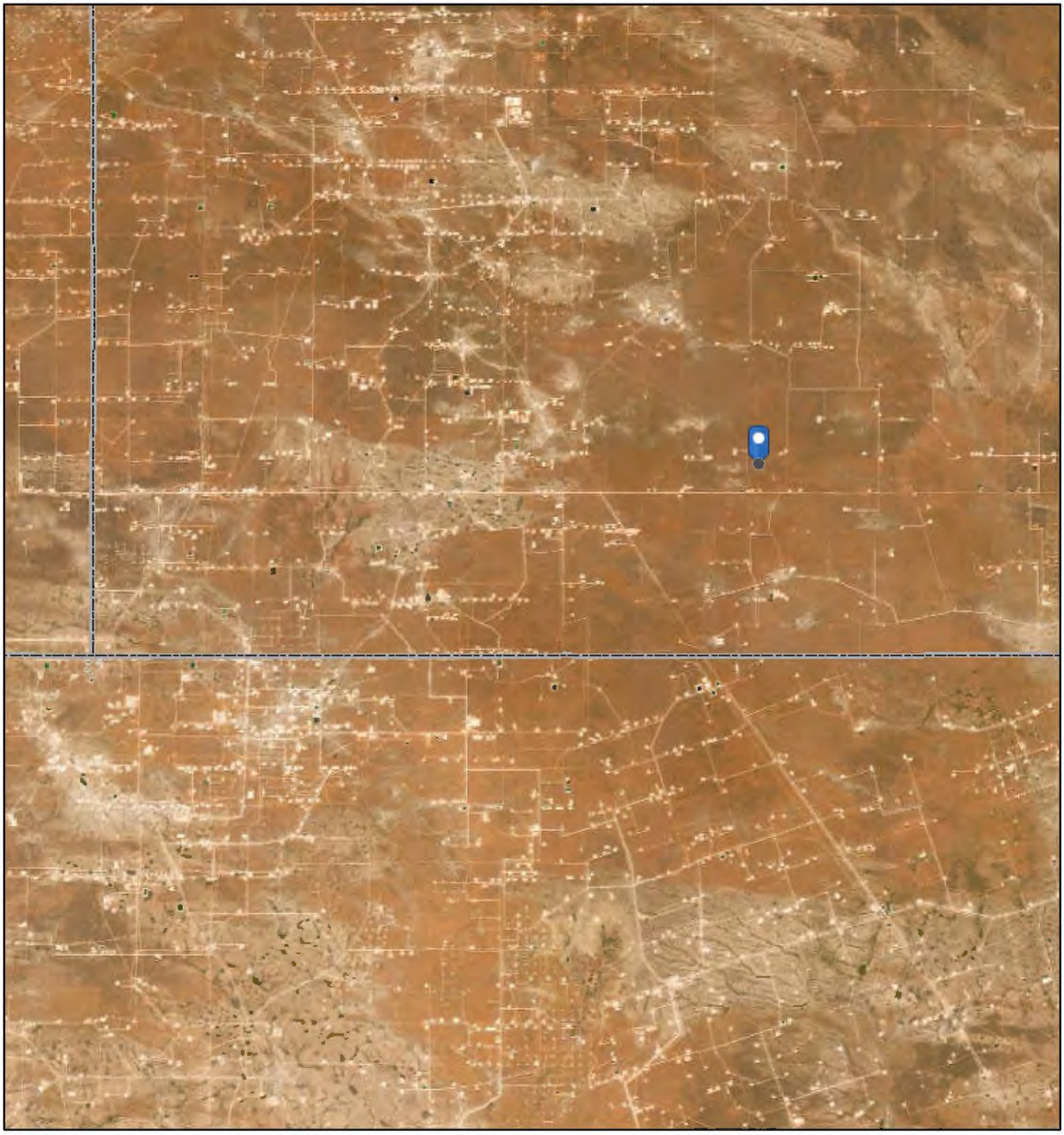
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Billiken 6 CTB 1 - Mines



11/20/2024, 3:39:40 AM

1:288,895

0 2 4 8 mi

0 3.25 6.5 13 km

- Uranium Occurrence – No Production
- Minor Uranium – Produced
- Major Uranium Deposits – Not Produced
- Major Uranium Deposits
- Uranium Mills

Asbestos Mineral Occurrences

- Metamorphic Host Rock
- Skarn or Carbonate Host Rock
- Mining_Ghost_Towns
- Counties

REE_Districts

- Fe skarn, carbonate-hosted Pb-Zn
- REE-Th-U veins, fluorite veins

New Mexico Bureau of Geology and Mineral Resources, New Mexico Bureau of Geology & Mineral Resources, Earthstar Geographics, NMBGMR

Billiken 6 CTB 1

0 0.05 0.1 0.2 mi

N

New Mexico State Land Office

Disclaimer:
The New Mexico State Land Office assumes no responsibility or liability for, or in connection with the accuracy, reliability or use of the information provided herein with respect to State Land Office data or data from other sources.

Data pertaining to New Mexico State Trust Lands are provisional and subject to revision, and do not constitute an official record of title. Official records may be reviewed at the New Mexico State Land Office in Santa Fe, New Mexico.

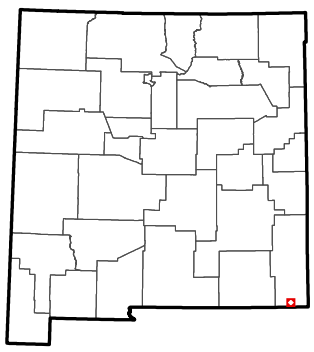
Map Created: 11/19/2024

- User drawn points
- Oil and Gas Leasing Restrictions
- Energy Leases
- Agricultural Leases
- Oil and Gas Leases
- Minerals Leases
- Commercial Leases

Karst_Potential_NM

Potential

- High
- Medium
- Low
- Critical_Karst_Zone_NM



National Flood Hazard Layer FIRMette

FEMA

103°24'59"W 32°4'50"N

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

1:6,000

103°24'21"W 32°4'20"N

Basemap Imagery Source: USGS National Map 2023

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 Cross Sections with 1% Annual Chance
- 17.5 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

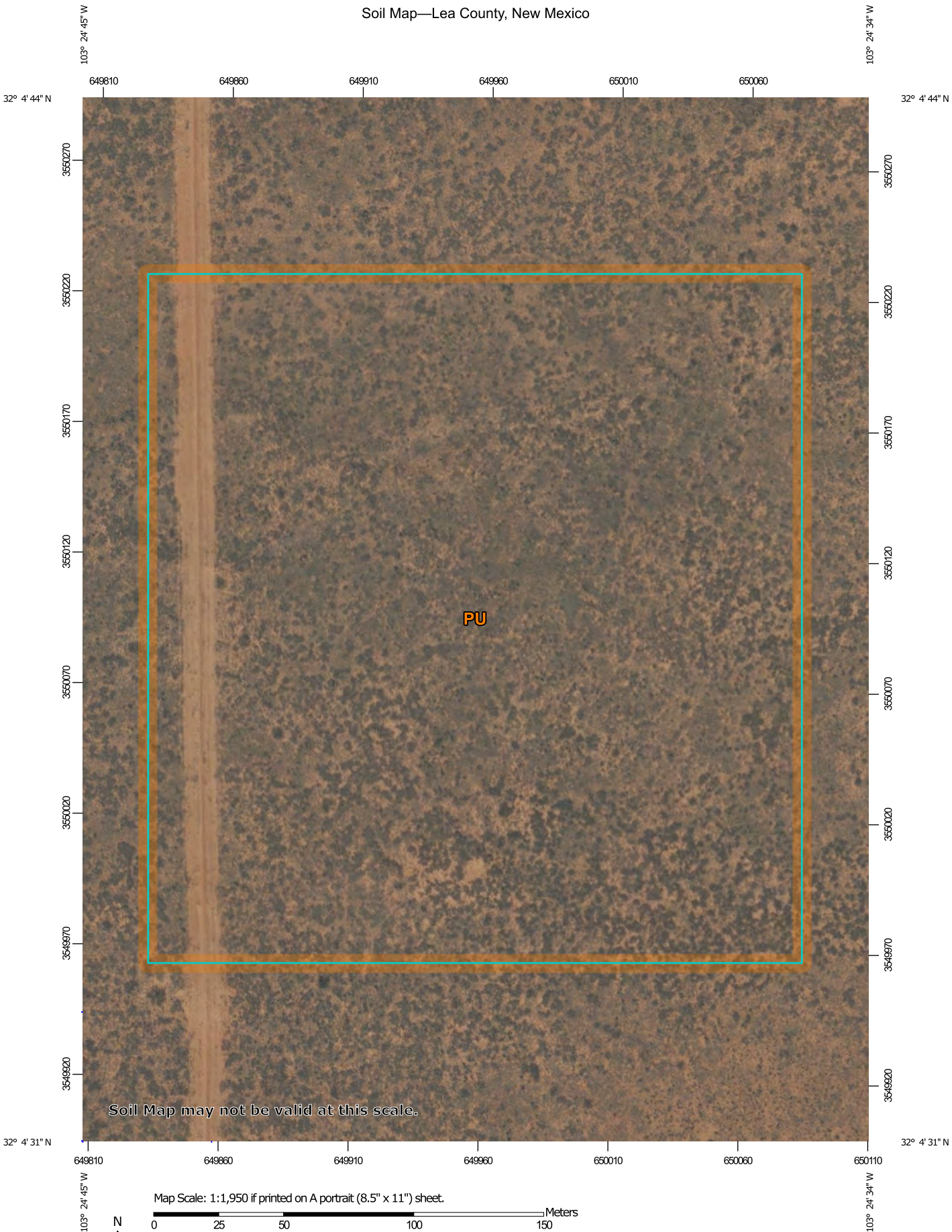
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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 11/20/2024 at 1:21 AM 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.

Soil Map—Lea County, New Mexico



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 20, Sep 6, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 7, 2020—May 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
PU	Pyote and Maljamar fine sands	16.5	100.0%
Totals for Area of Interest		**16.5**	**100.0%**

Lea County, New Mexico

PU—Pyote and Maljamar fine sands

Map Unit Setting

National map unit symbol: dmqq
Elevation: 3,000 to 3,900 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Pyote and similar soils: 46 percent
Maljamar and similar soils: 44 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pyote

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 30 inches: fine sand
Bt - 30 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R070BD003NM - Loamy Sand
Hydric soil rating: No

Description of Maljamar

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 24 inches: fine sand
Bt - 24 to 50 inches: sandy clay loam
Bkm - 50 to 60 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 40 to 60 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R070BD003NM - Loamy Sand
Hydric soil rating: No

Minor Components

Kermit

Percent of map unit: 10 percent
Ecological site: R070BC022NM - Sandhills

Hydric soil rating: No

Data Source Information

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 20, Sep 6, 2023

USDA Natural Resources Conservation Service

Ecological site R070BD003NM
Loamy Sand

Accessed: 09/21/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R070BD004NM	**Sandy** Sandy
R070BD005NM	**Deep Sand** Deep Sand

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is on uplands, plains, dunes, fan piedmonts and in inter dunal areas. The parent material consists of mixed alluvium and or eolian sands derived from sedimentary rock. Slope range on this site range from 0 to 9 percent with the average of 5 percent.

Low stabilized dunes may occur occasionally on this site. Elevations range from 2,800 to 5,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Alluvial fan (3) Dune
Elevation	2,800–5,000 ft
Slope	0–9%
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity-short duration thunderstorms.
Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes.

The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer.
The average frost-free season is 207 to 220 days. The last killing frost being late March or early April and the first killing frost being in later October or early November.
Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of this site. Strong winds blow from the southwest from January through June, which accelerates soil drying during a critical period for cool season plant growth.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	240 days
Precipitation total (average)	13 in

Influencing water features

This site is not influenced from water from wetlands or streams.

Soil features

Soils are moderately deep or very deep. Surface textures are loamy fine sand, fine sandy loam, loamy very fine sand or gravelly sandy loam.

Subsurface is a loamy fine sand, coarse sandy loam, fine sandy loam or loam that averages less than 18 percent clay and less than 15 percent carbonates.

Substratum is a fine sandy loam or gravelly fine sandy loam with less than 15 percent gravel and with less than 40 percent calcium carbonate. Some layers high in lime or with caliche fragments may occur at depths of 20 to 30 inches.

These soils, if unprotected by plant cover and organic residue, become wind blown and low hummocks are formed.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic soils are:
Maljamar
Berino
Parjarito
Palomas
Wink
Pyote

Table 4. Representative soil features

Surface texture	(1) Fine sand (2) Fine sandy loam (3) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid

Soil depth	40–72 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5–7 in
Calcium carbonate equivalent (0-40in)	3–40%
Electrical conductivity (0-40in)	2–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	4–12%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

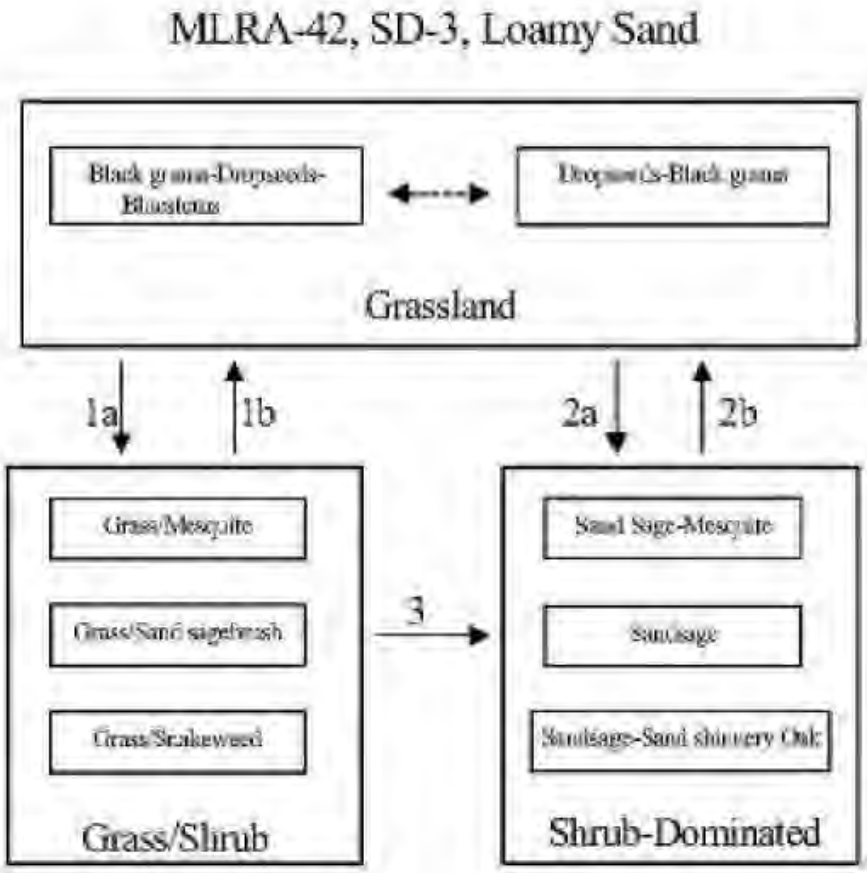
Overview

The Loamy Sand site intergrades with the Deep Sand and Sandy sites (SD-3). These sites can be differentiated by surface soil texture and depth to a textural change. Loamy Sand and Deep Sand sites have coarse textured (sands and loamy sand) surface soils while Sandy sites have moderately coarse textured (sandy loam and fine sandy loam) surfaces. Although Loamy Sand and Deep Sand sites have similar surface textures, the depth to a textural change is different—Loamy Sand sub-surface textures typically increase in clay at approximately 20 to 30 inches, and Deep Sand sites not until around 40 inches.

The historic plant community of Loamy Sand sites is dominated by black grama (*Bouteloua eriopoda*), dropseeds (*Sporobolus flexuosus*, *S. contractus*, *S. cryptandrus*), and bluestems (*Schizachyrium scoparium* and *Andropogon hallii*), with scattered shinnery oak (*Quercus havardii*) and sand sage (*Artemisia filifolia*). Perennial and annual forb abundance and distribution are dependent on precipitation. Litter and to a lesser extent, bare ground, are a significant proportion of ground cover while grasses compose the remainder. Decreases in black grama indicate a transition to either a grass/shrub or shrub-dominated state. The grass/shrub state is composed of grasses/honey mesquite (*Prosopis glandulosa*), grasses/broom snakeweed (*Gutierrezia sarothrae*), or grasses/sand sage. The shrub-dominated state occurs after a severe loss of grass cover and a prevalence of sand sage with secondary shinnery oak and mesquite. Heavy grazing intensity and/or drought are influential drivers in decreasing black grama and bluestems and subsequently increasing shrub cover, erosion, and bare patches. Historical fire suppression also encourages shrub pervasiveness and a competitive advantage over grass species (McPherson 1995). Brush and grazing management, however, may reverse grass/shrub and shrub-dominated states toward the grassland-dominated historic plant community.

State and transition model

Plant Communities and Transitional Pathways (diagram):



1a. Drought, over grazing, fire suppression.
1b. Brush control, prescribed grazing

2.a Severe loss of grass cover, fire suppression, erosion.
2b. Brush control, seeding, prescribed grazing.

3. Continued loss of grass cover, erosion.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

Grassland: The historic plant community is a uniformly distributed grassland dominated by black grama, dropseeds, and bluestems. Sand sage and shinnery oak are evenly dispersed throughout the grassland due to the coarse soil

surface texture. Perennial and annual forbs are common but their abundance and distribution are reflective of precipitation. Bluestems initially, followed by black grama, decrease with drought and heavy grazing intensity. Historical fire frequency is unknown but likely occurred enough to remove small shrubs to the competitive advantage of grass species. Fire suppression, drought conditions, and excessive grazing drive most grass species out of competition with shrub species. Diagnosis: Grassland dominated by black grama, dropseeds, and bluestems. Shrubs, such as sand sage, shinnery oak, and mesquite are dispersed throughout the grassland. Forbs are present and populations fluctuate with precipitation variability.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	442	833	1224
Forb	110	208	306
Shrub/Vine	98	184	270
Total	**650**	**1225**	**1800**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	28%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	22%

Figure 5. Plant community growth curve (percent production by month). NM2803, R042XC003NM-Loamy Sand-HCPC. SD-3 Loamy Sand - Warm season plant community .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

State 2
Grass/Shrub

Community 2.1
Grass/Shrub

Grass/Shrub State: The grass/shrub state is dominated by communities of grasses/mesquite, grasses/snakeweed, or grasses/sand sage. Decreases in black grama and bluestem species lead to an increase in bare patches and mesquite which further competes with grass species. An increase of dropseeds and threeawns occurs. Grass distribution becomes more patchy with an absence or severe decrease in black grama and bluestems. Mesquite provides nitrogen and soil organic matter to co-dominant grasses (Ansley and Jacoby 1998, Ansley et al. 1998). Mesquite mortality when exposed to fire is low due to aggressive resprouting abilities. Herbicide application combined with subsequent prescribed fire may be more effective in mesquite reduction (Britton and Wright 1971). Diagnosis: This state is dominated by an increased abundance of communities including grass/mesquite, grass/snakeweed, or grass/sand sage. Dropseeds and threeawns have a patchy distribution. Transition to Grass/Shrub State (1a): The historic plant community begins to shift toward the grass/shrub state as drivers such as drought, fire suppression, interspecific competition, and excessive grazing contribute to alterations in soil properties and herbaceous cover. Cover loss and surface soil erosion are initial indicators of transition followed by a decrease in black grama with a subsequent increase of dropseeds, threeawns, mesquite, and snakeweed. Snakeweed has been documented to outcompete black grama especially under conditions of fire suppression and drought (McDaniel et al. 1984). Key indicators of approach to transition: • Loss of black grama cover • Surface soil erosion • Bare patch expansion • Increased dropseed/threeawn and mesquite, snakeweed, or sand sage abundances Transition to Historic Plant Community (1b): Brush and grazing management may restore the grassland component and reverse shrub or grass/shrub dominated states back toward the historic plant community.

State 3
Shrub Dominated

Community 3.1
Shrub Dominated

Shrub-Dominated State: The shrub-dominated state results from a severe loss of grass cover. This state's primary species is sand sage. Shinnery oak and mesquite also occur; however, grass cover is limited to intershrub distribution. Sand sage stabilizes light sandy soils from wind erosion, which enhances protected grass/forb cover (Davis and Bonham 1979). However, shinnery oak also responds to the sandy soils with dense stands due to an

aggressive rhizome system. Shinnery oak's extensive root system promotes competitive exclusion of grasses and forbs. Sand sage, shinnery oak, and mesquite can be controlled with herbicide (Herbel et al. 1979, Pettit 1986). Transition to Shrub-Dominated (2a): Severe loss of grass species with increased erosion and fire suppression will result in a transition to a shrub-dominated state with sand sage, Shin oak, and honey mesquite directly from the grassland-dominated state. Key indicators of approach to transition: • Severe loss of grass species cover • Surface soil erosion • Bare patch expansion • Increased sand sage, shinnery oak, and mesquite abundance Transition to Historic Plant Community (2b): Brush and grazing management may restore the grassland component and reverse shrub or grass/shrub dominated states back toward the historic plant community. In addition, seeding with native grass species will augment the transition to a grassland-dominated state. Transition to Shrub-Dominated (3): If the grass/shrub site continues to lose grass cover with soil erosion, the site will transition to a shrub-dominated state with sand sage, shinnery oak, and honey mesquite. Key indicators of approach to transition: • Continual loss of dropseeds/threeawns cover • Surface soil erosion • Bare patch expansion • Increased sand sage, shinnery oak, and mesquite/dropseed/threeawn and mesquite/snakeweed abundance

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm Season**			61–123	
	little bluestem	SCSC	*Schizachyrium scoparium*	61–123	–
2	**Warm Season**			37–61	
	sand bluestem	ANHA	*Andropogon hallii*	37–61	–
3	**Warm Season**			37–61	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	37–61	–
	silver bluestem	BOSA	*Bothriochloa saccharoides*	37–61	–
4	**Warm Season**			123–184	
	black grama	BOER4	*Bouteloua eriopoda*	123–184	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	123–184	–
5	**Warm Season**			123–184	
	thin paspalum	PASE5	*Paspalum setaceum*	123–184	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	123–184	–
	fringed signalgrass	URCI	*Urochloa ciliatissima*	123–184	–
6	**Warm Season**			123–184	
	spike dropseed	SPCO4	*Sporobolus contractus*	123–184	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	123–184	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	123–184	–
7	**Warm Season**			61–123	
	hooded windmill grass	CHCU2	*Chloris cucullata*	61–123	–
	Arizona cottontop	DICA8	*Digitaria californica*	61–123	–
9	**Other Perennial Grasses**			37–61	
	Grass, perennial	2GP	*Grass, perennial*	37–61	–
Shrub/Vine					
8	**Warm Season**			37–61	
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	37–61	–
	giant dropseed	SPGI	*Sporobolus giganteus*	37–61	–
10	**Shrub**			61–123	

	sand sagebrush	ARFI2	*Artemisia filifolia*	61–123	–
	Havard oak	QUHA3	*Quercus havardii*	61–123	–
11	**Shrub**			34–61	
	fourwing saltbush	ATCA2	*Atriplex canescens*	37–61	–
	featherplume	DAFO	*Dalea formosa*	37–61	–
12	**Shrub**			37–61	
	jointfir	EPHED	*Ephedra*	37–61	–
	littleleaf ratany	KRER	*Krameria erecta*	37–61	–
13	**Other Shrubs**			37–61	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	37–61	–
Forb					
14	**Forb**			61–123	
	leatherweed	CRPOP	*Croton pottsii var. pottsii*	61–123	–
	Indian blanket	GAPU	*Gaillardia pulchella*	61–123	–
	globemallow	SPHAE	*Sphaeralcea*	61–123	–
15	**Forb**			12–37	
	woolly groundsel	PACA15	*Packera cana*	12–37	–
16	**Forb**			61–123	
	touristplant	DIWI2	*Dimorphocarpa wislizeni*	61–123	–
	woolly plantain	PLPA2	*Plantago patagonica*	61–123	–
17	**Other Forbs**			37–61	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	37–61	–

Animal community

This Ecological Site provides habitat which supports a resident animal community that is characterized by pronghorn antelope, desert cottontail, spotted ground squirrel, black-tailed prairie dog, yellow faced pocket gopher, Ord's kangaroo rat, northern grasshopper mouse, southern plains woodrat, badger, roadrunner, meadowlark, burrowing owl, white necked raven, lesser prairie chicken, morning dove, scaled quail, Harris hawk, side blotched lizard, marbled whiptail, Texas horned lizard, western diamondback rattlesnake, dusty hognose snake and ornate box turtle.
Where mesquite has invaded, most resident birds and scissor-tailed flycatcher, morning dove and Swainson's hawk, nest. Vesper and grasshopper sparrows utilize the site during migration.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.
Hydrologic Interpretations
Soil Series Hydrologic Group
Berino B
Kinco A
Maljamar B
Pajarito B
Palomas B
Wink B
Pyote A

Recreational uses

This site offers recreation potential for hiking, borseback riding, nature observation, photography and hunting. During years of abundant spring moisture, this site displays a colorful array of wildflowers during May and June.

Wood products

This site has no potential for wood products.

Other products

This site is suitable for grazing by all kinds and classes of livestock at any time of year. In cases where this site has been invaded by brush species it is especially suited for goats. Mismanagement of this site will cause a decrease in species such as the bluestems, blsck grama, bush muhly, plains bristlegrass, New Mexico feathergrass, Arizona cottontop and fourwing saltbush. A corresponding increase in the dropseeds, windmill grass, fall witchgrass, silver bluestem, sand sagebrush, shinery oak and ephedra will occur. This will also cause an increase in bare ground which will increase soil erodibility. This site will respond well to a system of management that rotates the season of use.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index Ac/AUM
100 - 76 2.3 – 3.5
75 – 51 3.0 – 4.5
50 – 26 4.6 – 9.0
25 – 0 9.1 +

Inventory data references

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Eddy County, Lea County, and Chaves County.

Other references

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Herbel, C. H, Steger, R, Gould, W. L. 1974. Managing semidesert ranges of the Southwest Circular 456. Las Cruces, NM: New Mexico State University, Cooperative Extension Service. 48 p.

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McPherson, Guy R. 1995. The role of fire in the desert grasslands. In: McClaran, Mitchel P.; Van Devender, Thomas R., eds. The desert grassland. Tucson, AZ: The University of Arizona Press: 130-151.

Pettit, Russell D. 1986. Sand shinnery oak: control and management. Management Note 8. Lubbock, TX: Texas Tech University, College of Agricultural Sciences, Department of Range and Wildlife Management. 5 p.

Contributors

Don Sylvester
Quinn Hodgson

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

3. **Number and height of erosional pedestals or terracettes:**

   _____

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

   _____

5. **Number of gullies and erosion associated with gullies:**

   _____

6. **Extent of wind scoured, blowouts and/or depositional areas:**

   _____

7. **Amount of litter movement (describe size and distance expected to travel):**

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

---

14. **Average percent litter cover (%) and depth (in):**

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

---

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

---

17. **Perennial plant reproductive capability:**

USDA Natural Resources Conservation Service

Ecological site R070BC022NM
Sandhills

Accessed: 09/21/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on plains. The soils are calcareous sandy eolian deposits derived from sedimentary rock. Land form of sand dunes or hillslopes. Slopes average 5 to 35 percent. Slopes are complex as the steeper slopes are shorter in length while the more gentle slopes are longer in length. Direction of slopes vary and is usually not significant. Elevations range from 2,842 to 4,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Hill (3) Dune
Flooding frequency	None
Ponding frequency	None
Elevation	2,842–4,500 ft
Slope	5–35%
Aspect	Aspect is not a significant factor

Climatic features

The climate of the area is “semi-arid continental”. The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity – short duration thunderstorms. Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer. The average frost-free season is 180 to 220 days. The last killing frost is in late March or early April, and the first killing frost is in late October or early November. Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of this site. Because of the texture of this soil, most rainfall is effective. Strong winds blow from the west and southwest from January through June which accelerates soil drying at a time for cool season

plant growth.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	240 days
Precipitation total (average)	13 in

Influencing water features

This site is not influenced by wetlands or streams.

Soil features

The soils of this site are deep and very deep. Surface textures are fine sand or loamy fine sand. Subsoilis a fine sand or loamy fine sand to a depth of 60 inches or more. These soils have less than 10 percent clay content. These soils are subject to severe wind erosion if vegetative cover is not adequate.

Minimum and maximum values listed below represent the characterist soils for this site.

Characteristic Soils Are:
Kermit
Aguena

Table 4. Representative soil features

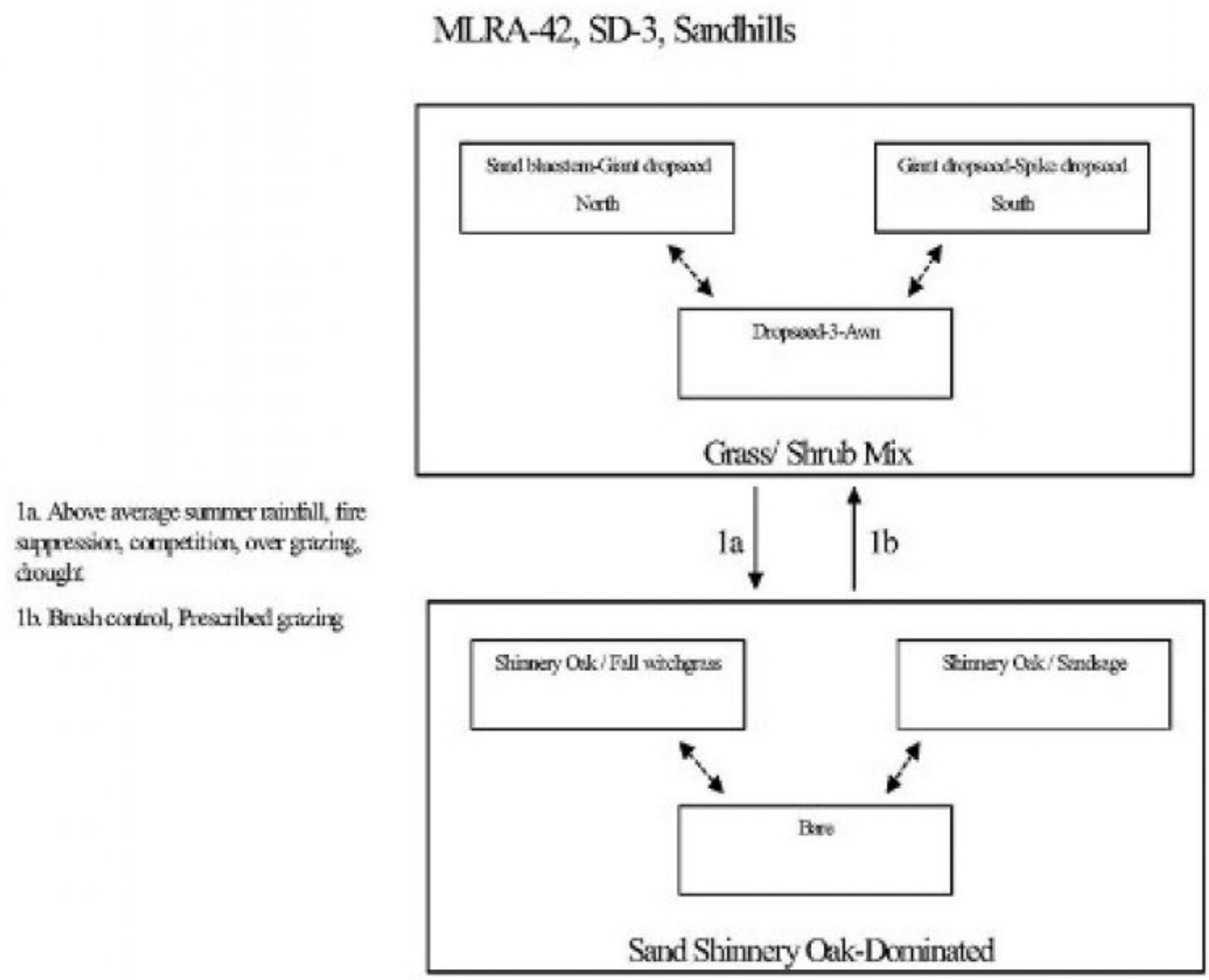
Surface texture	(1) Fine sand (2) Loamy fine sand (3) Loamy sand
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Rapid to very rapid
Soil depth	60–72 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–9 in
Calcium carbonate equivalent (0-40in)	0–7%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Overview:
The Sandhills site occurs adjacent to or intergrades with the Deep Sand site. The Sandhills site is differentiated from deep sand sites by a steeper average slope, and an increased depth to a soil texture change. Sandhills slopes are usually greater than eight percent, and the soil profile is a fine sand or loamy fine sand to a depth greater than 60 inches. Deep Sand sites have slopes less than eight percent and a textural change can occur at less than 60 inches. The historic plant community of the Sandhills site is a mixture of grasses, shrubs and forbs, with tall grasses dominating in aspect. During years of abundant spring moisture, tall growing forbs occasionally reach aspect dominance. Sand bluestem and giant dropseed are the dominant grasses, with Havard panicum and dropseeds as sub-dominants. Sand shinnery oak and soapweed yucca are the dominant shrubs. Drought favors shinnery by impacting grasses more severly. Shinnery oak's ability to store water and carbohydrates, and its strong negetive leaf water potential enable it to out compete grasses during drought conditions. Changes in historical fire regimes, competition by shrubs, and overgrazing may contribute to this site becoming dominated by sand shinnery oak.

State and transition model

Plant Communities and Transitional Pathways (diagram)



State 1
Grass/Shrub Mix

Community 1.1
Grass/Shrub Mix

Grass/Shrub Mix: The historic plant community in the northern part of the resource area (SD-3) is dominated by sand bluestem and giant dropseed, with Havard panicum as a sub-dominant. Primary grass dominance may gradually shift moving south across the resource area to a community dominated by giant dropseed and spike dropseed, with mesa dropseed as the sub-dominant grass species. Throughout the resource area sand shinnery oak and soapweed yucca are the dominant shrubs with sand sagebrush as the sub-dominant. As retrogression within this state occurs, plants such as sand bluestem, giant dropseed, Havard panicum, plains bristlegrass, sand paspalum, and fourwing saltbush decrease. This results in an increase in spike dropseed, sand dropseed, mesa dropseed, threeawns sand shinnery oak, and sand sagebrush. Continued loss of grass cover may result in a transition to a sand shinnery oak dominated state. Diagnosis: Sand bluestem or giant dropseed are dominant or present in substantial amounts. Spike dropseed, sand dropseed or mesa dropseed may be dominant in some instances. Grass cover is variable, shifting sands and large irregular dunes produce considerable variation in the spatial distribution and composition of the plant community. Grass cover is not continuous, but is fairly uniform across the more stable areas. Large natural bare areas or blowouts are a common feature on the less stable portions of the Sandhills site.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	360	585	810
Shrub/Vine	120	195	270
Forb	120	195	270
Total	**600**	**975**	**1350**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	10-15%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-25%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	45-60%

Figure 5. Plant community growth curve (percent production by month). NM2822, R042XC022NM Sandhills HCPC. R042XC022NM Sandhills HCPC warm season plant community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	4	10	10	25	30	12	5	0	0

State 2
Sand Shinnery Oak-Dominated

Community 2.1
Sand Shinnery Oak-Dominated

Additional States: Sand Shinnery Oak -Dominated: Sand shinnery oak is the dominant species and in dense stands may reduce forage production by as much as 90 percent.1 It often forms a mosaic of dense thickets interspersed with occasional motts of taller oaks, large areas of bare ground, and concentrations of sand sagebrush. Sand shinnery oak is well suited to deep sandy soils. The height and cover of oak decreases as sand depth decreases or clay content increases. The aggressive nature of fall witchgrass and continued loss of more palatable grasses and threeawn species may result in a sand shinnery oak-fall witchgrass community. Burning may result in a community with very little grass or sand shinnery oak (bare). Sand shinnery oak usually recovers due to its ability to sprout aggressively following fire. Diagnosis: Sand shinnery oak is the dominant species. Grass cover is sparse and patchy. Shrub cover is high. Blowouts and bare areas are common, however, high shrub cover mediates erosion. Transition to Sand Shinnery Oak Dominated (1a): Climate may play a role in facilitating the spread sand shinnery oak. It is best adapted to those areas that receive and average of 16 inches of annual rainfall; it may therefore gain a competitive advantage during cycles of above average precipitation. Sand shinnery oak spreads mainly by elongation of rhizomes, but in some instances will reproduce by seed. The establishment and survival of seedlings is limited to those years with abundant rainfall during the months of July and August. If fire historically played a part in suppressing the density and distribution of shrubs in desert grasslands, then fire suppression may facilitate a shift to shrub dominance.2 Competition for resources between grasses and shrubs may be a factor in increased densities of sand shinnery oak. 1 Sand shinnery oak has an extensive system of underground roots and stems that can uptake and store water for growth during drier periods, allowing it to increase, at times when grasses decrease. Evidence of competitive suppression of grasses is indicated by increases in herbaceous vegetation following chemical control of sand shinnery oak.1 However, this increase may in part be due to a flush of nutrients made available from the decomposing biomass of woody roots and stems. Loss of grass cover due to overgrazing or drought may give a competitive advantage to sand shinnery oak. Key indicators of approach to transition: * A decrease in the tall grass species and the associated increase in threeawns may be indicative of the initial stage of transition to a shrub-dominated state. * Increased cover of sand shinnery oak. Transition back to Grass/Shrub Mix (1b) Chemical brush control is an effective means of controlling sand shinnery oak and sand sagebrush. Where large areas of chemical control are planned, increased erosion and the effect on loss of wildlife habitat should be considered. Prescribed grazing will help ensure an adequate deferment period to allow grass recovery and subsequent proper forage utilization. There have been studies that suggest long term browsing by goats can reduce sand shinnery oak, altering production in favor of grasses.3

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				195–293	
	sand bluestem	ANHA	*Andropogon hallii*	195–293	–
	Havard's panicgrass	PAHA2	*Panicum havardii*	195–293	–
	giant dropseed	SPGI	*Sporobolus giganteus*	195–293	–
2				146–195	
	spike dropseed	SPCO4	*Sporobolus contractus*	146–195	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	146–195	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	146–195	–
3				49–98	
	thin paspalum	PASE5	*Paspalum setaceum*	49–98	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	49–98	–
4				29–49	

4				29–49	
	threeawn	ARIST	*Aristida*	29–49	–
	mat sandbur	CELO3	*Cenchrus longispinus*	29–49	–
	flatsedge	CYPER	*Cyperus*	29–49	–
5				29–49	
	Grass, perennial	2GP	*Grass, perennial*	29–49	–
Shrub/Vine					
6				49–98	
	Havard oak	QUHA3	*Quercus havardii*	49–98	–
7				49–98	
	soapweed yucca	YUGL	*Yucca glauca*	49–98	–
8				29–49	
	sand sagebrush	ARFI2	*Artemisia filifolia*	29–49	–
9				20–49	
	fourwing saltbush	ATCA2	*Atriplex canescens*	20–49	–
10				20–49	
	rabbitbrush	CHRYS9	*Chrysothamnus*	20–49	–
11				20–49	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	20–49	–
Forb					
12				20–49	
	featherplume	DAFO	*Dalea formosa*	20–49	–
13				29–49	
	sundrops	CALYL	*Calylophus*	29–49	–
	phlox heliotrope	HECO5	*Heliotropium convolvulaceum*	29–49	–
	sharpleaf penstemon	PEAC	*Penstemon acuminatus*	29–49	–
14				20–49	
	touristplant	DIWI2	*Dimorphocarpa wislizeni*	20–49	–
	lemon beebalm	MOCI	*Monarda citriodora*	20–49	–
16				29–49	
	hymenopappus	HYMEN4	*Hymenopappus*	29–49	–
	blazingstar	MENTZ	*Mentzelia*	29–49	–
	threadleaf ragwort	SEFLF	*Senecio flaccidus var. flaccidus*	29–49	–
17				20–49	
	sunflower	HELIA3	*Helianthus*	20–49	–
18				20–49	
	buckwheat	ERIOG	*Eriogonum*	20–49	–
19				20–49	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	20–49	–

Animal community

This site provides habitat which support a resident animal community that is characterized by pronghorn antelope, black-tailed jackrabbit, Ord's kangaroo rat, Northern grasshopper mouse, Southern Plains woodrat, swift fox, roadrunner, meadowlark, lark bunting, ferruginous hawk, lesser prairie chicken, mourning dove, scaled quail, sand

dune lizard, marbled whiptail, ornate box turtle, bullsnake and Western diamondback rattlesnake. Grasshopper and vesper sparrows utilize the site during migration. The ferruginous hawk sometimes nests on dunes associated with the site. White-tailed deer are also sometimes associated with this site (Mescalero Sands). Where mesquite invades, resident species of birds such as white-necked raven, roadrunner, pyrrhuloxia, mourning dove, and Harris hawk nest. Where sand hummocks form around shrubs, rodent populations and their predators increase. Fourwing saltbush, shinnery oak, sand sagebrush, and mesquite provide protective cover for scaled quail. Seed, green herbage, and fruit from a variety of grasses, forbs, and shrubs provide food for a number of birds and mammals, including mourning dove, scaled quail, lessor prairie chicken and antelope.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydrolic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series------- Hydrologic Group
Kermit---------- A
Aguena---------- A

Recreational uses

This site offers recreation potential for hiking, horseback riding, nature observation and photography. This site also offers opportunities for hunting of such species as quail, dove and antelope.

Mechanical, off-road vehicle use by dune buggies, four wheelers, or motor bikes is site-destructive, resulting in severe soil movement by wind erosion. Off-road vehicle use should be confined to those areas which are already deterioriated and where intensive management for soil protection can be practiced.

During years of abundant spring moisture, this site desplays a colorful array of wildflowers during May and June. A few showy summer and fall flowers also occur.

Wood products

The plant community associated with this site affords little or no wood products.

Other products

This site is suitable for grazing during all seasons of the year by all kinds and classes of livestock. Where shinnery oak has increased considerably above the amount in the potential plant community cattle loss can occur if grazed during the late bud and early leaf stage. This site responds well to an integrated brush management and grazing management. Brush management is inappropriate in occupied or potential habitat for sand dune lizard. Mismannagement of this site will cause a decrease in Harvard panicum, sand bluestem, giant dropseed, plains bristlegrass, sand paspalum and fourwing saltbush. There will be a corresponding increase in dropseeds, sand sagebrush and shinnery oak. When shinnery oak is not a problem, this site responds best to a system of mangement that rotates the season of use. Grazing management plans should be design to leave adequate residual cover for lesser prairie chicken nesting.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index----- Ac/AUM
100 - 76---------- 2.0 – 4.0
75 – 51---------- 3.0 – 6.5
50 – 26---------- 5.0 – 12.0
25 – 0---------- 12.0 - +

Inventory data references

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains (SD-3) Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: South Chaves, Eddy, Lea and Otero Counties.

Other references

Literature Cited:

1. Sears, W.E., C.M. Britton, D.B. Wester, and R.D. Pettit. 1986. Herbicide conversion of a sand shinnery oak (Quercus havardii) community: effects on biomass. J. Range. Manage. 39: 399-403.

2. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, September). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/ [accessed 1/07/02].

3.Villena, F. and J.A. Pfister. 1990. Sand shinnery oak as forage for Angora and Spanish goats. J. Range. Manage. 43: 116-122.

Contributors

David Trujillo
Don Sylvester

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

3. **Number and height of erosional pedestals or terracettes:**

   _____

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

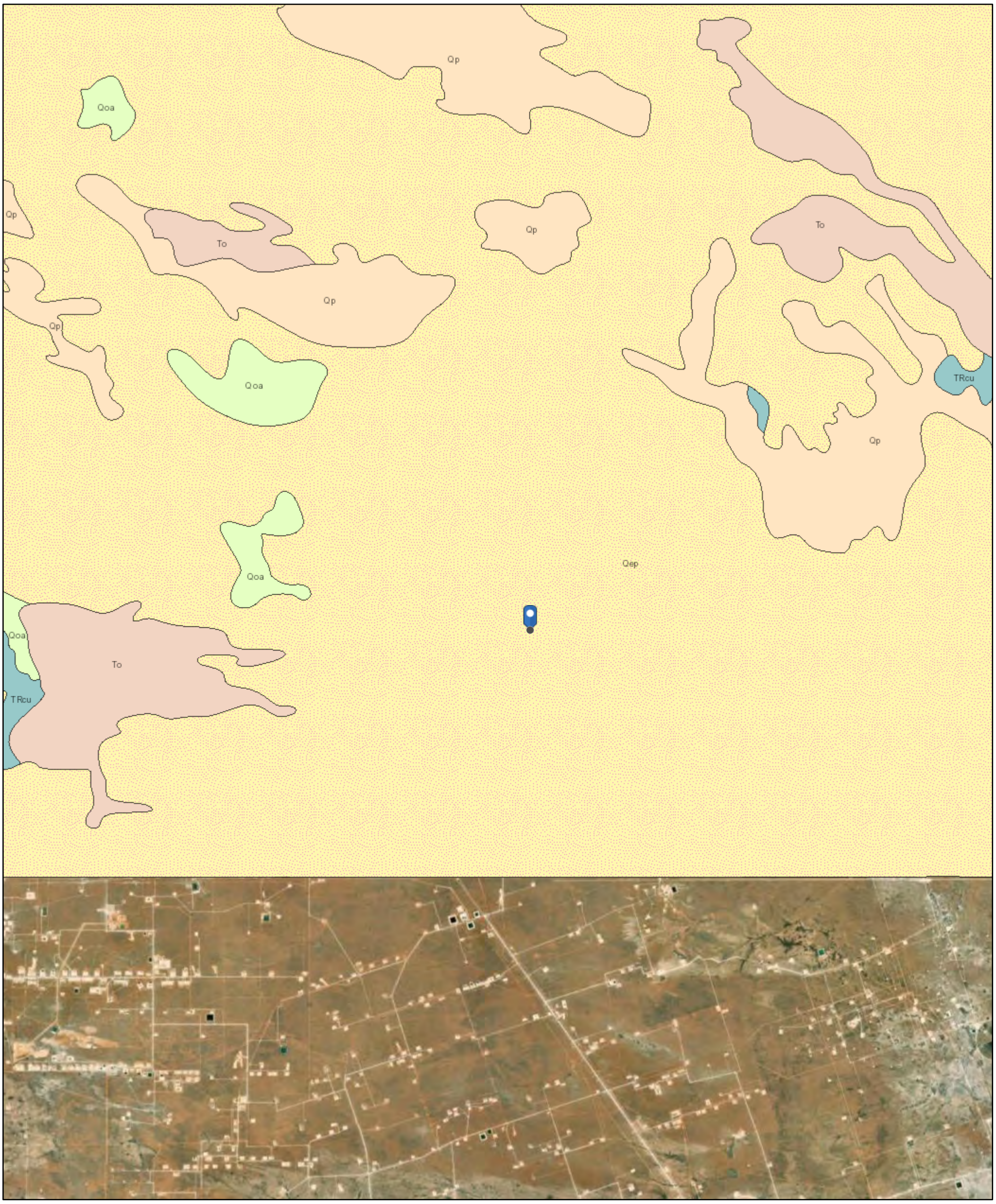
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

---

17. **Perennial plant reproductive capability:**

Billiken 6 CTB 1



11/19/2024, 6:13:21 PM

Lithologic Units

- Playa—Alluvium and evaporite deposits (Holocene)
- Water—Perenial standing water
- Qa—Alluvium (Holocene to upper Pleistocene)

1:144,448

0 1.25 2.5 5 mi

0 2.25 4.5 9 km

Earthstar Geographics, NMBGMR

ATTACHMENT 3: CORRESPONDENCE

Outlook

nAPP2427041103 Billiken 6 CTB 1 Liner Inspection Notification

From Monica Peppin <Monica.Peppin@soudermiller.com>
Date Fri 10/25/2024 2:13 PM
To jim.raley <jim.raley@dvn.com>
Cc Stephanie Hinds <stephanie.hinds@soudermiller.com>; Reid Allan <reid.allan@soudermiller.com>

1 attachment (29 KB)
Portal Questionaire Billiken 6 CTB 1.xlsx;

Jim,

Please see the attached portal questionnaire for the details of the liner inspection notification.

I put the inspection date for 10.30.24 at 11 AM. If this needs to be updated for a later time and date, please let me know. This date give a slightly larger window than the 48 hour alloted timeframe in case you see this email too late.

Let me know if you have any questions or concerns.

--MP

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Stronger Communities by Design

www.soudermiller.com

Monica Peppin, A.S.
Project Manager

Direct/Mobile: 575.909.3418
Office: 575.689.7040

201 S Halagueno St.
Carlsbad, NM 88220

Outlook

Billiken 6 CTB 1 Liner Inspection [In-person]

Organizer	Monica Peppin <Monica.Peppin@soudermiller.com>
Meeting time	This event occurred 3 weeks ago (Wed 10/30/2024 1:00 PM - 5:00 PM)
My response	Not yet responded
Optional attendees	jim.raley, Stephanie Hinds, Reid Allan
Message sent	Fri 10/25/2024 2:34 PM

1 attachment (29 KB)

Portal Questionaire Billiken 6 CTB 1.xlsx;

NAPP2427041103 Liner Inspection scheduled for 1 PM. Notification submitted to J. Raley at 2:35 PM on 10.25.24 with followup phone call of notification being submitted via email. Please forward verification that notice has been received to NMOCD for the closure report.

MP

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

QUESTIONS

Action 387343

QUESTIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 387343
	Action Type: [NOTIFY] Notification Of Release (NOR)

QUESTIONS

Location of Release Source *Please answer all the questions in this group.*	
Site Name	BILLIKEN 6 CTB 1
Date Release Discovered	09/24/2024
Surface Owner	Federal

Incident Details *Please answer all the questions in this group.*	
Incident Type	Produced Water Release
Did this release result in a fire or is the result of a fire	No
Did this release result in any injuries	No
Has this release reached or does it have a reasonable probability of reaching a watercourse	No
Has this release endangered or does it have a reasonable probability of endangering public health	No
Has this release substantially damaged or will it substantially damage property or the environment	No
Is this release of a volume that is or may with reasonable probability be detrimental to fresh water	No

Nature and Volume of Release *Material(s) released, please answer all that apply below. Any calculations or specific justifications for the volumes provided should be attached to the follow-up C-141 submission.*	
Crude Oil Released (bbls) Details	*Not answered.*
Produced Water Released (bbls) Details	Cause: Equipment Failure | Pump | Produced Water | Released: 20 BBL | Recovered: 20 BBL | Lost: 0 BBL.
Is the concentration of chloride in the produced water >10,000 mg/l	Yes
Condensate Released (bbls) Details	*Not answered.*
Natural Gas Vented (Mcf) Details	*Not answered.*
Natural Gas Flared (Mcf) Details	*Not answered.*
Other Released Details	*Not answered.*
Are there additional details for the questions above (i.e. any answer containing Other, Specify, Unknown, and/or Fire, or any negative lost amounts)	pinhole in water transfer pump discharge connection. 20.2 bbls produced water spilled. 20 bbls recovered. spill was in lined containment.

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QUESTIONS (continued)

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 387343
	Action Type: [NOTIFY] Notification Of Release (NOR)

QUESTIONS

Nature and Volume of Release (continued)	
Is this a gas only submission (i.e. only significant Mcf values reported)	**No, according to supplied volumes this does not appear to be a "gas only" report.**
Was this a major release as defined by Subsection A of 19.15.29.7 NMAC	**No**
Reasons why this would be considered a submission for a notification of a major release	*Unavailable.*
With the implementation of the 19.15.27 NMAC (05/25/2021), venting and/or flaring of natural gas (i.e. gas only) are to be submitted on the C-129 form.	

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	True
The impacted area has been secured to protect human health and the environment	True
Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices	True
All free liquids and recoverable materials have been removed and managed appropriately	True
If all the actions described above have not been undertaken, explain why	*Not answered.*
Per Paragraph 4 of Subsection B of 19.15.29.8 NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please prepare and attach a narrative of actions to date in the follow-up C-141 submission. 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 prepare and attach all information needed for closure evaluation in the follow-up C-141 submission.	

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ACKNOWLEDGMENTS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 387343
	Action Type: [NOTIFY] Notification Of Release (NOR)

ACKNOWLEDGMENTS

☑	I acknowledge that I am authorized to submit notification of a release on behalf of my operator.
☑	I acknowledge that upon submitting this application, I will be creating a new incident file (assigned to my operator) to track the notification(s) and corrective action(s) for a release, pursuant to NMAC 19.15.29.
☑	I acknowledge that creating a new incident file will require my operator to file subsequent submission(s) of form "C-141, Application for administrative approval of a release notification and corrective action", pursuant to NMAC 19.15.29.
☑	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.
☑	I acknowledge the fact that 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.
☑	I acknowledge the fact that, 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.

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CONDITIONS

Operator:	OGRID:
DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	6137
	Action Number: 387343
	Action Type: [NOTIFY] Notification Of Release (NOR)

CONDITIONS

Created By	Condition	Condition Date
wdale	When submitting future reports regarding this release, please submit the calculations used or specific justification for the volumes reported on the initial C-141.	9/26/2024

BILLIKEN 6 CTB 1

9/24/2024

OCD INCIDENT nAPP2427041103

Spills In Lined Containment	
Measurements Of Standing Fluid	
Length(Ft)	60
Width(Ft)	116
Depth(in.)	0.25
Total Capacity without tank displacements (bbls)	**25.83**
No. of 500 bbl Tanks In Standing Fluid	8
No. of Other Tanks In Standing Fluid	0
OD Of Other Tanks In Standing Fluid(feet)	0
Total Volume of standing fluid accounting for tank displacement.	20.23

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QUESTIONS

Action 388328

QUESTIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 388328
	Action Type: [C-141] Initial C-141 (C-141-v-Initial)

QUESTIONS

Prerequisites	
Incident ID (n#)	**nAPP2427041103**
Incident Name	**NAPP2427041103 BILLIKEN 6 CTB 1 @ 0**
Incident Type	**Produced Water Release**
Incident Status	**Initial C-141 Received**
Incident Facility	**[fAPP2123637205] BILLIKEN 6 CTB 1**

Location of Release Source	
Please answer all the questions in this group.	
Site Name	BILLIKEN 6 CTB 1
Date Release Discovered	09/24/2024
Surface Owner	Federal

Incident Details	
Please answer all the questions in this group.	
Incident Type	Produced Water Release
Did this release result in a fire or is the result of a fire	No
Did this release result in any injuries	No
Has this release reached or does it have a reasonable probability of reaching a watercourse	No
Has this release endangered or does it have a reasonable probability of endangering public health	No
Has this release substantially damaged or will it substantially damage property or the environment	No
Is this release of a volume that is or may with reasonable probability be detrimental to fresh water	No

Nature and Volume of Release	
Material(s) released, please answer all that apply below. Any calculations or specific justifications for the volumes provided should be attached to the follow-up C-141 submission.	
Crude Oil Released (bbls) Details	*Not answered.*
Produced Water Released (bbls) Details	Cause: Equipment Failure | Pump | Produced Water | Released: 20 BBL | Recovered: 20 BBL | Lost: 0 BBL.
Is the concentration of chloride in the produced water >10,000 mg/l	Yes
Condensate Released (bbls) Details	*Not answered.*
Natural Gas Vented (Mcf) Details	*Not answered.*
Natural Gas Flared (Mcf) Details	*Not answered.*
Other Released Details	*Not answered.*
Are there additional details for the questions above (i.e. any answer containing Other, Specify, Unknown, and/or Fire, or any negative lost amounts)	pinhole in water transfer pump discharge connection. 20.2 bbls produced water spilled. 20 bbls recovered. spill was in lined containment.

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QUESTIONS (continued)

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 388328
	Action Type: [C-141] Initial C-141 (C-141-v-Initial)

QUESTIONS

Nature and Volume of Release (continued)	
Is this a gas only submission (i.e. only significant Mcf values reported)	**No, according to supplied volumes this does not appear to be a "gas only" report.**
Was this a major release as defined by Subsection A of 19.15.29.7 NMAC	**No**
Reasons why this would be considered a submission for a notification of a major release	*Unavailable.*
With the implementation of the 19.15.27 NMAC (05/25/2021), venting and/or flaring of natural gas (i.e. gas only) are to be submitted on the C-129 form.	

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	True
The impacted area has been secured to protect human health and the environment	True
Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices	True
All free liquids and recoverable materials have been removed and managed appropriately	True
If all the actions described above have not been undertaken, explain why	*Not answered.*
Per Paragraph (4) of Subsection B of 19.15.29.8 NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please prepare and attach a narrative of actions to date in the follow-up C-141 submission. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC), please prepare and attach all information needed for closure evaluation in the follow-up C-141 submission.	

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.

I hereby agree and sign off to the above statement	Name: Dale Woodall Title: EHS Professional Email: Dale.Woodall@dvn.com Date: 09/30/2024

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QUESTIONS (continued)

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 388328
	Action Type: [C-141] Initial C-141 (C-141-v-Initial)

QUESTIONS

Site Characterization	
Please answer all the questions in this group (only required when seeking remediation plan approval and beyond). 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 in feet below ground surface (ft bgs)	*Not answered.*
What method was used to determine the depth to ground water	*Not answered.*
Did this release impact groundwater or surface water	*Not answered.*
What is the minimum distance, between the closest lateral extents of the release and the following surface areas:	
A continuously flowing watercourse or any other significant watercourse	*Not answered.*
Any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)	*Not answered.*
An occupied permanent residence, school, hospital, institution, or church	*Not answered.*
A spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes	*Not answered.*
Any other fresh water well or spring	*Not answered.*
Incorporated municipal boundaries or a defined municipal fresh water well field	*Not answered.*
A wetland	*Not answered.*
A subsurface mine	*Not answered.*
An (non-karst) unstable area	*Not answered.*
Categorize the risk of this well / site being in a karst geology	*Not answered.*
A 100-year floodplain	*Not answered.*
Did the release impact areas not on an exploration, development, production, or storage site	*Not answered.*

Remediation Plan	
Please answer all the questions that apply or are indicated. This information must be provided to the appropriate district office no later than 90 days after the release discovery date.	
Requesting a remediation plan approval with this submission	No
The OCD recognizes that proposed remediation measures may have to be minimally adjusted in accordance with the physical realities encountered during remediation. If the responsible party has any need to significantly deviate from the remediation plan proposed, then it should consult with the division to determine if another remediation plan submission is 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

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CONDITIONS

Operator:	OGRID:
DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	6137
	Action Number: 388328
	Action Type: [C-141] Initial C-141 (C-141-v-Initial)

CONDITIONS

Created By	Condition	Condition Date
rhamlet	None	10/1/2024

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QUESTIONS

Action 396172

QUESTIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 396172
	Action Type: [NOTIFY] Notification Of Liner Inspection (C-141L)

QUESTIONS

Prerequisites	
Incident ID (n#)	**nAPP2427041103**
Incident Name	**NAPP2427041103 BILLIKEN 6 CTB 1 @ 0**
Incident Type	**Produced Water Release**
Incident Status	**Initial C-141 Approved**
Incident Facility	**[fAPP2123637205] BILLIKEN 6 CTB 1**

Location of Release Source	
Site Name	**BILLIKEN 6 CTB 1**
Date Release Discovered	**09/24/2024**
Surface Owner	**Federal**

Liner Inspection Event Information *Please answer all the questions in this group.*	
What is the liner inspection surface area in square feet	7,025
Have all the impacted materials been removed from the liner	Yes
Liner inspection date pursuant to Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC	10/30/2024
Time liner inspection will commence	01:00 PM
Please provide any information necessary for observers to liner inspection	Contact Monica Peppin 575-909-3418
Please provide any information necessary for navigation to liner inspection site	Intersection of 128 and Buck Jackson travel southwest for 0.42 miles, turn left (southeast) on lease road, follow for 1.43 miles south, turn left (east) down lease road for 0.85 miles, continue on lease road where dog leg goes around location for 0.31 miles, continue travelling south for 0.14 miles and end on location. Contact Monica Peppin 575.909.3418 for assistance

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CONDITIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 396172
	Action Type: [NOTIFY] Notification Of Liner Inspection (C-141L)

CONDITIONS

Created By	Condition	Condition Date
jraley	Failure to notify the OCD of liner inspections including any changes in date/time per the requirements of 19.15.29.11.A(5)(a)(ii) NMAC, may result in the inspection not being accepted.	10/28/2024

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QUESTIONS

Action 406693

QUESTIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 406693
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Prerequisites	
Incident ID (n#)	**nAPP2427041103**
Incident Name	**NAPP2427041103 BILLIKEN 6 CTB 1 @ 0**
Incident Type	**Produced Water Release**
Incident Status	**Remediation Closure Report Received**
Incident Facility	**[fAPP2123637205] BILLIKEN 6 CTB 1**

Location of Release Source	
Please answer all the questions in this group.	
Site Name	BILLIKEN 6 CTB 1
Date Release Discovered	09/24/2024
Surface Owner	Federal

Incident Details	
Please answer all the questions in this group.	
Incident Type	Produced Water Release
Did this release result in a fire or is the result of a fire	No
Did this release result in any injuries	No
Has this release reached or does it have a reasonable probability of reaching a watercourse	No
Has this release endangered or does it have a reasonable probability of endangering public health	No
Has this release substantially damaged or will it substantially damage property or the environment	No
Is this release of a volume that is or may with reasonable probability be detrimental to fresh water	No

Nature and Volume of Release	
Material(s) released, please answer all that apply below. Any calculations or specific justifications for the volumes provided should be attached to the follow-up C-141 submission.	
Crude Oil Released (bbls) Details	*Not answered.*
Produced Water Released (bbls) Details	Cause: Equipment Failure | Pump | Produced Water | Released: 20 BBL | Recovered: 20 BBL | Lost: 0 BBL.
Is the concentration of chloride in the produced water >10,000 mg/l	Yes
Condensate Released (bbls) Details	*Not answered.*
Natural Gas Vented (Mcf) Details	*Not answered.*
Natural Gas Flared (Mcf) Details	*Not answered.*
Other Released Details	*Not answered.*
Are there additional details for the questions above (i.e. any answer containing Other, Specify, Unknown, and/or Fire, or any negative lost amounts)	pinhole in water transfer pump discharge connection. 20.2 bbls produced water spilled. 20 bbls recovered. spill was in lined containment.

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QUESTIONS (continued)

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 406693
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Nature and Volume of Release (continued)	
Is this a gas only submission (i.e. only significant Mcf values reported)	**No, according to supplied volumes this does not appear to be a "gas only" report.**
Was this a major release as defined by Subsection A of 19.15.29.7 NMAC	**No**
Reasons why this would be considered a submission for a notification of a major release	*Unavailable.*
With the implementation of the 19.15.27 NMAC (05/25/2021), venting and/or flaring of natural gas (i.e. gas only) are to be submitted on the C-129 form.	

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	True
The impacted area has been secured to protect human health and the environment	True
Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices	True
All free liquids and recoverable materials have been removed and managed appropriately	True
If all the actions described above have not been undertaken, explain why	*Not answered.*
Per Paragraph (4) of Subsection B of 19.15.29.8 NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please prepare and attach a narrative of actions to date in the follow-up C-141 submission. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC), please prepare and attach all information needed for closure evaluation in the follow-up C-141 submission.	

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.

I hereby agree and sign off to the above statement	Name: James Raley Title: EHS Professional Email: jim.raley@dvn.com Date: 11/26/2024

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QUESTIONS (continued)

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 406693
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Site Characterization	
Please answer all the questions in this group (only required when seeking remediation plan approval and beyond). 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 in feet below ground surface (ft bgs)	Between 100 and 500 (ft.)
What method was used to determine the depth to ground water	Direct Measurement
Did this release impact groundwater or surface water	No
What is the minimum distance, between the closest lateral extents of the release and the following surface areas:	
A continuously flowing watercourse or any other significant watercourse	Greater than 5 (mi.)
Any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)	Greater than 5 (mi.)
An occupied permanent residence, school, hospital, institution, or church	Greater than 5 (mi.)
A spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes	Between 1 and 5 (mi.)
Any other fresh water well or spring	Between 1 and 5 (mi.)
Incorporated municipal boundaries or a defined municipal fresh water well field	Greater than 5 (mi.)
A wetland	Between ½ and 1 (mi.)
A subsurface mine	Greater than 5 (mi.)
An (non-karst) unstable area	Greater than 5 (mi.)
Categorize the risk of this well / site being in a karst geology	Low
A 100-year floodplain	Greater than 5 (mi.)
Did the release impact areas not on an exploration, development, production, or storage site	No

Remediation Plan	
Please answer all the questions that apply or are indicated. This information must be provided to the appropriate district office no later than 90 days after the release discovery date.	
Requesting a remediation plan approval with this submission	Yes
Attach a comprehensive report demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined, pursuant to 19.15.29.11 NMAC and 19.15.29.13 NMAC.	
Have the lateral and vertical extents of contamination been fully delineated	Yes
Was this release entirely contained within a lined containment area	Yes
Per Subsection B of 19.15.29.11 NMAC unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.	
On what estimated date will the remediation commence	10/30/2024
On what date will (or did) the final sampling or liner inspection occur	10/30/2024
On what date will (or was) the remediation complete(d)	10/30/2025
What is the estimated surface area (in square feet) that will be remediated	7025
What is the estimated volume (in cubic yards) that will be remediated	0
These estimated dates and measurements are recognized to be the best guess or calculation at the time of submission and may (be) change(d) over time as more remediation efforts are completed.	
The OCD recognizes that proposed remediation measures may have to be minimally adjusted in accordance with the physical realities encountered during remediation. If the responsible party has any need to significantly deviate from the remediation plan proposed, then it should consult with the division to determine if another remediation plan submission is required.	

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QUESTIONS (continued)

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 406693
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Remediation Plan (continued)	
Please answer all the questions that apply or are indicated. This information must be provided to the appropriate district office no later than 90 days after the release discovery date.	
This remediation will (or is expected to) utilize the following processes to remediate / reduce contaminants:	
(Select all answers below that apply.)	
Is (or was) there affected material present needing to be removed	Yes
Is (or was) there a power wash of the lined containment area (to be) performed	Yes
OTHER (Non-listed remedial process)	*Not answered.*
Per Subsection B of 19.15.29.11 NMAC unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.	
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.	
I hereby agree and sign off to the above statement	Name: James Raley Title: EHS Professional Email: jim.raley@dvn.com Date: 11/26/2024
The OCD recognizes that proposed remediation measures may have to be minimally adjusted in accordance with the physical realities encountered during remediation. If the responsible party has any need to significantly deviate from the remediation plan proposed, then it should consult with the division to determine if another remediation plan submission is required.	

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QUESTIONS (continued)

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 406693
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Liner Inspection Information	
Last liner inspection notification (C-141L) recorded	**396172**
Liner inspection date pursuant to Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC	**10/30/2024**
Was all the impacted materials removed from the liner	**Yes**
What was the liner inspection surface area in square feet	**7025**

Remediation Closure Request	
Only answer the questions in this group if seeking remediation closure for this release because all remediation steps have been completed.	
Requesting a remediation closure approval with this submission	Yes
Have the lateral and vertical extents of contamination been fully delineated	**Yes**
Was this release entirely contained within a lined containment area	**Yes**
What was the total surface area (in square feet) remediated	7025
What was the total volume (cubic yards) remediated	0
Summarize any additional remediation activities not included by answers (above)	Liner Inspection Completed

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 (in .pdf format) 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.

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.

I hereby agree and sign off to the above statement	Name: James Raley Title: EHS Professional Email: jim.raley@dvn.com Date: 11/26/2024

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CONDITIONS

Action 406693

CONDITIONS

Operator: DEVON ENERGY PRODUCTION COMPANY, LP 333 West Sheridan Ave. Oklahoma City, OK 73102	OGRID: 6137
	Action Number: 406693
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

CONDITIONS

Created By	Condition	Condition Date
rhamlet	We have received your Remediation Closure Report for Incident #NAPP2427041103 BILLIKEN 6 CTB 1, thank you. This Remediation Closure Report is approved.	11/27/2024